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Contacting Infor

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Knowledge prerequisites

To install this product, you must have:

- Experience installing and configuring applications.
- Operating system administrator experience.

Infor ION Grid

The ION Grid is a Java-based application server that provides a distributed runtime environment for other applications. Those other applications may, at any time, be added (deployed) or removed (undeployed) from a grid. The distributed nature of a grid means that an instance of the Infor ION Grid may span multiple server machines.

The ION Grid consists of several parts:

- **Host**
  A host is a server machine that is participating in a grid. The host may be a physical or a virtual machine. Each grid has at least one host but may have several. A host may be a member of more than one grid.
  
  Hosts operating in the same grid do not have to be running the same operating system as each other. A grid can contain any combination of hosts from the supported platforms.

- **Bootstrap**
  The Grid bootstrap is a JVM used to install, upgrade, and launch the grid on a specific host. The bootstrap JVM is not owned by the grid but is in fact executed as a service, registered with the operating system. It is designed to be decoupled in this way to allow the bootstrap or the Host Router (which it launches) to fail independently of each other without causing total grid failure. In the list of services, locate the grid bootstrap service. It will have a name in the format: Infor ION GRID - `gridName`.

- **Host Router**
  The Host Router is a built-in default router JVM. It is started by the bootstrap and subsequently there is exactly one Host Router per host.
  
  The host router is responsible for:
  - Establishing the communication channels use for all grid internal communication
• Starting other grid JVMs on its host (application nodes and deploy nodes)
• Presenting a fixed point for communication with the grid from external clients (for example, the grid administration ui)

• Node
A node is a JVM that is registered as being part of a grid where grid applications are running. A grid typically has several nodes running different applications. Each node is running on one of the hosts that are part of the grid.
Nodes operating in the same grid do not have to be running the same Java version as each other. A grid can contain any combination of nodes running the supported Java versions. A typical example of combining Java versions could be using 32-bit and 64-bit editions together depending on the memory requirements for a specific node or application.

• Deploy Node
Deploy Nodes are used to execute deployment, upgrades, and undeployment of applications. The deploy node is not necessarily launched on a host which is the target of an application deployment operation. Also, one Deploy Node may perform a deployment operation with several hosts as targets.

Infor ION Grid application concepts
A user of the ION Grid should be aware of the following concepts when installing and administering the grid.

Node types
A node type defines what to run in a specific node. Each node is of exactly one node type. More precisely, the node type defines what application to run in nodes of this type and may also define default values for properties (for example, heap size). Node types are defined by the application developer.

Bindings
A binding defines where and how to run nodes of a specific node type. It can be seen as an association between a node type and a set of hosts. In order to start a specific node type on a particular host, a binding that associates the node type with the host is needed. Properties needed by the node or the application running in the node may be defined per binding.
Bindings are defined when applications are installed or by a grid administrator at runtime.

Applications
A grid application is a logical grouping of one or more application modules. An application may be running in more than one node. It is then said to have more than one application instance. Applications for the grid are packaged in gar files. A gar file is a type of zip file that can be installed in a grid. It contains Java class files (.jar files) and any other resources that the application may need.
Important network topology considerations

The Infor ION Grid is a highly distributed application server where application nodes can run on many different hosts. Every node is able and will initiate communication to all Host Routers within the same grid to register itself on startup, communicate during runtime, and de-register itself on shutdown.

Due to this design, low network latency and high bandwidth are essential for proper grid operation, and so the following guidelines must be adhered to in order to avoid problems:

• All hosts should be connected using a fast network (Gigabit or faster is recommended). The network has to be reliable. Dropped network connections result in unpredictable behavior of applications installed in the grid.

• All hosts included within a grid must be located on the same network segment and ideally connected to the same switch. The grid was not designed to work across network segments. Any topology which bridges network segments will not be supported and will likely result in poor application performance.

For example, the following configurations are unlikely to meet the requirements stated above and are therefore not supported:

• Mixing hosts which are located in different data-centers or on different sites
• Mixing hosts in the DMZ and on the intranet

• All hosts should be able to communicate freely with each other without hindrance from firewall configurations.

• If a firewall is in place, rules must be defined to ensure that TCP/IP traffic can flow freely between all hosts in the Grid for all fixed ports. It is recommended that a firewall be used to ring-fence the hosts rather than between hosts to minimize the chance of misconfiguration and resulting issues.

• Anti-virus software can interfere with communication between processes. If such software is installed and running on the servers then care must be taken to ensure that exceptions are created for the Java executable used to run the Grid.

• In the case of the Windows platform, care must be taken to ensure the firewall service (Windows service named Windows Firewall) is started. This service should not be disabled or stopped as this causes inconsistent behavior where traffic is randomly filtered.

• All hosts must be configured with a static IP address.
Chapter 2: ION Grid administration tools

This section describes the administrative tools that are available for a grid and how to access these tools.

ION Grid administration tool overview

A grid includes several administration tools for managing and configuring the grid. These are:

- **Grid Management Pages**
- **Offline Configuration Manager**
- **The Grid Script Utility**
- **Grid Bootstrap Status** page

For procedures to access the management and configuration tools, see:

- [Accessing the Grid Management Pages](#) on page 11
- [Accessing the offline version of the Grid GUI](#) on page 66

For information about each of these tools, see [Troubleshooting tools](#) on page 64

Accessing the Grid Management Pages

Use a browser to access the web-based Grid Management Pages. The web-based version is the primary user interface of the Grid Management Pages even if the Swing-based Java Web Start component still is available. New functionality will however mostly be supported in the web-based user interface.

Accessing the web-based Grid Management Pages

With the following method you may access the Management Pages remotely, by using a browser.

1. Open one of the supported browsers.
2 Navigate to the URL https://server:port/ where server is the name of the server hosting the grid and port is the HTTPS port for the grid router.

**Note:** To access the Management Pages, you must have one of these roles: grid-admin, app-admin, or grid-viewer. See "Global Roles and Application Roles" in *Infor ION Grid Security Administration Guide*.

### Alternative method

The following method will open the Grid Management Pages with grid-admin as assigned role which is required to perform many of the tasks.

**Note:**
- The following method can only be used on platforms which support a graphical user interface and have a supported browser installed.
- The scripts delivered assume that the Java executable location is on the path. To verify this, open a command prompt and type `java` and press Enter. If a command not found exception occurs then Java is not on the path and should be added.

1 Open the file explorer or browser tool on the server hosting the grid and navigate to `grid_root_installation_path\bin`.

2 Run the `AdminUI.cmd` by double-clicking on it.

**Note:** You can start the legacy swing-based Grid Management UI by running `AdminUIClassic.cmd` instead.

### Accessing the Grid Management Pages through LifeCycle Manager

**Note:** Sometimes when you are accessing the Grid Management Pages or the Configuration Manager from within the LifeCycle Manager, you may be presented with a window concerning the certificates. This is because the grid uses a self-signed root certificate as the issuer of grid certificates (client, host, SSL). Certificates issued by the grid root certificates are not by default trusted in browsers and in the Lifecycle Manager client like certificates issued by public certificate authorities such as VeriSign, EnTrust, and Thawte are. In order to permanently trust certificates, the grid root certificate must be imported into the Trusted Root Certificates store in each browser used. This situation is the same for the Lifecycle Manager client.

To access the Grid Management Pages through the LifeCycle Manager

1 In the LifeCycle Manager (LCM), select the **Applications** tab in the left pane and locate your grid.

2 Once you have located the particular grid you want to open the Grid Management Pages for, double-click it. This will open the dashboard for this grid in the right pane.
3 On the Tasks tab in the right pane, click the Grid Management Pages link. This will open the Management Pages in a new tab.

Grid Management Pages overview

The Grid Management Pages allows you to manage the grid in a browser. The top bar is the starting point of all navigation in the web user interface. It displays these top category pages:

- Home
- Hosts
- Applications
- Nodes
- Monitoring
- Security
- Configuration

The top bar also displays a search bar, current user information, Grid name, and a context menu for grid-wide tasks. This table shows the items in the grid-wide context menu:

<table>
<thead>
<tr>
<th>Top menu item</th>
<th>Description</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>About</td>
<td>Displays information about the current Grid and shows license information about third party libraries.</td>
<td></td>
</tr>
<tr>
<td>Show Hotkeys</td>
<td>Describes keyboard shortcuts.</td>
<td></td>
</tr>
<tr>
<td>UI Personalization</td>
<td>Allows enabling selected custom user interface preferences.</td>
<td></td>
</tr>
<tr>
<td>Error Codes</td>
<td>Displays Grid-specific error codes.</td>
<td></td>
</tr>
<tr>
<td>Reset Log Counters</td>
<td>Starts a task that immediately resets the log counters for all nodes in the grid.</td>
<td></td>
</tr>
<tr>
<td>Change Grid Name</td>
<td>Enables changing the display name of the grid.</td>
<td>See Changing of the display name of a grid on page 43</td>
</tr>
<tr>
<td>Set Grid Offline</td>
<td>Starts a task that immediately sets the grid offline.</td>
<td>See Putting applications or parts of the Grid in an offline state on page 58</td>
</tr>
<tr>
<td>Stop Grid</td>
<td>Starts a task that immediately stops the grid.</td>
<td>See Stopping the Grid on page 60</td>
</tr>
<tr>
<td>Sign Out</td>
<td>Immediately signs out the current user.</td>
<td></td>
</tr>
</tbody>
</table>
Home

The **Home** page is the first page of the Grid user interface. In addition to the top menu and drop-down menu, which are available from all sub-pages of the Grid user interface, the **Home** page contains a collection of widgets:

- List of notifications from events in the Grid that can be filtered by error, warning, or info
- List of hosts in the Grid, noting the number of running nodes and CPU and memory usage
- List of applications

Hosts

The **Hosts** page shows all hosts in the grid. The page can be viewed as individual cards, or as a list.

Hosts card view

The name and the address of the host are displayed in the header of each card. This table shows the items in the summary host card:

<table>
<thead>
<tr>
<th>Summary card items</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Host is</strong></td>
<td>Displays the state of the host including Started, Stopped, or Offline.</td>
</tr>
<tr>
<td><strong>Errors</strong></td>
<td>Lists the number of errors in all node logs for the host since the Reset Log Counter was used. You can click the link to show the detail card.</td>
</tr>
<tr>
<td><strong>Warnings</strong></td>
<td>Lists the number of warnings in all node logs for the host since the Reset Log Counters was used. You can click the link to show the detail card.</td>
</tr>
<tr>
<td><strong>CPU</strong></td>
<td>Current CPU used by the host.</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>Current memory used by the host.</td>
</tr>
</tbody>
</table>

Select a host card to open the detail card and access the host context menu.

This table shows the additional items in the detailed host card:

<table>
<thead>
<tr>
<th>Detailed host card items</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Host Group</strong></td>
<td>Shows which host group this host belongs to, if any. <strong>Note</strong>: This item is only visible if the specific Grid has defined host groups.</td>
</tr>
<tr>
<td><strong>Operating System</strong></td>
<td>The type and version of the host OS.</td>
</tr>
<tr>
<td><strong>Version</strong></td>
<td>Version of the Grid installed on the host.</td>
</tr>
</tbody>
</table>
### Detailed host card items

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Each node running on the host is represented by a miniature card. See Node card view on page 20 for details.</td>
</tr>
<tr>
<td>The context menu contains additional host-related views and actions.</td>
</tr>
</tbody>
</table>

This table shows the items in the host context menu:

<table>
<thead>
<tr>
<th>Host context menu items</th>
<th>Description</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bootstrap</strong></td>
<td>The page displays Bootstrap service information, such as version and status, for the selected host.</td>
<td>See <a href="#">Grid Bootstrap Status Page</a> on page 25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>See <a href="#">Opening the Bootstrap status page</a> on page 25</td>
</tr>
<tr>
<td>Application Folders</td>
<td>The page lists the folders and files of the applications installed on the host.</td>
<td></td>
</tr>
<tr>
<td>System Resource Folder</td>
<td>The page lists Grid runtime binaries installed on the host.</td>
<td></td>
</tr>
<tr>
<td><strong>Stop</strong></td>
<td>Stops the host, including all routers and nodes.</td>
<td>Note: Stopping the last host will take down the whole Grid, making it impossible to access the Admin UI. In this case, you must restart the host from command line using the <code>&lt;GRID_INSTALL_FOLDER&gt;/bin/StartHostScript</code></td>
</tr>
<tr>
<td><strong>Set Offline/Online</strong></td>
<td>Sets the host offline or online. The nodes running on the host will not accept any new requests until it is online again.</td>
<td>See <a href="#">To put hosts in an offline state</a> on page 58</td>
</tr>
<tr>
<td><strong>Start Node</strong></td>
<td>States a node on the host.</td>
<td>See <a href="#">To start grid nodes through the Hosts tab</a> on page 61</td>
</tr>
<tr>
<td><strong>Stop all Nodes</strong></td>
<td>Stops all application nodes on the host. Router nodes are not affected.</td>
<td></td>
</tr>
<tr>
<td><strong>Change Name</strong></td>
<td>Changes the host display name.</td>
<td>See <a href="#">Changing the display name of a host</a> on page 44</td>
</tr>
</tbody>
</table>
Host context menu items | Description | Additional information
--- | --- | ---
Host Group | Links to the Host Groups tab under Configuration. The host group of this host is selected. **Note:** If there are no host groups defined in the Grid, the Host Group field is not visible. | See [Host Groups](#) on page 72.
Delete | Deletes the host from the Grid configuration. This option is only available when the host is stopped. | This can be used to clean up the Grid configuration if the physical machine no longer exists. **Note:** Deleting a host from the Grid configuration does not uninstall the host. You must run the uninstaller on the host.

**Host list view**

The host list view can be filtered and sorted by column. The host list context menu contains a subset of options included in the context menu for the detailed host card.

**Applications**

The Applications page shows all installed applications in the grid. The page can be viewed as individual cards, or as a list. You can also click **Install New** to install additional applications, as detailed in [Install New Application](#) on page 75.

**Applications card view**

The application name, and the application type and version are displayed in the header of each card. This table shows the items in the summary application card:

<table>
<thead>
<tr>
<th>Summary card items</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application is</td>
<td>Shows if the application is <strong>Online</strong> or <strong>Offline</strong>.</td>
</tr>
<tr>
<td>Run State is</td>
<td>Shows the run state of the application: <strong>OK</strong>, <strong>Not OK</strong>, <strong>Not Running</strong>, or <strong>UNKNOWN</strong>.</td>
</tr>
<tr>
<td>Uptime</td>
<td>Shows the application uptime.</td>
</tr>
</tbody>
</table>
Summary card items | Description
--- | ---
Deploy State | Shows whether the application has been deployed correctly (OK, Failed, Queued).
Configuration | Shows if the application configuration is correct (OK, Failed, or Queued).
Errors | Lists the number of errors in the application node logs since the Reset Log Counters was used. You can click a specific link to show the filtered log file.
Warnings | Lists the number of warnings in the application node logs since the Reset Log Counter was used. You can click a specific link to show the filtered log file.

Select a specific application card to view the detailed card and access the context menu for the applications.

This table shows the additional items in the detailed application card:

<table>
<thead>
<tr>
<th>Detailed application card items</th>
<th>Description</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stop application</td>
<td>Click the link to stop the application immediately.</td>
<td></td>
</tr>
<tr>
<td>Management pages</td>
<td>This link is active if application-specific management pages are available.</td>
<td>See Accessing Application Management Pages on page 75.</td>
</tr>
<tr>
<td>Host groups</td>
<td>Shows which host group this application belongs to, if any. <strong>Note:</strong> This item is only visible if the specific Grid has defined host groups.</td>
<td>An application can belong to more than one host group, but when later adding a binding for the application, only one of the host groups can be selected.</td>
</tr>
<tr>
<td>Node count</td>
<td>Shows the total number of running nodes for the application</td>
<td>Click the node count to list the nodes.</td>
</tr>
<tr>
<td>Target Min Count</td>
<td>Shows the total number of running nodes for the application and the total number of nodes that will start. The total denotes the sum of all binding min values, when the application is online and started.</td>
<td></td>
</tr>
<tr>
<td>Miniature cards for each node</td>
<td>Each application node is represented by a miniature card.</td>
<td>See Nodes card view on page 20</td>
</tr>
<tr>
<td>Context menu</td>
<td>The context menu contains additional application-related views and actions.</td>
<td></td>
</tr>
</tbody>
</table>
This table shows the items in the application context menu:

<table>
<thead>
<tr>
<th>Application context menu items</th>
<th>Description</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Properties</td>
<td>Displays the <strong>Grid Properties</strong> page filtered to the specific application. On this page, you can edit application properties and Grid properties.</td>
<td>See <a href="#">Grid Properties</a> on page 49</td>
</tr>
</tbody>
</table>
| Bindings                      | Displays existing binding and enables managing binding for application-defined node types. | See [Creating a new binding](#) on page 42  
See [To edit existing bindings](#) on page 43. |
| Role Mappings                 | Displays the **Role Mapping** page, filtered to the current application. | To manage role mappings, see "Configuring Role Mappings" topic in the *Infor ION Grid Security Administration Guide*. |
| Web components                | Enables managing application-specific web components such as REST services or web applications, if applicable.  
**Note:** The **Web Components** menu option is enabled only if the application contains a web component. | See [Managing application-specific web components](#) on page 16. |
| Connection Dispatchers        | Manage connection dispatchers. This page displays any existing connection dispatcher configurations.  
**Note:** Connection dispatchers are enabled only if the application has been configured to have connection dispatchers. | See [Connection Dispatchers](#) on page 80. |
<p>| DBC Configuration             | Displays the <strong>Database Connection Configurations</strong> (DBC) page that lists existing configurations. | See <a href="#">Adding a DBC Configuration</a> on page 81. |
| Log Levels                    | Displays the <strong>Monitoring &gt; Log Levels</strong> &gt; page, filtered to the relevant application. | See <a href="#">Configuring temporary log levels for applications</a> on page 31. |
| Application Model             | Displays the XML that defines the application model. | |</p>
<table>
<thead>
<tr>
<th><strong>Application context menu items</strong></th>
<th><strong>Description</strong></th>
<th><strong>Additional information</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Deployment</td>
<td>Displays the page for managing the deployment of the application on hosts or host groups.</td>
<td>See <a href="#">Application deployment</a> on page 76.</td>
</tr>
<tr>
<td>Deployment Operations</td>
<td>Displays the deployment operations performed for the application.</td>
<td>See <a href="#">Deployment Operations</a> on page 82.</td>
</tr>
<tr>
<td>Import/Export</td>
<td>Enables exporting and storing the application settings as a document to store outside the Grid. This document can be imported at a later date to any Grid that supports the feature.</td>
<td>See <a href="#">Importing and exporting</a> on page 82.</td>
</tr>
<tr>
<td>Reset Log Counters</td>
<td>Starts a task that resets all log counters for the application nodes, that is, the warning and error count displayed on each node miniature card</td>
<td></td>
</tr>
<tr>
<td>Start Node</td>
<td>Starts an application node.</td>
<td>See <a href="#">Starting grid nodes through the Applications tab</a> on page 61.</td>
</tr>
<tr>
<td>Start initial Nodes</td>
<td>Starts all application bindings with an initial count &gt; 0. Will start as many nodes as the initial count. Will not start anything if the number of running nodes already is equal or greater than the initial count.</td>
<td></td>
</tr>
<tr>
<td>Set Offline</td>
<td>Sets the application offline.</td>
<td>See <a href="#">Putting applications in an offline state</a> on page 58.</td>
</tr>
</tbody>
</table>

**Applications list view**

The applications list view can be filtered and sorted by column. The application list context menu contains a subset of the options included in the context menu for the detailed application card.
Nodes

The Nodes page shows all running nodes in the grid. The page can be viewed as individual cards, or as a list. You can also click Start Node to start an additional node, as detailed in Starting a new node on page 85.

Nodes card view

The node name, and the JVM ID are displayed in the header of each card. This table shows the items in the summary node card:

<table>
<thead>
<tr>
<th>Summary card items</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entity type</td>
<td>Shows either node or router.</td>
</tr>
<tr>
<td>Node is</td>
<td>Shows that the node is in any of these statuses:</td>
</tr>
<tr>
<td></td>
<td>• OK</td>
</tr>
<tr>
<td></td>
<td>• Offline</td>
</tr>
<tr>
<td></td>
<td>• Stopping</td>
</tr>
<tr>
<td></td>
<td>• Starting</td>
</tr>
<tr>
<td></td>
<td>• Not Responding</td>
</tr>
<tr>
<td></td>
<td>• Stale</td>
</tr>
<tr>
<td></td>
<td>• Failed</td>
</tr>
<tr>
<td></td>
<td>• Limited</td>
</tr>
<tr>
<td>Uptime</td>
<td>Shows how long the node has been running for, or the time since the node last started.</td>
</tr>
<tr>
<td>Errors</td>
<td>Lists the numbers of errors in the node log since the Reset Log Counters was used. You can click a specific link to show the filtered log file.</td>
</tr>
<tr>
<td>Warnings</td>
<td>Lists the number of warnings in the node log since the Reset Log Counters was used. You can click a specific link to show the filtered log file.</td>
</tr>
</tbody>
</table>

Select a specific node card to view the detailed card and access the context menu for nodes.

This table shows the additional items in the detailed node card:

<table>
<thead>
<tr>
<th>Detailed node card items</th>
<th>Description</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stop Node</td>
<td>Click the link to stop the node immediately.</td>
<td></td>
</tr>
<tr>
<td>Management pages</td>
<td>This link is active if node-specific management pages are available.</td>
<td></td>
</tr>
<tr>
<td>Application</td>
<td>Shows either SYSTEM or the name of the application.</td>
<td></td>
</tr>
<tr>
<td>Detailed node card items</td>
<td>Description</td>
<td>Additional information</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>Host</td>
<td>Shows the grid host in which the node is running.</td>
<td></td>
</tr>
<tr>
<td>PID</td>
<td>Shows the system Process ID (PID) for the node.</td>
<td></td>
</tr>
<tr>
<td>Debug Port</td>
<td>Shows the port opened for debugging.</td>
<td>Only if the host router node is started in debug mode.</td>
</tr>
<tr>
<td>CPU</td>
<td>Shows the approximate CPU usage.</td>
<td></td>
</tr>
<tr>
<td>Memory</td>
<td>Shows the heap memory usage.</td>
<td></td>
</tr>
<tr>
<td>Log</td>
<td>Shows the link where you can view the node specific log.</td>
<td></td>
</tr>
<tr>
<td>Modules</td>
<td>Shows the modules in the node, including their status. This field also shows the router that has ports allocated in it.</td>
<td>Non-router nodes only.</td>
</tr>
<tr>
<td>Ports</td>
<td>Gives an overview of the ports the node has allocated.</td>
<td>Router nodes only.</td>
</tr>
<tr>
<td>Context menu</td>
<td>The context menu contains additional node-related views and actions.</td>
<td></td>
</tr>
</tbody>
</table>

**Node context menu**

This table shows the items in the node context menu.

<table>
<thead>
<tr>
<th>Node context menu items</th>
<th>Description</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Properties</td>
<td>Displays all the node properties, Java system properties, and operation system environment variables for this node.</td>
<td>It is possible to filter the content when searching for a specific property or value.</td>
</tr>
<tr>
<td>Log Levels</td>
<td>Displays the log levels for this node. Changes are applied immediately, and are only valid until this specific node is stopped.</td>
<td>See Configuring temporary log levels for specific nodes on page 32.</td>
</tr>
<tr>
<td>Threads</td>
<td>The view presents a tree view of active threads in the node. Click a thread name to view stack trace, CPU usage, and other details.</td>
<td>See Viewing threads on page 65.</td>
</tr>
<tr>
<td>Counters</td>
<td>This view presents the counters for the node.</td>
<td>See Viewing counters on page 38.</td>
</tr>
</tbody>
</table>
### Node context menu items

<table>
<thead>
<tr>
<th><strong>Node context menu items</strong></th>
<th><strong>Description</strong></th>
<th><strong>Additional information</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Proxies</td>
<td>Lists all proxies registered in this node, including the type of proxy as well as the key expression.</td>
<td></td>
</tr>
<tr>
<td>Classpath</td>
<td>Displays the classpaths for the modules in the node. Expand each module to view the classpaths.</td>
<td></td>
</tr>
<tr>
<td>Client Connections</td>
<td>Lists the number of active proxy clients connected to this node.</td>
<td>Routers only.</td>
</tr>
<tr>
<td>Connection Dispatchers</td>
<td>Lists all connection dispatchers for the host, grouped by router.</td>
<td>Routers only. See <a href="#">Connection Dispatchers</a> on page 80.</td>
</tr>
<tr>
<td>Connection Handlers</td>
<td>Lists the connection handles active in this node, as well as the number of active connections.</td>
<td>Application nodes only.</td>
</tr>
<tr>
<td>Node Capacity</td>
<td>Enables setting a threshold for the relative number of requests accepted for this node.</td>
<td>See <a href="#">Node Capacity</a> on page 84.</td>
</tr>
<tr>
<td>Reset Log Counters</td>
<td>Starts a task that clears the error and warning counters for this node, both system and application counters.</td>
<td></td>
</tr>
<tr>
<td>Set Offline/Online</td>
<td>Sets the node offline. The node will not accept any new requests until it is set Online again.</td>
<td>See <a href="#">To put individual application nodes in an offline state</a> on page 59.</td>
</tr>
<tr>
<td>Thread Dump</td>
<td>Starts a task that creates a thread dump for the node.</td>
<td></td>
</tr>
<tr>
<td>Heap Dump</td>
<td>Starts a task that creates a heap dump for the node.</td>
<td></td>
</tr>
</tbody>
</table>

### Node list view

The nodes list view can be filtered and sorted by column. The node list context menu contains a subset of the options included in the context menu for the detailed node card.
Monitoring

The Monitoring page is the starting point for the monitoring information and tasks in Grid Management pages. The top category page contains these pages:

<table>
<thead>
<tr>
<th>Monitoring pages</th>
<th>Description</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring</td>
<td>This page enables configuring event filters for monitoring purposes.</td>
<td>See Configuring filtered views for events on page 39.</td>
</tr>
<tr>
<td>Log Files</td>
<td>This page enables viewing log files.</td>
<td>See To view log files for old nodes currently running on page 29.</td>
</tr>
<tr>
<td>Log Levels</td>
<td>This page enables configuring the log levels for all modules in the Grid.</td>
<td>See Configuring temporary log levels grid-wide on page 32.</td>
</tr>
<tr>
<td>HttpTrace Logging</td>
<td>This page enables logging HTTP traffic details.</td>
<td>See HTTP Trace logging on page 67.</td>
</tr>
<tr>
<td>Log Archiver</td>
<td>This page enables configuring the log archive management in terms of scheduling and purging.</td>
<td>See Log Archiver on page 33.</td>
</tr>
<tr>
<td>Alarms</td>
<td>This page shows alarms for applications modules that cannot carry out all tasks. When the problem is resolved, the alarm is automatically cleared.</td>
<td>See Alarms on page 38.</td>
</tr>
<tr>
<td>Notifications</td>
<td>This page shows notifications for events in the Grid.</td>
<td>See Notifications on page 38.</td>
</tr>
<tr>
<td>Status Report</td>
<td>This page enables creating a Grid status report.</td>
<td>See Generating a Grid status report on page 33.</td>
</tr>
<tr>
<td>Tasks</td>
<td>This page shows the tasks that have resulted in downloadable resources, such as Grid status reports and thread dumps.</td>
<td></td>
</tr>
</tbody>
</table>

Security

Most information about security-related topics is covered in the Infor ION Grid Security Administration Guide.
<table>
<thead>
<tr>
<th>Security pages</th>
<th>Description</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security</td>
<td>The Security tab consists of sections, HTTP Security settings, and Users, which displays the roles connected to your current user.</td>
<td>See Configurable headers chapter, in the Infor ION Grid Security Administration Guide.</td>
</tr>
<tr>
<td>Role mappings</td>
<td>This page displays the role mapping for all applications.</td>
<td>For more information about managing role mappings, see Configuring Role Mappings in the Infor ION Grid Security Administration Guide.</td>
</tr>
<tr>
<td>Sessions</td>
<td>This page displays current sessions.</td>
<td>For each session, the principal, its roles, the origin of the call that established the session, the component that established the session, and its expiry time are listed. It is also possible to delete sessions prematurely.</td>
</tr>
<tr>
<td>Client certificates</td>
<td>This page enables managing client certificates.</td>
<td>See Managing client certificates in the Grid Management Pages in the Infor ION Grid Security Administration Guide.</td>
</tr>
<tr>
<td>Identities</td>
<td>This page enables managing identities.</td>
<td>See Managing HTTPS identities in the Grid Management Pages in the Infor ION Grid Security Administration Guide.</td>
</tr>
<tr>
<td>OAuth Credentials</td>
<td>This page enables managing OAuth credentials.</td>
<td>See Configuring OAuth consumer credentials in the Infor ION Grid Security Administration Guide.</td>
</tr>
<tr>
<td>Audit</td>
<td>This page enables managing auditing.</td>
<td>See Configuring audit in the Infor ION Grid Security Administration Guide.</td>
</tr>
</tbody>
</table>
Configuration

<table>
<thead>
<tr>
<th>Configuration pages</th>
<th>Description</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grid Properties</td>
<td>This page enables configuring Grid Properties on different levels, grid-wide, or per host, application, node type, or binding.</td>
<td>See <a href="#">Grid Properties</a> on page 49.</td>
</tr>
<tr>
<td>JDBC Drivers</td>
<td>This page enables managing the available JDBC drivers.</td>
<td>See <a href="#">JDBC Drivers</a> on page 53.</td>
</tr>
<tr>
<td>Application Repository</td>
<td>This page shows a table over all Grid Application Archives (.gar files) that have been uploaded. It also enables uploading and installing grid applications.</td>
<td>See <a href="#">Application Repository</a> on page 75.</td>
</tr>
<tr>
<td>Runtime History</td>
<td>This page enables comparing two version of the Runtime history.</td>
<td></td>
</tr>
<tr>
<td>Endpoints</td>
<td>This page shows the endpoints available in the Grid that is published on the router your browser is accessing.</td>
<td></td>
</tr>
<tr>
<td>Routers</td>
<td>This page shows the available routers and their configuration.</td>
<td></td>
</tr>
<tr>
<td>Host Groups</td>
<td>This page enables defining host groups.</td>
<td>See <a href="#">Host Groups</a> on page 72.</td>
</tr>
</tbody>
</table>

Grid Bootstrap status page

The Grid Bootstrap status page can be used to monitor the bootstrap process for the Grid Agent on the host that the bootstrap service is running on.

Opening the Bootstrap status page

To open the Bootstrap status page from the Grid Management pages:

1. Navigate to the Hosts page.
2. Click a host card.
3. On the host detail card menu, select Bootstrap.
Copy the address url and paste it in the address field of a web browser.

To open the Bootstrap status page from the Grid host (Windows hosts only):

1. Open the file explorer or browser tool and navigate to `grid_root_installation_path`.
2. Double click on the `BootstrapWebUI-xxxxx` where `xxxxx` is the port on which the bootstrap HTTP interface is running.

To open the Bootstrap status page directly (from other hosts or clients), in a browser, access the bootstrap WebUI link at `http://server:port` where `server` is the name of the server hosting the grid and `port` is the HTTP port for the bootstrap process which can be found in the bootstrap sub menu of a detail host card in the Hosts page of the Grid Management Pages or by locating the value in the `grid_root_installation_path/config/bootstrap.properties` file.

**The Bootstrap status page**

The Bootstrap status page contains this information:

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infor ION Grid header</td>
<td>Below this header the name of the Grid, host and current Bootstrap and Grid version numbers are displayed.</td>
</tr>
<tr>
<td>Status section</td>
<td>In this section the Status, Last Updated time, and the last known status of the Host Router is displayed.</td>
</tr>
<tr>
<td></td>
<td>The Bootstrap Status indicates the overall combined status of the Bootstrap and Host Router:</td>
</tr>
<tr>
<td></td>
<td>• OK: Indicates that no warnings or errors have been encountered.</td>
</tr>
<tr>
<td></td>
<td>• WARN: Indicates that a problem was encountered. Once the problem is resolved, for example the Host Router dies and is successfully restarted, the status will revert to OK.</td>
</tr>
<tr>
<td></td>
<td>• FATAL: Indicates a fatal error that will most likely require user intervention and possibly a restart of the Bootstrap service. Whenever a fatal error that causes the Bootstrap service to become suspended has occurred, a Resume link is displayed next to the status which allows an administrator to signal the Bootstrap to resume operations. An example of such a fatal error is when the Bootstrap fails to create a database connection due to invalid database user or password; in this case the Bootstrap service will be suspended as it cannot continue operations until an administrator signals (Resume) that the problem has been resolved.</td>
</tr>
<tr>
<td></td>
<td>Last Updated is a timestamp when the status of Bootstrap was last updated on the server.</td>
</tr>
<tr>
<td></td>
<td>Host Router status is a list of time-stamped status changes indicating when the Host Router was started or stopped. Clicking the status and timestamp link will display a history of previous states of the Host Router.</td>
</tr>
</tbody>
</table>
This section details the tasks the Bootstrap service is currently performing.

This section lists the previous Bootstrap service activities.

### Description of the Current Activities and History section

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity ID number</td>
<td>Activity ID number</td>
</tr>
<tr>
<td>Activity</td>
<td>The name of the activity, see the Activity Types table.</td>
</tr>
<tr>
<td>Description</td>
<td>A short description of the activity</td>
</tr>
<tr>
<td>Message</td>
<td>A more detailed message. Clicking the row will expand the row to see the full message. Details relating to warnings and errors are displayed in the message column and included when the warning or error first occurred, last occurred and number of times the same warning or error has occurred.</td>
</tr>
<tr>
<td>Started</td>
<td>Displays the time the activity was initially started.</td>
</tr>
<tr>
<td>Last Updated</td>
<td>Displays the last time the status of the activity was updated.</td>
</tr>
</tbody>
</table>

### Activity types

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>START_STATUS_SERVER</td>
<td>Indicates that the Bootstrap service is starting.</td>
</tr>
<tr>
<td>DATABASE_VERSION_CHECK</td>
<td>Indicates the Bootstrap service is verifying whether the database is the correct version. If this check fails, startup of the Bootstrap will be suspended until the database check passes. The Bootstrap startup being suspended is a normal procedure during an upgrade of the Bootstrap service and Grid.</td>
</tr>
<tr>
<td>START</td>
<td>Indicates the Bootstrap service is starting the Host Router.</td>
</tr>
<tr>
<td>STOP</td>
<td>Indicates the Bootstrap service is stopping the Host Router.</td>
</tr>
<tr>
<td>Activity</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>CHECK</td>
<td>Indicates that the consistency check activity is active. The consistency check is responsible for keeping the Host Router alive as well as report any inconsistencies such as database connectivity issues.</td>
</tr>
<tr>
<td>INSTALL</td>
<td>Indicates the Grid is being installed and will only run once for each host.</td>
</tr>
<tr>
<td>UPGRADE</td>
<td>Indicates the Bootstrap service is upgrading the Grid and the Bootstrap to a new version.</td>
</tr>
<tr>
<td>PREPARE_UPGRADE</td>
<td>Indicates the Bootstrap service is in the process of preparing an upgrade of the Grid and the Bootstrap service.</td>
</tr>
</tbody>
</table>

The Settings menu
Clicking the cog icon in the right corner displays the Settings menu.

These settings are available:

<table>
<thead>
<tr>
<th>Menu option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto Refresh</td>
<td>Turns the auto refresh of the status page on and off.</td>
</tr>
<tr>
<td>Debug</td>
<td>View if debug log level is enabled or disabled. See the tooltip on how to enable or disable debug.</td>
</tr>
<tr>
<td>View Log</td>
<td>View the Bootstrap service log file.</td>
</tr>
</tbody>
</table>
Chapter 3: Monitoring the Grid

Log files and reports

Viewing log files

At least two log files are associated with each grid node, one containing the system log entries and one or more containing the application-specific log entries. System log entries are those generated by the grid as the container for the application running in the node; examples might include bootstrapping information such as Grid and Java versions. Application log entries are those generated by the application and relate specifically to functionality in the application; an application may declare more than one log file. Because each application is running in one or more grid nodes, you can obtain valuable information about an application by viewing these log files. You typically access log files from the Applications, Nodes, or Log Files pages. Once a log file is opened, you can filter and search for relevant information. It is also possible to view log files of old nodes that are no longer running and to download log files in order to, for example, email them to someone.

Viewing log files

1 Log files can be accessed from the Applications, Nodes and Log Files pages.
2 Click the appropriate link, depending on which page you are on.
   • On the Applications page, select an application by clicking the application card. Then click the log icon in one of the Node cards.
     On the Node list page a log icon is available on each row in the list of nodes. Click the icon to open the log for that node.

Viewing log files for old nodes or nodes not currently running

Note: This procedure is useful to access log files for nodes that have crashed. The log files in that case are not accessible by the usual means.
1 Select the Monitoring tab and then the Log Files tab.
2 In the list of log files, click the link in the File Name column for the log file you want to view.
You can also download log files. Click the Download link in the last column for the log file you want to download.
You can click a column header to sort log files. Clicking a column header again will toggle between ascending and descending order. Use the text field to filter the view. Specify a search word and then press Enter.

Configuring logging levels
The log level can be configured on multiple levels. The configuration is found in slightly different ways for each level.

Note: By activating more detailed logging, logs can fill up quickly. If activating debug or trace logging, remember to switch back the log levels after capturing an event in the log.

To configure grid-wide logging levels
1. Access the Grid Management Pages as a user with the grid-admin role.
2. Click Configuration.
3. Find the Node log level property (in the Node Logging property group) and click on the link in the Value column. The link is either "<undefined>" or a list of log levels such as "ERROR,WARN,INFO,NOTE."
4. Select the applicable log levels. Click Create Property or Update Property.

To configure router logging levels
1. Access the Grid Management Pages as a user with the grid-admin role.
2. Click Configuration.
3. Find the Node log level property (in the Node Logging property group) and click the "Node log level" link (not the link in the Value column).
4. To change the log level of a particular router, click on the link on the row for that router in either the "Any host" column or the column for a particular host. If a particular host is selected, the logging levels set will only affect the selected router on that host.
5. Click Create Property or Update Property.

To configure application logging levels
To set the application log level it is either possible to follow the instructions for router levels above or to do the following:
1. Access the Grid Management Pages as a user with the grid-admin role.
2. Click Applications.
3 Click the application to configure log levels for.
4 In the context menu drop-down in the upper right corner, click on Properties.
5 Click the Node log level property (in the Node Logging property group). To find a property quickly, use the input filter field.
6 Click Edit and then select log levels.
   **Note:** The Level Error check box cannot be cleared.
7 Click Save.
   The new log level will be applied to all nodes started after the configuration. It will not be applied to running nodes.

To configure application-level logging for a specific host

1 Access the Grid Management Pages as a user with the grid-admin role.
2 Click Applications.
3 Click the application to configure log levels for.
4 In the context menu drop-down in the upper right corner, click on Properties.
5 Click the Node log level property (in the Node Logging property group). To find a property quickly, use the input filter field.
6 In the context list to the left, find the Hosts section and click the host you want to override the log level on.
7 Click Edit and then select log levels.
   **Note:** The Level Error check box cannot be cleared.
8 Click Save.
   The new log level will be applied to all affected nodes started after the configuration. It will not be applied to running nodes.

Configuring temporary log levels for applications

The log levels can be configured temporarily for specific loggers in an application. This makes it possible to get detailed logs for a specific theme handled by that application or module while avoiding filling the logs with unnecessary noise. During trouble shooting it is useful to increase the log levels on a detailed level. The changed log levels can be reset to the property values used for all new nodes that are started.

1 Access the Grid Management Pages as user with the grid-admin role, and select Applications.
2 In the relevant application card, open the context menu and select Log levels.
3 The Log levels page displays the application name and modules for the selected application.
4 Click the application name, or module name to display all loggers.
5 Identify the relevant loggers using the logger filter.
6 Select the check boxes for the relevant loggers to change the logging. Log level changes are immediately applied.
When the required events have been captured in the logs, click the Reset icon. This resets the log level configuration to the corresponding property values, for all loggers for this application. Resetting the log levels is especially important for log levels Debug and Trace, which can have a serious impact on performance.

Configuring temporary log levels for specific nodes

The log levels can be configured temporarily for specific loggers in a given node. This makes it possible to get detailed logs for a specific theme handled by that node or module while avoiding filling the logs with unnecessary noise. During troubleshooting it is useful to increase the log levels on a detailed level. The changed log levels can be reset to the property values used for all new nodes that are started.

1. Access the Grid Management Pages as a user with the grid-admin role, and select Nodes.
2. In the relevant node card, open the context menu and select Log levels.
3. The Log levels page displays the application name and modules for the selected node.
4. Click the application name, or module name to display all loggers.
5. Identify the relevant loggers using the logger filter.
6. Select the check boxes for the relevant loggers to change the logging. Log level changes are immediately applied.
7. When the required events have been captured in the logs, click the Reset icon. This resets the log level configuration to the corresponding property values, for all loggers for this node. Resetting the log levels is especially important for log levels Debug and Trace, which can have a serious impact on performance.

Configuring temporary log levels grid-wide

The log levels can be configured temporarily for specific loggers in a running grid. This makes it possible to get detailed logs for a specific theme handled by applications, nodes, modules or loggers, while avoiding filling the logs with unnecessary noise. During troubleshooting it is useful to increase the log levels on a detailed level. The changed log levels can be reset to the property values used for all nodes.

1. Access the Grid Management Pages as user with the grid-admin role, and select Monitoring > Log Levels. The left panel displays all the applications and modules currently running in the grid.
2. Click the applicable application or module to display the individual loggers. You can also select All to display loggers for all applications and modules.
3. Identify the relevant loggers, for example by specifying the name in the logger filter.
4. Select the check boxes corresponding to the applications, module or loggers to change the logging. Log level changes are immediately applied.
5. When the required events have been captured in the logs, click the Restart icon. This resets the log level configuration to the corresponding property values, for all loggers. Resetting the log levels is especially important for log levels Debug and Trace, which can have serious impact on performance.
Generating a Grid Status report

Use this procedure to generate a Grid Status report.

The ION Grid is able to generate a report that includes a variety of information that is useful for determining the state of a grid and its deployed applications. The report will indicate problems that it finds and it will also contain log files, configuration files, and other things that may be of use for tracking down problems. Although you can use the report simply to confirm that the grid is working satisfactorily, the report is very helpful to include when you need to report a bug or problem with the ION Grid or an application running in the grid.

1. Select the Monitoring tab and then the Status Report tab.
2. Click the Calendar icon next to the From and To fields to change the log file range. The default range is one day.
3. Click Generate. The progress for generating the status report is displayed. When the report is ready, either a Save dialog box is displayed, or the generated file is downloaded. This will depend on the settings of your browser.

Viewing a Grid Status report

Use this procedure to view a Grid Status report that you have generated and downloaded as described in Generating a Grid Status report on page 33.

To view a Grid Status report

1. Unzip the saved report into a separate directory. It needs to be unzipped to work correctly. Viewing the report directly from within the zip file doesn’t work.
2. In the new directory, open the report.html document with a browser. The report.html document provides an overview of the current status. Any problems that were found are typically indicated using strong yellow or red color schemes.
3. View other report files in the directory. These include:
   - Log files for existing and old grid nodes
   - Configuration files for the grid

Log Archiver

The log archiver consists of three parts: an archiver, a purger, and a scheduler.

The archiver, when run, archives all the inactive log files on one or more hosts within the Grid. An inactive log is a log for which its node has stopped. The archives are placed in the database and can be read in the Log Archive Viewer. Whenever the log archiver is run, a notification is displayed. Notifications can be viewed on the Home screen and under Monitoring > Notifications.
The purger, when run, purges old archives in the database to free up disk space or remove archives that are no longer need to be kept.

**Note:** Log archiving will run when you are uninstalling hosts if the `archiveLogsInDatabase` flag is passed to the uninstaller. For more information, see [Remove an additional host](#) on page 70.

### Configuring automatic archiving

Configuring automatic archiving causes the archiver to run at a specific time on specific days of the week. This allows you to archive all your inactive log files at specified intervals. You can also specify rules for purging old log files automatically to manage the retention of archives and as a consequence, the size of the database.

1. Navigate to the **Log Archiver** page under the **Monitoring** tab.
2. Click **Configure**.
3. Select the days of the week and specify a time.
4. Click **OK**.

### Configuring automatic purging

Configuring automatic purging allows you to specify rules for purging old log files automatically to manage the retention of archives and as a consequence, the size of the database.

1. Navigate to the **Log Archiver** page under the **Monitoring** tab.
2. Click **Configure**.
3. In the Schedule Automated Purge section, specify the age of archives (day) you wish to retain and the maximum size of archives (MB).
4. Click **OK**.

### Manually running the Log Archiver

To manually run the Log Archiver:

1. Navigate to the **Log Archiver** page under the **Monitoring** tab.
2. Click **Run Archiver**.

### Manually running the Log Purger

To manually run the Log Purger:

1. Navigate to the **Log Archiver** page under the **Monitoring** tab.
2. Click **Purge Logs**.
3. Specify the age of archives (day) you wish to retain and the maximum size of archives (MB).
4 Click OK.

Viewing and downloading archived logs

To view archived logs, navigate to the Log Archiver page under the Monitoring tab.
All the log archives in the database are displayed in the log archives table on the left side of the page.

Monitoring tools

Monitoring the state of the Grid from the classic administration UI

Use this procedure to monitor the grid using the profiler viewer and log viewer that are available through the Grid Management Pages when these are accessed by running \[\text{grid_root_installation_path}\]/bin/AdminUIClassic.cmd. The tools are accessed through the Launch menu at the top of the window.

Profiler Viewer

This tool enables advanced low-level profiling for the grid application nodes to enable troubleshooting and advanced performance monitoring. The profiler is primarily intended for use by developers and those with a deep understanding of how the grid functions.

When you launch the tool, you will be presented with a list of the grid nodes for which profiling is enabled. That view is structured as follows:

```
Grid
Node:<node_name>/<ip_address>:<port>-<process_id>
  -<module_name>
  -<grid_proxy_name>
  -<method>
  -<counter>
```

For each of the counters you can view the following information which is valid for the duration between you starting then stopping profiling:

- Count - number of iterations of that entity
• Time (ms) - total time spent on iterations in ms
Size (KB) - total amount of data for all the iterations
Time/Count - average time spent per iteration
Size/Count - average amount of data per iteration

Menu options available in the function and descriptions are as follows:

<table>
<thead>
<tr>
<th>Menu</th>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>File</td>
<td>Open</td>
<td>Open a previously saved profile data log file.</td>
</tr>
<tr>
<td></td>
<td>Save</td>
<td>Save the current profiling data to a profile data log file.</td>
</tr>
<tr>
<td>Actions</td>
<td>Reset Profiler</td>
<td>Clear profiling data</td>
</tr>
<tr>
<td></td>
<td>Stop Profiling</td>
<td>Stop profiling data</td>
</tr>
<tr>
<td></td>
<td>Start Profiling</td>
<td>Start profiling data</td>
</tr>
<tr>
<td>View</td>
<td>Size Unit</td>
<td>Change the displayed size unit for profiled data (Bytes, Kilobytes, Megabytes).</td>
</tr>
<tr>
<td></td>
<td>Time unit</td>
<td>Change the displayed time unit for profiled data (Nanoseconds, Microseconds, Milliseconds, Seconds).</td>
</tr>
<tr>
<td></td>
<td>Expand/Collapse</td>
<td>Show Methods - expand the profile data tree to only show methods, only applicable when tree is fully collapsed.</td>
</tr>
<tr>
<td></td>
<td>Aggregation</td>
<td>• <strong>Expand All</strong>: Fully expand the profile data tree</td>
</tr>
<tr>
<td></td>
<td>Refresh</td>
<td>• <strong>Collapse All</strong>: Fully collapse the profile data tree.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Change the aggregation levels for the data.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Refresh the panel.</td>
</tr>
</tbody>
</table>

Log Viewer

The log viewer allows multiple log files to be able to be combined and searched in a merged fashion. This has multiple uses including the ability to find out what an entire grid was doing at a particular point in time, or to find all instances of a particular word or phrase.

The viewer consists of four separate panels:

• Files panel
  Use to add files either by clicking **Add** or by dragging and dropping them directly into the pane. You can select multiple files for adding by using **Shift** and **Ctrl**. Files can be either individual .log files or .zip files. If you add a .zip file, the tool recursively searched the .zip file directories and adds all .log files to the panel. This is useful for loading the contents of a Grid Status Report .zip file.
For any files that do not have a `.log` extension, you will be prompted with the option to include them.

**Note:** Adding files which do not have a `.log` extension may prevent the merging of the log files from occurring properly.

The Files panel has several buttons:

- **Add:** Adds files, either `.log` or `.zip` containing log files.
- **Remove:** Removes the selected file or if no selection is made, removes all files.
- **Invert:** Inverts the current selection of files in the panel.
- **Details:** Toggles between showing all file details, including the name, size, modified date, and the file path, and showing only the name. The default is to show all details.
- **Sort:** Sorts the list by the order in which the files were added, the file names, the size of the files, the date the files were last modified, from, and to.

**Filter panel**

Use to set filter criteria for viewing the log files. After you set the criteria, you click **Update** and the results are displayed in the Output panel (right panel).

There are several filter options:

- **Clear:** Clears the filters
- **Include Entries:** Case insensitive text search for word to include. It is possible to include OR as an operator by inserting a vertical bar (|) between the words to search for. For example, `info OR system` would be constructed as `info|system`.
- **Exclude Entries:** Case insensitive text search for word to exclude. It is possible to include OR as an operator by inserting a vertical bar (|) between the words to search for. For example, `info OR system` would be constructed as `info|system`.
- **From:** Specify a date and time from which the filtered merge should begin.
- **To:** Specify a date and time at which the filtered merge should end.
- **Update:** Update the merged log output pane based on the selected files and filter. If no files are selected in the file list pane, all files are included.

**Logs Time Span panel**

Shows the time span at which the merged entity occurred in an included log file.

To work with this panel:

- Hold the mouse cursor over an area in the panel to see the date and time shown as a tool tip. Click in the window to position the merged output pane according to the date and time displayed in the tool tip.
- Right-click in the window on a specific log file to position the merged output pane on the selected log file according to the date and time displayed in the tool tip.

**Output panel**

This panel show the merged log output. The data is ordered in the following manner:

- First, the merged sources (log files) are listed.
- Second, the results of the merge, including applied filters, are displayed.

The result lines contain identifying numbers showing which source they are from.
Viewing counters

Counters are a mechanism that measures (counts) different things that occur in a grid node and that may be of interest for monitoring and diagnosing the inner workings of an application. Counters are maintained for each grid node and they are not persisted, so the information is lost if a node is stopped.

Good examples of counters are Used Heap, which shows the memory consumption, and Total Requests, which shows how many requests have been handled by a thread pool in a node. However, there are many others.

One very important aspect of counters is that the counter value is sampled periodically and a history of counter values is maintained for each counter. This makes it possible to view things like memory usage over time and even get the information displayed as a graph.

1. Navigate to the Nodes page.
2. Click on the card of the node you want to monitor. Remember that counters belong to nodes.
3. Select Counters from the context menu of the Node detail card. A list of counters will be displayed. The displayed list shows the counters with their current value. Some counters define a valid value range. If a counter is outside of the valid range, it is marked with a yellow background. A counter that is outside of its valid range is unusual and is worth investigating.
4. Clicking on the name of a counter will display a graph with the counter values over time. At the top of the page it is possible to select units of measurement and also how often the counter history should be polled and how much of it to keep in memory.

Alarms

Alarms are used by an application to signal that they are partly in a faulty state, that is, even though all nodes are functioning (Global State is ok) it can't carry out all tasks. The alarms are raised by module, and when the module is fully functioning again, the alarm is automatically cleared.

To view the raised alarms, select Monitoring > Alarms. To get more information about a specific alarm, review the description or click the information icon (i) next to the alarm.

Notifications

The purpose of notifications is to bring the attention of Grid Administrators both to required tasks that must be performed and to inform about what has recently happened in the Grid. Notifications are created when certain actions are performed, either by an admin or by an automatic process. All notifications are stored in the Grid database up to a maximum of 10000 notifications. This default can be changed through the grid.events.max.stored property.
Viewing notifications

Notifications can both be viewed in the Notifications section on the Home page of the Grid Admin UI and on the Monitoring - Notifications page. An Atom feed is also available at https://host:port/grid/rest/events/events.atom. For monitoring what happens in a Grid, the Events REST API is a good starting point. The events REST service is located at https://host:port/grid/rest/events. The documentation for the REST API is available at https://host:port/grid/rest.

Configuring filtered views for events

On the Monitoring page an administrator can configure filtered views for certain events.

The available event types are:

- Application Event
  Generic event triggered by Grid applications.
- Application Status
  Triggered when the Global State of the specified application is NOT OK. Cool-down applies and the event is only sent once per change in state.
- Heap Usage
  Triggers when the application heap threshold is surpassed.

To add an event filter to the Monitoring page:

1. Click New Filter under the desired event type to open the New Event Filter dialog box.
2. Select what application the filter should apply to.
3. Optionally, select Edit Recipients to open the Recipients dialog box.
   a. In the Recipients dialog box, specify a valid e-mail address and click the Add button to add a recipient.
   b. Click OK to finish adding recipients.

Each card on the Monitoring page represents a filter for the event type (column) and application (row). The Event Filter card details what application the filter is for and, if e-mail notifications are enabled, the number of recipients of e-mail notifications and the number of times the event has been triggered.

- E-mail notifications can be enabled or disabled per event type and application by selecting the enable or disable button.
- To edit the e-mail recipients for a given event type and application, click on the recipients icon in the card to open the Recipients dialog box.
- To view the triggered events, click on the Triggered badge to open the Notifications page with those events displayed.

Note: For e-mail notifications to be fully enabled the following Grid Properties must be specified on the Grid Properties page:

- SMTP Server Address - required
- SMTP Server Port - optional if the default port is used
• SMTP Sender - required
• SMTP Password - required depending on security
• SMTP Security - required depending on security
Chapter 4: Changing the Grid configuration

Configuring memory given to applications

This procedure explains how to set a global application value for the Max Heap property. The Max Heap property as defined in the grid configuration controls the maximum memory amount that can be allotted at node start to an application in a particular node. This property is one of the most commonly configured properties. It enables you to accomplish the important task of ensuring that application nodes have sufficient amounts of memory.

As with any grid property, it is possible to configure the Max Heap property differently for different contexts. For example, you want an application node to have more memory if it is running on a particular host. Sometimes applications define several node types and you may want to configure the Max Heap property differently for different node types. The same goes for bindings. For more information about configuring a property for different contexts, see Grid Properties on page 49.

1. Go to Applications > Applications.
2. Select the application for which you would like to change max heap settings.
3. Select the Properties menu.
4. In the Grid Defined Properties section under Node Memory, click the row for the Max Heap property.
5. Edit the max heap for the application by clicking Edit, and then specifying the max heap size in the input field that appears. Click Save.

Note: If the max heap has been overridden or configured in several contexts, you can view and edit those values by navigating the different contexts on the left. If there is an arrow to the left of the context name, this indicates that the Max Heap value has been overridden in that context or by a child to that context.

Configuring bindings

Bindings are needed in order to start applications. A binding is a mapping from a node type, which the application defines, to a set of hosts. So, in order to start an application on a particular host, there has to be or at least one binding that associates the application (and its node type) with that host.

The bindings are also used to govern the minimum and maximum number of application node instances that should be allowed. This means that if a binding is configured with a minimum of 2, the grid will always try to make sure that at least two application node instances referenced by that binding are
running in the grid. If the number of nodes becomes fewer than the configured value, the grid will automatically start nodes until the minimum is met.

The maximum works in the same but reverse way. It is impossible to start more application node instances using this binding than the configured maximum. It should be noted that the maximum is soft-enforced, if some condition arises which means the running node count exceeds the maximum value, the Grid will not terminate a node to enforce the constraint.

It is also possible to configure the initial number of application nodes you want for a binding. If configured, the initial value will be considered when the application starts. In fact, starting applications is just a matter of honoring the initial value for all the bindings that belong to the application.

Also, as described in Grid Properties on page 49, the bindings are one of the different contexts that you may use when defining property overrides. This enables you to define different property values for your application depending on which binding is used to do the launch.

Creating a new binding

1. Go to Applications.
2. Select an Application.
3. Select Bindings.
4. Click Add New.
5. Specify this information for the binding:
   - **Name**: Specify a binding name.
   - **Type**: Select the node type to create a host binding.
   - **Hosts**: Select one or more hosts or select All, which means that the binding can be started on any host on which the application is deployed.
   - **Min**: The minimum number of nodes for this binding which should be running in the Grid according to the launch constraints, if the number of running nodes becomes lower than the minimum value set, the Grid will start additional ones.
   - **Initial**: The initial number of nodes for this binding which should be started when the grid is first started (providing that the application is not offline) or when the application is started if that is later, according to the launch constraints.
     - **Note**: For most use cases the initial setting can be left as is, using the Min and Max settings should be enough for most applications.
   - **Max**: The maximum number of nodes for this binding which should be started according to the launch constraints. Maximum values are softly-enforced meaning if a condition arises where there are
more nodes running than the maximum value, the Grid will not stop running nodes and if necessary they must be stopped manually.

**Constraint**
- **Global**: The constraints will be applied globally, that is, the number of nodes will be distributed evenly across all hosts to which the binding applies (affected by Preferred Host, see below).
- **Per Host**: The constraints will be applied to each host, that is, the number of nodes will be started on all hosts to which the binding applies.

**Preferred Host**
The preferred host on which this binding will be started, if the preferred host is not available when the consistency check is performed, the binding will be started on another host for which this binding is configured. Preferred host is only available when the constraint type is global.

**Note**: If the application is connected to one or more host groups, the only difference is that there is a choice of host group (or all host groups) instead of hosts and there is no preferred host selection.

**Editing existing bindings**

Bindings are deleted and edited through the mini-card. The fields are the same as when you create a binding. **Min**, **Initial**, and **Max** values can be edited directly on the card using the minus (-) and plus (+) icons.

In the bindings overview card, you may view the bindings as a list by selecting the **Show as List** check box. You can also filter bindings by specifying any of the binding fields in the **Filter** field. If you are using a filter, the number of matched bindings and the total number of bindings will show next to the filter.

**Changing the display name of a grid**

Use this procedure to change the display name for a grid. When you create a grid, you provide a name for the grid that then appears in various management tools. However, at a later date, you may want to change the name, especially if the name no longer matches what you use the grid for.

Note that changing the display name of a grid does not change the name of the directory where grid configuration information is stored. The directory name will still match the original name of the grid.

1. On the top UI menu (located in the top right corner), click on **Change Grid Name**.
2. In the dialog box, specify a new name and click **Apply**.
Changing the display name of a host

Use this procedure to change the display name for a host in the grid. When you installed the grid (and when adding a scale-out host), you provide a name for the grid that then appears in various management tools. However, at a later date, you may want to change the name, especially if the name no longer matches what you use the host for. Note that changing the display name of a host does not change the name in the configuration, it simply creates an alias for display purposes.

1. Go to Hosts.
2. Select the host you want to rename.
3. Select the Change Name menu option.
4. In the dialog box, specify a new name and click Apply.

Comparing runtime history

Whenever changes are made to the runtime configuration, a new version of runtime.xml is saved in the Grid database. The runtime.xml describes the runtime configuration for the Grid, which all hosts access. You can view older versions of runtime.xml, see a description of the changes in each version, and compare two versions of runtime.xml.

To compare runtime history:

1. Navigate to Configuration.
2. Select Runtime History.
   
   A list of the most recent versions of the runtime.xml file is displayed.
3. Select two check boxes in the list and click Compare.
   
   The change set is displayed.
4. In the compare dialog, it is possible to do a quick compare of two other runtime configurations given their index or name. The name can be found in an optionally displayed column in the runtime history table.

Changing how JVMs are launched on the OS process level

All grid nodes including Host Router, router and application nodes are JVMs. When a grid node is started on a host, by default the new node is started using the same JDK or JRE as the Host Router on that host is running on. However, at times you may want to influence how the JVM processes are started in the operating system.

For example:
• You want a particular application to be launched using a particular JDK or JRE that is different from the one used by the grid agent.
• You have an application that is monopolizing a resource (such as CPU) and you want to constrain the application nodes to a subset of the available CPU cores on a host.

You want JVM processes belonging to a particular application to be launched using a specific user that is different from the user running the grid agent process.

Regardless of example or needs, the way you change how JVM processes are launched is as follows:

1 Create a host operating system specific script file that launches the JVM process in the way you want.
2 Override the Java Executable grid property so that it points to the script file created above. The scripts are most likely OS- and host-specific, so the recommendation is to define the property overrides in different host contexts.

Requirements for script files that launch new JVMs

Obviously, the script file should in one way or the other launch a JVM since that is the purpose of the script, but there are additional requirements that the script has to comply with

1 The script must be passed all arguments that the grid would normally pass to the JVM during launch. Those arguments define what type of grid node to create. The script is responsible for propagating all those arguments to the JVM that is started by the script.
2 The script may terminate in one of two possible ways:
   • The script may block and not terminate until the launched JVM (grid node) terminates.
   • The script may asynchronously launch the JVM and exit with a return code of zero (0). A return code other than zero will be considered an error by the grid.

Overriding the Java Executable grid property

Example scenarios with different scripts are described below. Each of the scenarios requires that you override the Java Executable grid property so that it targets the script of each scenario. A generic description of how to do this is given below and specific details will be given in each scenario.

Working with grid property overrides in general is described in Grid Properties on page 49.

1 Decide whether the override should be made in the context of an application or be made global? Typically you want to override the property in the context of an application. However, there may be odd scenarios where you want to perform the override regardless of the application. In that case, you do it in the global context.

Depending on the situation, select one of the two paths below:

a To override the property in the context of an application, select Applications > Applications.

b Select the application you want to reconfigure.

c Select the Properties menu.
a  To override the property in the global context, select **Configuration > Grid Properties**.

**Note:** Applications can be selected on the **Grid Properties** page.

2  In the Grid Defined Properties section under Node Properties, click the Java Executable property. The edit page for the property is displayed. Here the value can be set and overridden in different contexts. Using this matrix it is possible to override in various contexts. In the different example scenarios described below, details will be given relevant to each case that will enable you to continue from this point.

3  Given details from the different scenarios described below, identify the property context that you want to override and edit the corresponding value.

4  Specify the path to the script file from the different example scenarios. Note that regardless of host platform (OS) the path to the script file should be entered using forward slashes ("/" ) (even on Windows).

5  Click **Save**.

### Verifying the scripts are using the correct Java Executable to launch a node

If you want to make sure that the script files are used to start the grid nodes in the correct situations and in the correct way, check in the correct java executable log. If you have a script file named `C:/script/start.cmd`, you should be able to find log entries similar to the following: 2011-09-28 09:36:12,864 DEBUG NodeLauncher: launching: \[C:\script\start.cmd. However, the log level DEBUG must be turned on in the Host Router in order for this to be displayed.

### Example scripts

The scripts are executed by the operating system of each grid host. Since the operating system may vary between different hosts the scripts has to be made specifically for each platform. The examples in this document are for the Windows platform but there should be no problem to port them to other platforms using other but equivalent commands.

### Multi-host grids

The grid you are working on may be a multi-host grid and the application you want to change in the different scenarios may be deployed on many of the hosts in that multi-host grid. In order to keep things simple, the description of each scenario below will operate on one host but you must repeat the process for each host that is relevant for each scenario.
Scenarios

The scenarios described below give detailed information for each case. The detailed information is intended to be used together with the generic instructions above.

Scenario 1: Using a specific JRE when launching an application

In this scenario, assume you want all grid nodes belonging to a particular grid application to be running in JVMs from a specific JRE. The rest of the Grid and other applications should not be affected. Typical reasons for wanting to do this may be that the application only works using a specific patch level or a JRE from a specific vendor.

In this scenario, assume that:

• The grid host is named HOST1
• HOST1 has a JRE installed on the following path "C:\Program Files\Java\jre8".
• The grid application APP1 is deployed on HOST1

To use a specific JRE when launching an application

1. Create a script file on the grid host (HOST1), for example, C:\GridNodeStartScript\StartNodeJRE8.cmd, containing the following single line:

   "C:\Program Files\Java\jre8\bin\java.exe" %*

   As can be seen, the script line simply targets java.exe in the JRE that was wanted, and by the use of "%*" at the end of the line, it makes sure to propagate all arguments that were passed to the script.

2. Configure the application to use the script by editing the Java Executable grid property. Use the following values:
   • Override in the context of an application (APP1 in this case).
   • In the matrix, identify the host column belonging to the host (HOST1) and click on the value link in the first row (the application level row).
   • Enter the following path in the dialog box: C:/GridNodeStartScript/StartNodeJRE8.cmd. Remember to use forward slashes in the path.

   The application nodes should now be launched using the specified script on HOST1.

Note: The examples given here are trying to illustrate the generic approach of creating a script file and configuring the Java Executable grid property to point to that script file. This generic approach allows for advanced scripts to be created. However, this particular example is so simple that you actually don’t have to create a script file at all. In this case, you could just enter "C:/Program Files/Java/jre8/bin/java.exe" as the value of the Java Executable grid property and skip the script file completely.

Scenario 2: Running grid nodes belonging to an application as a specific user

Grid nodes are started using the same OS user that the grid agent is running as. Normally, an application is not concerned about this user. It is a user that was specified when the Grid was created, and it should work appropriately. However, if a particular application has to be running as another user, problems can occur. The Grid is intended to run multiple applications in the same Grid, so a particular application...
can’t be allowed to change the user that the entire Grid is using since that would impact the other applications. In this case, you need to launch nodes belonging to just this particular application by using another user.

Doing this in a safe way can be tricky since it may require that user names and passwords are hard coded in script files. However, that is not something that can be recommended for security reasons. Because of these challenges, there are no recommendations for this case, but general observations can be noted.

On a UNIX platform, you have the sudo command and on Windows you have the run as command that can be used to start processes as another user. Neither of them accepts that passwords are passed to them from the command line. This is good since hard coding passwords in script files should be avoided.

Third-party tools that are similar to the Windows run as command and also accept a password on the command line exist. However, these are not recommended by Infor for the reasons mentioned above, even though they would technically solve the problem. Some of the third-party tools support encryption of the password information. Potentially those tools may provide a secure way of solving this problem, but Infor does not give any recommendations in this area.

**Giving the user access to the configuration area**

If a particular user is used to run all or some of the grid nodes, it is crucial that the user has sufficient security rights in the grid configuration area. The topic, Changing the Grid Service user on page 86, describes how to change the directory security. The information is for Windows but the situation is the same on all platforms. The user has to be given access to the grid configuration area.

**Changing the JDK for a grid node**

If a grid is installed using a particular JDK version and you later want to change to another JDK version, you may do that by configuring a grid property. As always with grid properties, they may be configured and overridden in different contexts (see Grid Properties on page 49). Typically a change of JDK version will be done on all hosts in a grid or on individual hosts of a grid. The following steps describe how to change the JDK version for all nodes running in one host. If you want to change the JDK version for all hosts, you repeat the procedure for each host.

1. Go to Configuration.
2. Go to Grid Properties.
3. In the property list, click Java Executable in the Node Properties section.
4. In the context listing on the left, locate Hosts and click the host whose JDK you want to change.
5. Click Edit.
6. In the input field, specify the absolute path to the Java executable of the new JDK version. For example, C:/JDK1.8/bin/java.exe).
7. Click Save.
8. Repeat this procedure for other hosts whose JDK you want to change.
For any nodes currently running, you will need to restart them to apply the changes. Any new nodes will use the new JDK when they are started.

Changing the JDK for a grid host

Use this procedure to change the JDK version used on a particular grid host.

Note: Any overrides at host, application, or node level to the JDK set in the grid properties will still be in place following this step, and will not be updated.

Changing the JDK stops all running applications immediately and then stops all grid nodes including the Host Router. This procedure should only be done in controlled circumstances since it will impact users of the application.

1 Stop the Grid. See Stopping the Grid on page 60.
2 Open a command prompt and navigate to grid_root_installation_path\bin.
3 Run the ChangeJDK script passing the new JDK as parameter. For example: ChangeJDK c:\java\java18 (Windows) or ChangeJDK opt/java18 (*ix).
4 Repeat for all grid hosts for which you want to change the JDK.
5 Start the Grid. See Starting the Grid on page 57.

Grid Properties

The Grid Properties are a fixed set of settings defined for the Grid or the grid applications. Each property has a collection type and a type (single, list, map, map list : integer, string, boolean, enum etc). Most of them have a given default value. An administrator may set another value for the property in a different context with higher priority, so that it will have another value at runtime.

In addition to the fixed grid-defined and application-defined grid properties, ad hoc properties can be defined if needed.

The Grid Properties are primarily managed from Grid Management Pages>Configuration>Grid Properties, where each property is described in detail. If the Grid is offline, the properties and their descriptions are still accessible by launching the offline UI, see Accessing the offline version of the Grid GUI on page 66.

If no application is selected from the drop down list in Configuration > Grid Properties, Grid Defined Properties and Ad Hoc Properties are displayed. If an application is selected, the properties Application Defined Properties are displayed, followed by Grid Defined Properties and Ad Hoc Properties.

On each row, the following are displayed:

• The property title, if defined (if not, the property name is displayed)
• The value of the property in the current context (grid-wide or application)
• A description of the property
• The property name

Click a property in the list to edit the runtime value. When editing a property, you can define and set the value for this property in different contexts.

Property context

When editing a property value, all available contexts are listed on the left side of the page. Contexts are shown hierarchically. For example, node types are displayed below applications, and bindings below node types. Each level is more specific and overrides any value set by its parent. Values for specific hosts can be set on each context. Grid-defined global properties can only have values on the grid-wide context. Application-defined global properties can only have values on the application-wide context.

An input field is available for filtering the displayed contexts. This can be useful when there are a lot of bindings. There is also a check box for showing only the contexts that have a value set on that context, or any of its children.

An arrow to the left of the context name indicates if a value has been set on that context or any of its children.

For example, consider an application that uses lots of memory, which can be managed by overriding the global value of Max Heap property. Typically, you would give this property a value in the application-wide context. That means that all application nodes on any host will get this value when launched.

Now, assume that the application has two different node types with different memory requirements. In this case, you assign a higher value to the MaxHeap property in the context of the node type that requires more memory. This will override the application context for this node type. Consequently, the property will have the application-wide value in all application nodes except nodes of this node type.

The contexts have different priorities, so a property may be defined in several contexts, and the one with the highest priority will be used as the actual runtime value depending on how and where the application is running.

By setting a value in a context with higher priority, all children of that context will also resolve to that value, unless they in turn have a different value specified. To see where a specific value is resolved, click the expandable section Origin.

Resolving property values for application

These are the contexts, listed with lowest priority first. The property will resolve to the value specified for the given context unless overridden by a context with higher priority.

1 Grid-wide and all host
   This is the global base context (lowest priority). Use this context to set a base value for the property, that will be inherited in other contexts (for example application, node type, binding).
2 Specific host (grid-wide and specific host)
   Use this context to set a grid-wide property on a specific host.

3 Application-wide and all hosts
   This is the base context (lowest priority) for application-defined properties. Use this context to set a base value for the property, that will be inherited in other contexts (for example, node type, binding). This is the context you start in when selecting an application property from the property list.

4 Node type (node type and all hosts)
   Use this context to set a property for all application instances that are running in a node of this node type. This value will be inherited by bindings and hosts running this node type.

5 Specific host (application-wide and specific host)
   Use this context to set a property for application nodes running on this specific host.

6 Binding (Binding and all hosts)
   Use this context to set a property in the context of a binding.

7 Node type and specific host
   Use this context to set a property in the context of a node type on a specific host.

8 Binding and specific host
   This is the context with the highest priority. It sets a property value for application nodes started with a specific binding on a specific host.

Resolving property values for routers

These contexts are (lowest priority first):

1 Grid-wide and all hosts
   This is the global base context (lowest priority). Use this context to set a base value for the property, that will be inherited in other contexts.

2 Routers
   This is the base context (lowest priority) for routers. Use this context to set a base value for the property, that will be inherited in the other router contexts.

3 Specific host (grid-wide and specific host)
   Use this context to set a grid-wide property on a specific host.

4 Router
   Use this context to set a property for a specific router.

5 Routers and specific host
   Use this context to set a property for a specific router.

6 Router and specific host
   Use this context to set a property for a specific router on a specific host.

This is how the property value is resolved in runtime for single values:
Each application node or router is started using exactly one binding on exactly one host. When resolving a property, the system will look for a property override for exactly that binding on exactly that host (Binding and specific host context). If it finds one, the system has found the applicable runtime value and is finished. If not, the system will continue to look for a property value in contexts with lower priority until it finds a context that has defined a value. The last context to look in is the global context (grid-wide or application-wide).

If a property has been specified in a given context, a right arrow is displayed in front of the value. To remove a value set in a given context, click Clear.

Property strategies

If a value is set on different contexts (for example, grid-wide and for a specific application), the resulting value (for any given node) that will be used depends on the property strategy for each context. When you edit the value of a property you can also change the strategy. Different collection types have different strategies.

- Single value properties will always use the value from the context with the highest priority. The strategy is “replace”. Since the strategy cannot be changed, it is not displayed in the Grid Management Pages.
- List value properties can have one of these strategies:
  - Replace - will ignore all values with a lower priority.
  - Prepend - will use the values for the current context before values with a lower priority.
  - Append - will use the values for the current context after values with a lower priority.
- Map and Listmap value properties can have one of these strategies:
  - Replace - will ignore all values with a lower priority.
  - Merge - will add all key/value-pairs for the current context to the map with a lower priority. Any conflicting keys will use the values from the context with a higher priority.

Note: The only properties that can be completely removed, that is, no longer listed, are ad hoc properties, because these properties are the only ones that can be added in runtime. To remove an ad hoc property, select it in the property list and clear the property value on all set contexts. This will remove the ad hoc property.

Adding a new ad hoc property

Create new Ad hoc properties only if it is necessary. Ad hoc properties can be useful for example to assign environment variables to specific hosts, or be required for specific applications.

1 In Configuration > Grid Properties, click New Ad Hoc Property.
2 Specify the name of the property
3 Select the check boxes This should be a list, Environment Variable, and System Property as applicable.
4 Click Add to create the property and display the edit property page.
5 Specify the property value for the applicable contexts.
Click Save.

JDBC drivers

JDBC drivers can be used by applications to connect to databases. The Grid provides drivers for the databases that are supported by Grid. However, if an application requires other drivers they can be uploaded manually.

Use the following procedures to manage the database drivers that can be used by application JDBC connections.

**Note:** You cannot edit existing drivers, only add new ones (and remove old ones).

Add a database driver

The Grid supports the uploading of new database drivers (type 4 JDBC drivers only). If you have type 4 JDBC drivers you want to use, you can upload them to the Grid.

1. Navigate to the **Configurations** tab.
2. Click **JDBC Drivers**.
3. Click **Add New**.
4. Specify a name in the Name text field.
5. Browse to the driver file that you want to upload.
6. Click **Save**.

Remove database drivers

1. Navigate to the **Configuration** tab.
2. Click **JDC Drivers** menu.
3. Select the check box for each driver that you want to remove.
4. Click **Delete** and confirm that you want to remove the driver.

**Note:** You cannot remove the Grid internal drivers. You cannot remove drivers that are being used by applications. Any application using the driver is shown in the **Used By** column. You must first either uninstall the application or remove the connection configuration that is using the driver.

Routers

Defined routers are listed. Host routers are not visible by default.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edit</td>
<td>Edits this router.</td>
</tr>
</tbody>
</table>
### Field | Description
--- | ---
Delete | Removes this router. Note that you cannot remove Host Routers.
Host/Host Groups | The hosts or host groups that the router is configured to run on. It is possible to configure a router so that it automatically runs on all current and future hosts in the Grid by choosing All. This can be useful if configuring a load balancer to distribute the load of client connections amongst all the hosts in the Grid for either resilience or load balancing.
External Address | Optional external address (FQDN or IP Address). If undefined, the router listens on the same address as the grid agent is using on this host. If the host has several network interfaces, it is possible to select a different one here.
Proxy Port | The port the router is listening on for non-HTTP traffic such as legacy socket connections (connection dispatchers) and the Grid client protocol.
Encryption & Ciphers | It is possible to enable SSL encryption for the proxy port. For more information on what these settings mean, see "To configure SSL for Grid proxy clients" in the Infor ION Grid Security Administration Guide.
HTTPS Port | The HTTPS port of the router if defined. The HTTPS port serves web applications and web services.
HTTPS Authentication Type | It is possible to configure the authentication type for the HTTPS connections on this port. See the Infor ION Grid Security Administration Guide.
HTTPS Encryption & Ciphers | It is possible to enable SSL encryption for this port. For more information on what these settings mean, see “To configure SSL for Grid HTTP clients” in the Infor ION Grid Security Administration Guide.
HTTPS WWW Authentication Methods | The router configuration dialog has settings for WWW authentication methods. For more information on what these settings mean, see “Configuring Router WWW Authentication Methods” in the Infor ION Grid Security Administration Guide.
HTTPS Identity | Configure the HTTPS identity to use for this router. For more information about HTTPS identities, see “HTTPS Identities” in the Infor ION Grid Security Administration Guide.
### Field Description

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Token Authentication</td>
<td>It is possible to enable token authentication for this router. See &quot;Token Authentication&quot; in the <em>Infor ION Grid Security Administration Guide</em>.</td>
</tr>
<tr>
<td>Impersonation</td>
<td>It is possible to enable impersonation on this router. For more information about impersonation, see &quot;Impersonation&quot; in the <em>Infor ION Grid Security Administration Guide</em>.</td>
</tr>
<tr>
<td>HTTP Strict Transport Security</td>
<td>HTTP Strict Transport Security (HSTS) is a security enhancement activated by a web application through a HTTP response header. This enhancement enforces the browsers to only use HTTPS when accessing the web site domain. It also prevents browsers from accessing the web server if it does not have an SSL certificates signed by a CA trusted by the browser.</td>
</tr>
<tr>
<td>Published Applications</td>
<td>Configure which applications are accessible on this router. <strong>Note:</strong> Disabling <strong>SYSTEM</strong> disables access to the Grid Management Pages using this router.</td>
</tr>
</tbody>
</table>

### Editing and adding routers

Routers may be added or existing routers may be reconfigured. Client applications may connect to any router as long as it is exposing the right type of port, HTTPS or proxy, and that port is exposed on a network interface that is accessible from the client.

One reason for adding a new router is that you want to bind it to another network interface compared to the existing routers, or you wish to add an additional router to distribute the load or scale-out to an additional host for resilience. The external address property of the router is used for this (see above). Another reason for adding a router is to achieve high availability. By having two routers that serve the same types of ports but on different hosts, you still have a way for clients to connect to the Grid even if one of the routers fails. To make this fully transparent to the clients, some form of network load balancer in front of the routers may be needed.

To add a router, click the **Add Router** link. Edit a router by clicking on the router name link in the list, then **Edit**. In both cases you will be presented with a dialog that lets you configure the router.

### Application publishing and restrictions

Routers can be configured to publish different applications, depending on the intended role of that router and the sensitivity of the published content. An application intended for a specific audience, e.g. intranet users, may be published on a router that is only accessible on the intranet. By limiting where an application is published, the access to that application is restricted. In this context, access to an application means access to all its services: web services, REST services, and web applications. Access to specific components cannot be configured.
SYSTEM is listed as a publishable application in the routers. By not publishing SYSTEM via a given router, the Management UI will not be accessible via that router. SYSTEM is always published by the Host Routers.

**Note:** The SYSTEM application cannot be removed from host routers.

To view the applications published by a router

1. Access the Web UI and select **Configuration > Routers**.
2. Select the router to view.
3. Scroll down to Published Applications.

To modify the application components published by a router

1. Access the Web UI and select **Configuration > Routers**.
2. Select the router to configure and click **Edit**.
3. Under Published Applications, select the applications you want to have published using that router.
4. Click **Save**.
Chapter 5: Managing the Grid

This section describes common administrative tasks, just as those for stopping and starting the grid. Some of these tasks are performed interactively through an administrative user interface while others can be performed programmatically.

Managing the Grid

Starting the Grid

The grid will start automatically when the host starts. The sequence of events is:

- The server starts and the operating system boots up.
- The grid bootstrap service is started by the operating system.
  - The grid bootstrap service checks the activation flag in the grid database and, if the host should be active, it starts the Host Router.

If the grid does not start automatically, take the following steps (these are for Windows):

1. Access the Windows Server Manager on the server where the grid bootstrap service runs.
2. Under Configuration, select Services.
3. In the list of services, locate the grid bootstrap service. It will have a name in the format: InforION Grid – gridName.
4. Verify the Status column states Started. If the service is not started, right-click on the service and select Start.
5. If the grid still does not start automatically, execute the StartHost.cmd or StartAllHosts.cmd script, which is located in grid_root_installation_path\bin.
6. If the grid still does not start automatically, follow these steps:
   a. Launch the offline configuration manager. See Accessing the offline version of the Grid GUI on page 66.
   b. Click on the Hosts link.
   c. Check that the host is activated. If it is not, click the start symbol to activate the host.
Putting applications or parts of the Grid in an offline state

In the ION Grid it is possible to prevent new client requests from being accepted by the server applications. This state is called offline. When some part of the grid is offline, it will no longer accept new requests but ongoing requests will be allowed to finish. This is ideal for situations when parts of a grid need to be taken down but you do not want to simply kill nodes since that would terminate existing processes performed there. In this situation, you may start by having the grid enter an offline state. When all ongoing requests are completed, you can stop the nodes or the relevant parts.

A typical example is that you want to stop an application in order to perform some maintenance. Just stopping all application nodes could perhaps result in some ongoing processing being terminated prematurely. The solution is to first put the application in an offline state. This prevents clients from calling the application with more requests. When all ongoing requests are finished, you may safely stop the application.

An important implication of an application being in an offline state is that nodes will no longer be automatically started even if the application has bindings that are configured to maintain a minimum number of running nodes. If an application has bindings of this type, it will be impossible to stop the application without also putting it in an offline state. This is because not doing so would cause the grid to automatically start new nodes to replace the stopped one.

The following entities may be put in an offline state:
- The entire Grid
- Individual hosts within the Grid
- Applications
- Individual application nodes

The following procedures describe how to put different parts of the grid in an offline state. Getting them on-line again is done in the same way.

Putting hosts in an offline state

**Note:** This will put all the nodes on this host in an offline state regardless of what application they belong to. The typical reason for doing this is that you intend to remove this host from the grid and you want to allow application nodes to finish executing in a controlled manner.

1. Navigate to the **Hosts** tab.
2. Click a host to expand its card.
3. Open the context menu for a host and select **Set Offline**.

Putting applications in an offline state

**Note:** This will put all the nodes belonging to a particular application in an offline state regardless of where the nodes are running. It will also prevent the grid from automatically restarting nodes even if they have been configured for that. The typical reason for doing this is that you intend to stop an application for maintenance but you want to allow application nodes to finish executing in a controlled manner.
1 Navigate to the Applications tab.
2 Click an application to expand its card.
3 Open the context menu for the application and select Set Offline.

Putting individual application nodes in an offline state

**Note:** This will put only one node in an offline state. The typical reason for doing this is that you intend to stop this node and you want to allow ongoing work in the node to finish executing in a controlled manner.

1 Navigate to the Nodes tab.
2 Click on a node to expand its card.
3 Open the context menu for the node and select Set Offline.

Stopping an individual Grid node

Normally, you do not stop individual application nodes. Instead, you stop an entire application and, as a result, all nodes belonging to the application will be stopped. However, there are situations when you want to stop an individual application node.

For example:

- A node is experiencing problems and you need to stop it, perhaps with the intention of starting a new node to replace the stopped one.
- The application has been started in multiple instances (nodes) but all that capacity is no longer needed, so some of the nodes can be removed in order to free resources.
- You want to clear a particular host in a multi-host grid from all nodes in order to perform some maintenance on that host.

Considerations before stopping a node:

- Should the node be put in an offline state first?
- If the application node is the only one of its kind, the application may stop working. Should a new similar application node be started first before the node is stopped?
- Applications are implemented differently. Some applications manage their nodes themselves. Consult the documentation of the application. Does the documentation recommend some alternative procedure to stopping the node in this case?

To stop an individual grid node

1 Navigate to the Nodes tab.
2 Click a node to expand its card.
3 Click Stop Node.
Stopping the Grid

**Note:** Stopping the entire Grid stops all applications that are running in it. When the Grid is stopped, no applications can run and no requests can be served. Do not stop the Grid as a quick fix for any problems that might occur.

Stopping the Grid completely can be useful when you need to run maintenance tasks, such as:

- Making a full backup of the database
- Exchanging an end-of-lifetime component in the hardware
- Upgrading the operating system to a newer version, which requires rebooting of a host

**Considerations before stopping the Grid:**

- Do you have access to start the Grid again? Verify that the bootstrap service is running and available, or make sure that you have access to at least one of the hosts in the Grid.

**To stop the Grid:**

1. Click the menu located at the top right.
2. Click **Stop Grid**. A message **Are you sure?** is displayed.
3. Click **Yes**. A task should be displayed. After the task is finished, you will not be able to connect to the server anymore.

Starting new Grid nodes (application instances)

Application instances are started by launching a binding that targets the correct node type. Normally you do not start individual application nodes. Instead, you start an entire application and, as a result, all nodes belonging to the application will be started. However, there are situations when you want to start an individual application node. Examples are:

- An application is experiencing increased load and you want to start a new server application instance, perhaps on a new host with spare capacity.
- You intend to stop an existing node and you want to start a new alternative node first so that the operations of the application will not be disturbed when you stop the node.
- You want to move the execution of this application from one host to another. This would be done by starting new nodes on the new host combined with stopping the old nodes on the original host. Note that not all applications support this operation. Consult the documentation for the application.

**Considerations before starting a node:**

- Does the application support manually starting new nodes? Some applications manage their own nodes and they should not be started manually.
- Some applications do not support several instances running simultaneously. If that is the case with the application you are starting, existing nodes may have to be stopped first. However, ideally, applications should be written to support this.
- Always consult the application's documentation on what is supported in each case.
Starting grid nodes through the Hosts tab

1. Navigate to the **Hosts** tab and click a host.
2. Click the menu icon for the host and select **Start Node**.
3. In the pop-up, select a binding and click **Start**.

Starting grid nodes through the Applications tab

1. Navigate to the **Applications** tab and click an application.
2. Click the menu icon for the application and select **Start Node**.
3. In the pop-up, select a binding and a host and click **Start**.

Starting grid nodes through the Nodes tab

1. Navigate to the **Nodes** tab.
2. Click **Start New Node**.
3. In the pop-up, select a binding and a host and click **Start**.

What if the binding to start does not appear in the pop-up?

The typical reasons for not finding a particular binding when trying to launch it on a host are:

- The binding is not configured to be able to run on that host.
- The binding is configured to allow a maximum number of simultaneously running nodes of this type and that maximum number of nodes is already running in the grid.

For information on configuring bindings, see [Configuring bindings](#) on page 41.

Managing the Grid programmatically

Programmatically operating on the Grid by using REST

Use this procedure to programmatically operate on a grid. The ability to programmatically act upon a grid depends on the fact that the ION Grid exposes a number of status documents and operations using REST. The REST-enabled APIs are easy to call programmatically and may be used in various scripting scenarios that operate on the grid or on individual parts of it, for example, applications or nodes).
The REST services are defined by a WADL file in the same way that web services are defined in a WSDL file. For more information on WADL, see http://www.w3.org/Submission/wadl/.

The WADL file describes the set of operations that is exposed and the schema of the data that is passed as requests and returned as responses. The WADL file is typically imported into some external tooling that will generate code in different languages that makes it easy to implement calls to the exposed REST services.

The REST services are accessed through any of the HTTPS ports that are defined in the grid routers. The WADL file is also accessible through any of those ports.

REST API

The documentation and a testing tool for Infor ION Grid REST API is available on all grid routers.

To read the documentation and to test the Infor ION Grid REST API:

1. Open a supported web browser.
2. Navigate to this URL:
   https://server:port/grid/rest where server is the name of the server hosting the grid and port is the HTTPS port for the grid router.

3. The Infor ION Grid REST API UI with a listing of available resources is displayed.
   - Click the name of a resource to expand the listing of available operations.
   - Click the name of an operation to display details about that operation.
   - Clicking the operation link again will minimize the operation.

Note about PUT and POST operations: By clicking the Model Schema link in the Parameters section a JSON skeleton of what the input for that operation looks like is displayed. Clicking this JSON skeleton will fill the Value text area in the Parameters section with the JSON skeleton.

The Infor ION Grid REST API requires authentication and some of the REST methods require authentication with the grid-admin and/or app-admin role. Authentication may be performed using username/password or certificates. For information about how to generate a client certificate, see the Infor ION Grid Security Administration Guide.

Programmatically operating on the Grid by using command line interface

The tools folder contains grid-cli.jar that enables performing of tasks and fetching information about the Grid from a command shell or script. The CLI commands are useful both for interactive work where each command is submitted through the command line or from a scripting environment where script output can be captured in json format (--json option).

Use the tool by specifying java -jar grid-cli.jar in the tools folder. This command returns a general overview of options and commands. Adding the help parameter gives more information about
each command. To list possible sub commands, type `java -jar grid-cli.jar help command`. To display the available options and parameters for a sub command, specify `java -jar grid-cli.jar help command subcommand`.

Rolling upgrade

Rolling upgrade primarily targets Grids deployed in cloud, and is normally initiated by the Infor Cloud team.

When the Grid detects that a Rolling Upgrade of Grid has been initiated, the upgrade is visualized in the top right corner of the Grid Management Pages. The progress of the upgrade is visualized in the Hosts tab and the Node tab. Once one of the host routers run the new version, it is possible to switch to the new version of the Grid Management Pages by clicking Switch UI Version in the top right corner. If a failed patch or standard updated is detected, a warning is displayed.
Chapter 6: Troubleshooting

Introduction to troubleshooting

The first approach to troubleshooting is to use the techniques for monitoring the grid. As described in chapter "Monitoring the Grid", you typically view log files and change log levels in order to gain more information. When this is not enough, you can consider the state of the hosts (machines) and anything related to the operating system on them. Are they configured optimally and do they have enough resources at hand. For example, are the disks full? Do you need more memory? Are the CPUs stressed? Are there network issues?

Troubleshooting tools

The ION Grid provides many sources of information about the configuration and runtime status of a grid and the applications running within the grid. These include:

- Log files
  Log files are available for each node. For more information, see Viewing log files on page 29.
- Counters
  Counters are available for each grid node as well as a counter history. For more information, see Viewing counters on page 38.
- Configuration history
  You can review a history of changes to the grid configuration so that you can, for example, identify changes that caused a problem or revert to a previous configuration. For more information, see Comparing runtime history on page 44.
- Heap dumps and thread dumps
  You can view heap dumps and thread dumps for individual grid nodes.
- Grid Status report
  The Grid Status report is a generated report that shows the overall status of the grid, and also includes log files, configuration files. For more information, see Generating a Grid Status report on page 33 and Viewing a Grid Status report on page 33.
Investigating problems or issues

Viewing threads

If a grid node is using an unusually high percentage of the CPU for an extended period of time or if a node show signs of being unresponsive, you may consider looking at the threads in the node in order to see what is happening in the node. It could be a situation where a thread is in an endless loop or it could be in a deadlock situation.

1. Navigate to the Nodes tab.
2. Click a node to expand its card.
3. Click the menu icon and select Threads.
4. Click a specific thread or group link to view the current state and call stack.

Reviewing an application's configuration

Problems may result from applications being incorrectly configured. One way of getting an indication of such problems is to view the configuration of each application.

1. Navigate to the Applications tab.
2. Click an application to expand its card.
3. If a suggested action to perform is displayed below the Configuration problems header, you may have a problem. Often the problem can be fixed by clicking on the Fix this problem link next to the suggested action. However, consult the application's documentation in each case.
4. In addition to looking for a suggested action, review the information on this page. Consult the application's documentation in each case.

Gathering information when reporting a problem

When reporting a problem, it is very helpful if as much information as possible is included. Log files with errors and warnings are particularly helpful. For instructions on how to download log files, see Viewing log files on page 29. If the problem is related to a specific application, gathering as much information as possible about that application is also helpful.

If the Grid has operational problems, but at least parts of it are still running, it is always best to generate a Grid Status Report as described in Generating a Grid Status report on page 33 and include that when reporting the problem.

If the Grid is experiencing so many problems that it can't be started, it will not be possible to generate the Grid Status Report. You will also not be able to view log files and other information sources the normal way. In this case, log files and other information must be retrieved manually from disk. See The
Grid and how it is stored on disk on page 89 for instructions on how to locate the grid configuration area. In the configuration area, all log files and configuration files may be found.

Disaster recovery

Accessing the offline version of the Grid GUI

Use this procedure to access the basic offline-version of the graphical user interface for Grid. This should only be used when you cannot access the other administrative user interfaces.

Some examples of where this might be required are as follows:

- The grid will not start because all hosts have been deactivated.
- You cannot log in to the grid as grid-admin because of a breakdown in the security process. For example, all administrators have been accidentally removed.

Note:

- The following method can only be used on platforms which support a graphical user interface and have a supported browser installed.
- The scripts delivered assume that the Java executable location is on the path, to verify this you can open a command prompt and type `java` and press Enter. If a command not found exception occurs then Java is not on the path and should be added.

To access the offline graphical user interface for Grid:

1. Open the file explorer or browser tool on the server hosting the grid and navigate to `grid_root\installation_path\bin`.
2. Run the `OfflineConfigUI.cmd` by double-clicking on it.
3. Enter the connection options for the grid you want to manage. The default is to use the configuration for the grid located where you launched the command from.
4. Click `Launch Config Manager`.

Recovering from the loss of a host

In the context of this procedure, a failed host is considered to be the permanent loss of a host. For example, a disk crash or other hardware failure has occurred that renders the host unable to be restarted to re-join the grid.

Use this procedure to replace a lost host:

- Remove the host from the Grid.
- Add the host to the Grid.
Note: Unlike Grid 1.x, Grid 2.x does not have the notion of a primary host. In 2.x you can install one or more hosts and then remove any of them at will. As long as at least one host remains, the Grid will be operational.

Removing a failed host from the configuration

Once you remove a failed host from the configuration, the remaining hosts will update the new configuration accordingly.

Note: If the host is still operational, running the Grid's uninstaller is the preferred way to remove a host. This instruction is only meant to be used when a host is completely unrecoverable and/or the uninstallation procedure fails.

To remove a failed host from the configuration, run grid-cli host remove host-name from any other functional host.

Note: this will remove the host from the configuration and the Grid's database only. Files will not be removed and running Grid processes may still be running.

HttpTrace Logging

The HttpTrace Grid logger logs http traffic details. This page is used to configure which traffic is logged on which detail level. Configuration changes made on the page are immediately active and persistent. All log entries are tagged with a request ID to help correlate multiple log entries belonging to the same request.

The configurable levels are as follows:

<table>
<thead>
<tr>
<th>Configurable level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disabled</td>
<td>No logging</td>
</tr>
<tr>
<td>Summary</td>
<td>One log entry per request containing summary information</td>
</tr>
<tr>
<td>Events</td>
<td>Logs entry per event for the request; typically each buffer processed</td>
</tr>
<tr>
<td>Headers</td>
<td>Inbound and outbound headers</td>
</tr>
<tr>
<td>Hexdump</td>
<td>Buffers are logged as hex dumps</td>
</tr>
</tbody>
</table>

A more detailed level always includes all less detailed levels, for example, Headers include Events and Summary.

The ways to trigger the tracing are as follows. When multiple triggers are in effect, the most detailed level of the triggers is used.
Cookies

This feature is used to enable tracing of individual clients. When enabled, clients can access `/grid/trace/level`, for example, `/grid/trace/Headers`, to obtain a cookie which will control how that particular client is traced. The cookie is valid for 5 minutes.

To get the current trace level of the client, access `/grid/trace`.

URI Patterns

Tracing can be enabled by adding URI patterns. When a request matches a pattern, the configured level will be applied to the tracing of the request. The patterns are case sensitive and are used to match anything.

<table>
<thead>
<tr>
<th>URI patterns</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>*</td>
<td>All requests</td>
</tr>
<tr>
<td>/saml/*</td>
<td>Requests that start with <code>/saml/</code></td>
</tr>
<tr>
<td><em>login</em></td>
<td>Any request which contain <code>login</code> anywhere in the URI</td>
</tr>
<tr>
<td><em>root</em>??<em>tenant=</em></td>
<td>Any request with the text <code>root</code> in the path and a query parameter named or ending with <code>tenant</code></td>
</tr>
</tbody>
</table>

Header Patterns

Header names or values can be used to trigger http tracing. The patterns are case insensitive and * is used to match anything.

For example:

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>user-agent</td>
<td><code>curl/*</code></td>
<td>Requests sent with the curl (curls default user agent)</td>
</tr>
<tr>
<td>*</td>
<td><em>TrackMe</em></td>
<td>Requests with any header value including <code>trackme</code> in the value</td>
</tr>
<tr>
<td>cookie</td>
<td><em>infor</em></td>
<td>Requests with <code>infor</code> in a cookie name or value</td>
</tr>
<tr>
<td>x-tenantid</td>
<td>*</td>
<td>Requests containing a x-tenantid header</td>
</tr>
</tbody>
</table>
Chapter 7: Administrative task reference

Administering the Grid

This section describes administrative tasks related to the entire Grid.

Note: The scripts delivered assume that the Java executable location is on the path. To verify the location, open a command prompt, type "java", and then press Enter. If a command not found exception occurs, then Java is not on the path and should be added.

Grid scripts

The ION Grid is delivered with a number of scripts which enable you to quickly perform operations such as starting or stopping a host of the Grid. Furthermore, these scripts can be embedded in other scripts, for example to control operation during a backup or maintenance script.

To locate the scripts, open the file explorer/browser tool or command prompt and navigate to grid_root_installation_path\bin.

These scripts are delivered:

- StartAllHosts.cmd - set the status for all hosts in the grid to ACTIVATED which will cause the bootstrap of each host to launch the Host Router resulting in Grid startup on all hosts.
- StartHost.cmd - set the status for the host on which the command is executed in the grid to ACTIVATED which will cause the bootstrap of the host to launch the Host Router resulting in Grid startup on this host.
- StopAllHosts.cmd - set the status for all hosts in the grid to DEACTIVATED which will cause the bootstrap of each host to stop the Host Router resulting in the Grid stopping on all hosts.
- StopHost.cmd - set the status for the host on which the command is executed in the grid to DEACTIVATED which will cause the bootstrap of the host to stop the Host Router resulting in the Grid stopping on this host.

Note:

- Modifying the delivered scripts is not recommended as they are subject to replacement during upgrades.
- The scripts delivered assume that the Java executable location is on the path. To verify that Java is on the path, open a command prompt, type java, and then press Enter. If a command not found exception occurs then Java is not on the path and should be added.
Administering Grid hosts

This section describes administrative tasks related to grid hosts.

Add an additional host

Use this procedure to add another host to the grid. By adding a new host to the grid, applications may scale out to this new host or new applications may be installed there.

1. Run the UI installer on the desired host.
2. Specify the name of the Grid and the database address.
3. Follow the prompts.

   **Note:** Requirements:
   - Windows: local or domain account with the ability to log on and run as a service with CRUD access to the file system where the grid will be installed
   - Linux: local service account with CRUD access to the file system where the grid will be installed

   a. Run the Grid installer on the new server. See the installation instructions.
   b. Ensure to give the Grid host a unique name.
   c. Specify the same database and schema information as on the first host.

Remove an additional host

Use this procedure to remove a host from the Grid. Before removing a host from the Grid, you should undeploy any applications running there. For more information on removing applications, see **Administering Grid applications** on page 74.

1. In the file system of the host you are removing, navigate to the Grid uninstall folder. This is `grid_root_installation_path/uninstall`.
2. On Windows, make sure the user running the uninstaller is part of the group named gridname_full.
3. On Windows, using elevated rights, run as administrator and then run the file named uninstall.cmd.
4. On Linux, run as root and then run uninstall.

**Uninstall errors**

One or more of the following errors may occur during the uninstallation:

- DATABASE_FAIL - The uninstaller failed to connect to the database. Verify the connection details in the datasource.properties file located in `grid_root_installation/config`.
- SCALED_OUT - The Grid is scaled out to additional hosts. Remove these hosts before uninstalling the primary host.
- STOP_SERVICE_FAIL - The uninstaller could not stop the service/daemon. Stop the service/daemon manually, then run the uninstaller again.
On Windows, the service is named: Infor ION Grid - `gridname`.
On Linux, the daemon is named: `grid_gridname`.

- STOP_GRID_FAIL - The uninstaller could not stop the grid host.
- FILE_SYSTEM_LOCKED - Files or folders in the Grid install directory were locked, or the uninstaller did not have sufficient permissions. Close any locking processes and verify that the uninstaller has access to the files and folders.
- REMOVE_SERVICE_FAIL - The uninstaller could not remove the service/daemon. Remove the service/daemon manually, then run the uninstaller again.

On Windows, the service is named: Infor ION Grid - `gridname`.
On Linux, the daemon is named: `grid_gridname`.

- CLEAN_DATABASE_FAIL - The uninstaller could not clean up the database.
- CLEAN_FILE_SYSTEM_FAIL - The uninstaller could not clean up the file system. If no other error occurred, you can manually delete the remaining files.
- REMOVE_UNINSTALLER_FILES_FAIL - The uninstaller could not remove the uninstaller files. You can manually delete the remaining files.

**Uninstaller flags**

If you want to force the uninstallation to ignore a certain problem, you can pass one or more flags to the uninstaller. In the file system of the host you are removing, navigate to the grid uninstall folder. This is `grid_root_installation_path\uninstall`. Using elevated rights (run as administrator on Windows, root on Linux), run:

```
java -jar uninstall.jar flags -baseDir grid_root_installation_path
```

For example, if the database no longer exists, and you want to uninstall the grid, you can use:

```
java -jar uninstall.jar ignoreDBErrors -baseDir grid_root_installation_path
```

The flags you can use include:

- archiveLogsInDatabase - Archive all log files on disk in the database.
- forceClean - Remove uninstaller files even if errors occurred. You will not be able to rerun the uninstaller.
- forceCleanIgnoreAll - Remove uninstaller files even if errors occurred and ignore all errors.
- help - Show the available start options.
- ignoreDBErrors - Ignore errors relating to database connections and cleanup. Use this if the database is unreachable.
- ignoreLockedFileErrors - Ignore errors relating to locked files. Files might be left on disk after the uninstaller finishes.
- ignoreScaleOutErrors - Ignore errors relating to scale out hosts. The whole grid will be deleted from the database. Scaled out hosts might have files left on disk.
- ignoreServiceErrors - Ignore errors relating to the service/daemon. The service/daemon might not be removed.
- ignoreStopGridErrors - Ignore errors relating to stopping the grid. Grid processes might be running, and the files on disk might not be deleted.
preserveLogFiles - Archive all log files on disk. The grid log files will be in a zip-file named gridname-grid-log-archive-timestamp.zip. The uninstaller log will be named uninstall-gridname.log. Both files will be located in the parent folder of the Grid install directory.

Handling transient hosts in a cloud environment

In most cloud Grid environments, hosts are not as static as they are in on-premises environments. The hosts are more transient in nature. This means that hosts are added to and removed from a Grid configuration regularly. The Grid does not know if hosts are just in a stopped state or have been removed completely. In an on-premises environment, to remove a host from the Grid cluster, you execute a Grid uninstaller. In a cloud environment, you need to run this Grid uninstaller automatically when a host is terminated. The uninstaller takes down the host and then notifies the rest of the Grid that the host has been removed completely. The uninstaller also archives log files for later reference.

If instances fail or for other reasons that the uninstaller cannot be executed, you can configure the Grid to automatically remove hosts that are down in the Grid configuration but are not available in the cloud environment. Note that configuring the Grid to do this cleanup means that there are no archived log files. In addition, if a host is removed without executing the uninstaller, the Grid cannot determine if the host is completely removed or the host is removed because of a temporary network glitch. The Grid will log some proxy warnings that the host is unexpectedly unresponsive. These warnings will stop after the host has been cleaned up, but existing warning will remain.

In some Grid environments, there are hosts that should never be removed from the configuration. If the automatic cleanup is enabled, there is a possibility to add some hosts to a white list of hosts that should not be part of the automatic cleanup. Make sure that the uninstaller is not executed when these hosts are stopped.

Considerations to keep the Grid configuration up to date from a host perspective

- Create a service that will run the Grid uninstaller when a host is shut down or terminated. This will ensure that the host is unregistered from the Grid.
- Set Grid property grid.host.cleanupLostHosts to true to enable the Grid monitor lost hosts. Stopped hosts in Grid where the corresponding cloud instance is not available will be removed from the configuration.
- Any hosts that should not be automatically removed from the configuration should be added to the Grid property grid.host.cleanupWhitelist.

If neither of these steps are enabled, it is your responsibility to remove hosts that have been lost, either manually or by scripting through Grid REST and cloud API.

Host Groups

Host Groups are used to group together a number of hosts. Applications and routers can be assigned to the host group. When you assign an application, it will be deployed to all hosts in the group. When you assign a router, it will start on all hosts in the group.
Adding a host group

1. Click **Add New**.
2. Specify a name for the host group.
3. To add hosts to the host group, select hosts from the Available host section and click the small left arrow.

Adding hosts is optional. A host group can be empty.

**Note:** If the host is already added to a host group a message *Are you sure?* is displayed. Moving a host from one host group to another can potentially uninstall and install different applications and stop and start different routers on that host. Applications and routers are assigned to the host group on their respective pages. On the **Host Groups** page, they are only listed.

Assigning application to host group

An application can be assigned to a host group for deployment purposes. When an application is assigned to a host group, the grid will handle deployment, scale in and scale out operations based on what hosts are part of the host group.

Assigning an application to a host group

1. Navigate to **Applications**.
2. Click the application that you want to assign to a host group.
3. In the context menu, click the item named **Deployment**.
4. Click **Edit**.
5. Mark any host groups that the application should be assigned to. A confirm dialog describing the scale out operation that will be triggered is displayed.
6. If the dialog describes the desired behavior, click **Apply**; otherwise, click **Cancel**.

Assign router to host group

You can assign a router to a host group. This will let the grid start routers, to set the assigned routers configuration on the hosts that are members of the host group. Any router bar host-routers can be assigned to a host group.

1. Navigate to **Configuration**.
2. Click the **Routers** tab.
3. Click the router that you want to assign to a host group.
4. If the environment has any host groups defined, a **Host Group** option for the label **Hosts** is displayed. Click this option.
5. Select the host group to assign the router to.
6. Click **Save**.
Assign binding to host group

You can assign a binding to a host group. This will let the grid start nodes, to apply the binding configuration on the hosts in the host group. If an application is deployed to a host group, its bindings can also be assigned to a host group.

1. Navigate to Applications.
2. Click the application which bindings you want to assign to a host group.
3. In the card context menu, click Bindings.
4. Hover over the binding that you want to move to a host group. A pen icon is displayed. Click this pen.
5. In the Edit Binding dialog box, select the applicable host group or host groups for the application binding.

Note: A binding in an illegal state carries a warning symbol. This happens when the application is assigned to a host group, but the binding is not, or the other way around. A wildcard is an exception. A wildcard is a part of both a host group and mode and of a host mode simultaneously.

Administering Grid applications

This section describes administrative tasks related to grid applications.

Starting an application

An application is started based on the information given in the bindings. If a binding is configured with an initial node count greater than zero, that node count will be considered when starting the application. So, if an application has two different bindings and both of them have an initial count of one (1), the grid will recognize this and start one node each for the two bindings.

Select Applications > Applications > Select application > Start Application (Link).

Stop application

The Stop Application task stops all grid nodes belonging to this application and sets the application in an offline state. Since the application is put in an offline state, nodes will not be automatically started even if a binding exists with a minimum count greater than zero. The application will remain in an offline state until it is started again; depending on the choice made when stopping the application it will remain in this offline state permanently or until Grid restart.

Note: We recommend that you first put the application in an offline state before stopping it. This gives the application time to finish processing while at the same time preventing it from accepting new client requests.
1 Select Applications > Applications > Select application > Stop Application.
2 Click Yes to confirm the operation.

Accessing Application Management Pages

The management pages for an application are displayed if the application is running. The actual content of the pages will differ depending on the application.

1 Select Applications > Select application.
2 Select an application.
3 In the application card, click Management Pages. The management page for this application is now displayed.

Application Repository

Shows a table over all Grid Application Archives (.gar files) that have been uploaded.

Note: An application might have been uploaded several times but with different versions.

All versions are listed in the table with information about when it was uploaded and if it is installed or not. Application installation can be initiated right from this page by clicking the plus sign icon. Archives can be downloaded by clicking the download icon located on the far right.

Upload application

1 Click Upload at the top of the page.
2 Select a .gar or .war file and click the Upload button.
   Alternatively, drag and drop the .gar or .war file onto the repository page.

Delete applications from the repository

Select the corresponding check boxes and click the waste bin.

Note: Any application using that version must be uninstalled first.

Install new application

1 Click Install New on top of the page.
2 Select an already uploaded application or click Upload to upload a new application.
3 Select which version of the application to install.
4 Click Next to go to next wizard page.
5 Specify a name for the application.
Choose which deployment profile to use.

Upload configuration data if applicable.

If the application is possible to auto scale, you can indicate it should not by clearing the **Auto scaling** check box.

Select which hosts to deploy.

Click **Install** to perform the installation.

### Application deployment

When describing managing the installation and un-installation of a Grid application on a host or a host group, we use the terms deploy and undeploy. The Grid contains an application deployment mechanism which supports managing applications deployment on one or more hosts including the primary install (deploying to the first host), scaling-in, scaling-out, upgrading and un-installing. To be functional, a grid application must be deployed on at least one host, but an application can also be installed without being deployed.

1. An application’s deploy state indicates, per host or globally, the current deploy state of the application - that is, if the deploy was successful, is in progress or failed.

2. A deploy is considered successful if the application files could be unzipped on disk on the target host and the deployment profile was executed successfully.

3. Note that an application binding can only be started on a host where the application is considered to be **OK**. An application can have one of these deployed states:

<table>
<thead>
<tr>
<th>State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OK</td>
<td>An application is deployed successfully.</td>
</tr>
<tr>
<td>In progress</td>
<td>A deploy is currently in progress.</td>
</tr>
<tr>
<td>Failed</td>
<td>A deploy has failed and must be handled.</td>
</tr>
</tbody>
</table>

The **Deployment** page shows which hosts the application is currently deployed on and the deploy state.

On the **Deployment** page, you can do these tasks:

- **Upgrade** - Upgrade the application to another version.
- **Scale Out** - Deploys the application to another host so it is possible to start the application on that host. Scale Out is only available if there are hosts the application yet has not been deployed to.
- **Scale In** - Undeploys the application from a host.
  
  **Note:** This stops the application on that host if it is running. Scale in is only available if the application is deployed to more than one host.
- **Uninstall** - Completely removes the application and its configuration from all hosts.
- **Edit host groups**, if host groups are defined in the grid.
Deploy application on hosts

If you want to scale out an application to a host that it is not yet deployed to, you may use this procedure. After you have deployed the application on the new hosts, you also must reconfigure bindings for the application so that the bindings allow for the application to start on the new hosts. To configure the bindings, use the procedure Configuring bindings on page 41.

An alternative to scaling out is that you want to move the application to a new host. In that case, you deploy the application to the new host, as described here, and later remove the application from the old host. An alternative to removing the application from the old host is to leave it there but just reconfigure the bindings so that it is not possible for the application to start on that host.

**Note:** Consult the documentation of each application. Some applications do not support scale-out and there may be restrictions on what each application supports in terms of moving an application.

1. Open the Deployment page in the Application menu.
2. Click the Scale Out link.
3. Select the host that you would like to scale the application out to and confirm the change.

Undeploy application from hosts

Use this procedure to remove an application from one or several hosts. Binding references associated with this application and the selected hosts will be removed.

It is recommended to first stop any application nodes on the host that you want to remove the application from.

**Note:** Removing the application from a host will remove all artifacts of that application including configuration and data files depending on the application. Further, any grid properties which were configured for that host will be lost. Please consult the documentation for each application for more guidance.

1. Open the Deployment page in the Application menu.
2. Click the Scale In link and select the hosts you want to remove the application from.

Install a web application

Along with Grid applications, Grid also supports web applications (war files). Once installed the web application works just like a Grid application.

To install a web application:

1. On the Application page, select Install New to open the Install Application dialog box.
2. Select the Upload link in the Install Application dialog box to open the Upload to Repository dialog box.
3. Click the Browse button and select a Web Application Archive file (.war).
The Install Application dialog box now shows the selected .war file along with two new fields, Type Name and Version.

Specify a Type Name. This is the application name for the entry in the Application Repository.

Specify a Version. This is the application version for the entry in the Application Repository.

Optionally click the Show Details link for selection of advanced features.

**Vertically Scalable**
Determined whether the application can be scaled vertically on the same host; enabled by default.

**Horizontally Scalable**
Determines whether the application can be scaled horizontally across multiple hosts; enabled by default.

**Session Affinity**
Indicates that the application requires Session Affinity; enabled by default.

**Parent Class Loader First**
Determines the behavior of the web application classloader; disabled by default.

Click the Upload button to add the Web Application to the Application Repository.

Select the newly uploaded application in the Install Application dialog box and click Next.

Specify a name for the application.

Select the Auto Scaling option if the application must be automatically installed on any new hosts added to the Grid.

Select what hosts the application must initially be installed on.

Click Install to complete the installation.

By default a global Binding, named as the application, with minimum set one is created. Also a context root with the same name as the binding in lower case is added.

**Servlet Context Init Parameters**

Servlets may require configuration in the form of Servlet Context Init Parameters. Such parameters can be added to the application in the form of Grid Properties.

To add a Grid Property which will be used as a Servlet Context Init Parameter:

- On the Applications page, select the Web Application to expand the detail card for the application.
- From the detail card context menu, select Properties to go to the property configuration page.
- Select Add Ad Hoc Property at the bottom of the page to display the fields for creating an ad hoc property.
- Specify the name of the property. In order for the property to be propagated to the Servlet Context as an Init Parameter, the property must be prefixed with "grid.servletContext.initParam.". For example: "grid.servletContext.initParam.Language".
- Leave all check boxes unselected.
- Click Add to create the selected property and display the edit property page.
- Click Edit to set the value for all hosts. If the value should only be valid for a specific host, select a host in the context listing on the left.
• Specify a value and click Save.
• At this point the application must be restarted in order for the properties to be propagated to the Servlet Context.

Deployment profile data
Servlet Context Init Parameter Grid properties can be created during installation through the use of a Profile Data file. The profile data file for Web Applications uses the same format as the normal Grid applications (Java properties). During installation the profile data file is read and for each key prefixed with "servletContext" a grid.servletContext.initpParam Grid property is created.

Example:
A profile data properties file has these contents:

```
servletContext.language=EN
servletContext.database=dbserver.example.com
```

Two grid properties are created:

```
grid.servletContext.initParam.language=EN
grid.servletContext.initParam.database=dbserver.example.com
```

These properties in turn are available as Init Parameters named "language" and "database" in the Servlet Context when the application starts.

Managing application-specific web components
If the node types of a specific grid application contain web applications, or if they expose REST or web services, these are managed from the context menu in each detail card in Grid Management Pages.

The menu option Web Components is only enabled for applicable applications.

The Grid Management page is grouped by module.

Edit Context Root settings

1. Navigate to the Grid management pages. Go to Applications > Applications.
2. Open the detailed card for the application.
3. Open the application context menu and select Web Components.
4. Click Edit.
5. Edit the applicable check boxes for Compression, Header Routing, and Path Routing as directed in the application documentation.
6. Click Save.

Note: Context root tries cannot be removed, only edited.
Ports for client applications

This section provides a general description of how client applications and other server applications connect to the grid through ports. More specific descriptions of this are in the installation guides for each application that needs to connect to the grid. Use this description to identify the correct ports for client applications to use to connect to the grid.

Grid applications do not normally expose ports themselves. Clients connect to ports opened in one of the grid routers. This is an important concept that enables grid applications to be moved between hosts and scaled out without confusing the connected clients.

It is possible for applications to bypass the routers and open ports themselves. However, they rarely do and, if they do, the correct way of configuring that application is described in the application's documentation. In that case, what is written here does not apply.

The routers may expose ports of different types:

- Proxy - Access to the internal Grid communication protocol.
- HTTPS - Access to web applications, web services, and REST.
- Connection Dispatchers - Ports opened on behalf of grid applications with proprietary communication configured per application.

Technically, routers are application neutral. A client may connect to any router in a grid as long as that router exposes the correct type of port on a network interface that is accessible from the client. So, given that an application client needs a particular type of port, it is possible to select any such port as long as the client can reach it. However, this should be described in the documentation of the client application.

Connection Dispatchers

Manage connection dispatchers, that is, open ports on behalf of Grid applications with proprietary information.

This page displays any existing connection dispatcher configurations.

**Note:** Connection dispatchers are enabled only if the application has been configured to have connection dispatchers.

1. Click **Add New**.
2. Specify this information.

**Type**
Specify a pre-defined application-specific name of the connection dispatcher.

**Authentication Type**
Select between **No authentication**, **Server authentication only**, **Clients may authenticate with certificate**, or **Clients must authenticate with certificate**.

**Router**
Specify which router to use when opening the port.
Port
Specify the port to use.

Description
Provide a description for the connection dispatcher.

Adding a DBC Configuration

The Database Connection Configurations (DBC) page lists existing configurations. Click the pen icon to edit any configuration.

1. Click Add New.
2. Specify this information.

Name
Specify the name of the database connection.

Driver
Specify the JDBC driver in use for the database connection.

JDBC URL
Specify the connection string for the database connection.

Schema
Optionally, specify the database connection schema.

Username
Specify the database connection user name.

Password
Specify the database connection password.

Keys
Optionally, map the DBC Configuration to one or more keys. These can be used for tenant mapping.

Pool Settings
Click to expand and optional change how the database pooling is configured.

- **Min idle connections**: The minimum number of connections that can remain idle in the pool, without extra ones being created, or zero to create none.
- **Max idle connections**: The maximum number of connections that can remain idle in the pool, without extra ones being released, or negative for no limit.
- **Max total connections**: The maximum number of active connections that can be allocated from this pool at the same time, or negative for no limit.
- **Max wait millis**: The maximum number of milliseconds that the pool will wait (when there are no available connections) for a connection to be returned before throwing an exception, or -1 to wait indefinitely.
• **Time between evictions runs millis**: The number of milliseconds to sleep between runs of the idle object evictor thread. When non-positive, no idle object evictor thread will be run.

• **Num tests per eviction run**: The number of objects to examine during each run of the idle object evictor thread (if any).

• **Min evictable idle time millis**: The minimum amount of time an object may sit idle in the pool before it is eligible for eviction by the idle object evictor (if any).

• **Soft min evictable idle time millis**: The minimum amount of time a connection may sit idle in the pool before it is eligible for eviction by the idle connection evictor, with the extra condition that at least 'minIdle' connections remain in the pool. When minEvictableIdleTimeMillis is set to a positive value, minEvictableIdleTimeMillis is examined first by the idle connection evictor. For example, when idle connections are visited by the evictor, idle time is first compared against minEvictableIdleTimeMillis (without considering the number of idle connections in the pool) and then against softMinEvictableIdleTimeMillis, including the minIdle constraint.

• **Test on borrow**: The indication of whether objects will be validated before being borrowed from the pool. If the object fails to validate, it will be dropped from the pool, and we will attempt to borrow another.

• **Test on create**: The indication of whether objects will be validated after creation. If the object fails to validate, the borrow attempt that triggered the object creation will fail.

• **Test on return**: The indication of whether objects will be validated before being returned to the pool.

• **Test while idle**: The indication of whether objects will be validated by the idle object evictor (if any). If an object fails to validate, it will be dropped from the pool.

**Note:** There are Grid counters for DBC pooling. These can be viewed for each node on the node page.

**Deployment Operations**

This page displays a row for each deployment operation for the application, and links to the corresponding log files.

On this page you can do these tasks:

• **Retry/Undo** - This option is available if an operation has failed. This is the same as on the Deploy page.

• **View profile data** - This option is available if the operation used the deployment profile data.

**Importing and exporting**

An application's settings can be exported and stored outside of the Grid in a document. This document can be imported at a later date to any Grid that supports the feature. This can be useful for migration, cloning, or back up of an application's configuration.
Exporting a document

1. Navigate to Applications.
2. Click on the application where you want to import the settings.
3. In the menu in the card, click Import/Export Settings.
4. Under import, click on the folder icon.
5. Specify a password in the text field. The password must be at least 16 characters.
6. Verify the password.
7. In the Valid Through field, specify the date when the document should expire.
8. Click Export. A download prompt is displayed. When exporting a document, any sensitive data will be encrypted. The encrypted fields cannot be decrypted after the specified validity date.

Importing a document

1. Navigate to Applications.
2. Click on the application where you want to import the settings.
3. In the menu in the card, click Import/Export Settings.
4. Under import, click on the folder icon.
5. Navigate to the document you want to import and click OK.
6. Specify the password to decrypt sensitive data.
   If there is no sensitive data in the document, you will not be asked to specify the password.
7. Click Import.

When importing a document, any configuration for the application will be replaced with the data from the imported document. This may remove or add settings for an application, such as bindings, properties, and persisted data. If you want to check the changes to be made in the document, use the diff functionality. The import will not modify anything if it detects that the document contains settings that are illegally configured, but will present the detected errors in a list instead.

Using diff on an imported document with the application’s current state:

1. Navigate to Applications.
2. Click on the application where you want to use the diff settings.
3. In the menu in the card, click Import/Export Settings.
4. Under import, click on the folder icon.
5. Navigate to the document where you want to use diff and click OK.
6. Specify the password to decrypt sensitive data.
   If there is no sensitive data in the document, you will not be asked to specify the password.
7. Click Diff.

Diff is presented as a JSON document containing data from both the settings that are currently in use for the application and the provided JSON document. Any setting that would be removed by an import
is marked red. Any setting that would be added by an import is marked green. Any setting that would be changed by an import is marked yellow. Unchanged settings are not marked in any specific way. If you agree with the presented changes, you can click Import.

If the diff shows something unwanted or if there is an error message presented when you import, you may modify the document manually to change any values that should be imported. Before making any changes to the document, it is recommended that you first create a copy of the document that you want to modify.

Grid used to provide a different wizard based Import or Export zip format. This format is still supported and now comes with a converter. The converter allows you to extract the settings for an application and creates a JSON document for it. This JSON document can be imported. The new JSON preserves the password to decrypt sensitive data so you must specify the same password used for the zip in the old import/export tool.

Converting an imported zipped document

1. Navigate to Applications.
2. Click on the application where you want to use the diff settings.
3. In the menu in the card, click Import/Export Settings.
4. Under import, click on the folder icon.
5. Navigate to the zipped document that you want to convert and click OK.
6. Click Convert.

Administering Grid nodes

This section describes administrative tasks related to grid nodes.

Node capacity

The node capacity option makes it possible to define a threshold for the relative number of requests accepted for this node.

Setting node weight

A node with a weight of 50 will receive half the number of requests as a node with weight set to 100. This configuration only affects the running node.

**Note:** This task is only applicable in environments without load balancers.

1. Navigate to Nodes.
2  Open the detail card for the applicable node.
3  Select **Node Capacity** from the context menu.
4  Specify a Node Weight and click **Set**.

**Busy monitor**

Enabling the Busy Monitor makes the node go Offline whenever the heap usage in percent is greater than the Memory Threshold. The denied request counter tracks the number of requests being denied because of memory problems.

This configuration only affects the running node.

**Note:** This task is only applicable in environments without load balancers.

1  Navigate to **Nodes**.
2  Open the detail card for the applicable node.
3  Select **Node Capacity** from the context menu.
4  Specify a value for **Busy Monitor**.
5  Click **Set**.

**Starting a new node**

Starting a new node can be triggered from both the node card and the node list. Click to launch a new node. First select the binding (application name is in italics) and then select the host to launch the node on and finally click **Start**.

Application instances are started by launching a binding that targets the correct node type. Normally you do not start individual application nodes. Instead, you start an entire application and, as a result, all nodes belonging to the application will be started.

However, there are situations when you want to start an individual application node. Examples are:

- An application is experiencing increased load and you want to start a new server application instance, perhaps on a new host with spare capacity, to cope with the new situation.
- You intend to stop an existing node and you want to start a new alternative node first so that the operations of the application will not be disturbed when you stop the node.
- You want to move the execution of this application from one host to another. This would be done by starting new nodes on the new host combined with stopping the old nodes on the original host.

Before starting a node, note these considerations:

- Does the application support manually starting new nodes? Some applications manage their own nodes and they should not be started manually.
- Some applications do not support several instances running simultaneously. If that is the case with the application you are starting, existing nodes may have to be stopped first. However, ideally, applications should be written to support this.
- Always consult the application's documentation on what is supported in each case.
Start initial nodes

Starts all application bindings with an initial count > 0. Will start as many nodes as the initial count. Will not start anything if the number of running nodes already is equal or greater than the initial count.

Stopping a node

You can stop a node immediately, which is not recommended, or in a controlled fashion, which gives the node 60 seconds to clean up.

Normally, you do not stop individual application nodes. Instead, you stop an entire application and, as a result, all nodes belonging to the application will be stopped. However, there are situations when you want to stop an individual application node.

For example:

• A node is experiencing problems and you need to stop it, perhaps with the intention of starting a new node to replace the stopped one.
• The application has been started in multiple instances (nodes) but all that capacity is no longer required, so some of the nodes can be removed to free resources.
• You want to clear a particular host in a multi-host grid from all nodes to perform some maintenance on that host.

Before stopping a node, note these considerations:

• Should the node be put in an offline state first?
• If the application node is the only one of its kind, the application may stop working. Should a new similar application node be started first before the node is stopped?
• Applications are implemented differently. Some applications manage their nodes themselves.
• Consult the documentation of the application. Does the documentation recommend an alternative procedure to stopping the node in this case?

Set offline

Sets the application offline, meaning that the Grid will not automatically start any nodes and most parts of the application will not be available. For example, HTTP, REST, and non admin proxys.

Changing the Grid Service user

Use this procedure if you need the grid bootstrap service to run as a different user than the default user.

If the grid runs on multiple hosts, repeat this procedure for each host.
Changing the user assigned to the grid service on Windows platforms

1. Stop the Grid.
2. Access the Windows Server Manager on the server where the grid bootstrap service runs.
4. In the list of services, locate the grid bootstrap service. It will have a name in the format: Infor ION Grid - gridname.
5. To stop the grid bootstrap service, right-click the entry and select Stop.
6. Double-click the entry to open the Properties dialog box.
7. On the Log On property tab, change the default user to the user you want the grid on this host to run as.
8. Ensure that the Grid service user is added to the local Grid full security group, named gridName_full. For more information, see “File Security” in the Infor ION Grid Security Administration Guide.
9. Start the grid bootstrap service. Right-click the grid bootstrap service entry and select Start.
10. Start the Grid.

Changing the user assigned to the grid service on Linux platforms

1. Stop the Grid. At the command line, type /grid_installation_dir/bin/StopHost.
2. Stop the grid bootstrap service. At the command line, type service grid_gridname stop.
3. To launch the bootstrap service as the new user, edit the file /etc/init.d/grid_gridname. Replace the line USER= with the new user name.
4. Change the owner of the Grid directory. At the command line, type chown -R newUser Name:newUserName /grid_installation_dir/.
5. Start the grid bootstrap service. At the command line, type service grid_gridname start.
6. Start the Grid. At the command line, type /grid_installation_dir/bin/StartHost.

Maintenance

Grid database

The grid uses a database to store all grid data, including but not limited to the following examples:
• Grid runtime binary files
• Grid applications and associated configuration files
• Grid topology and runtime metadata

The Grid keystores and certificates of the grid database are generally considered to be static, that is, non-transactional. The most common trigger of an update to the grid database is when configuration changes are made. The following are some examples of such changes:

• Add, remove or change a host
• Add, remove, upgrade or re-configure an application
• User management changes
• Grid configuration changes including but not limited to bindings and properties

Given the content of the database, it is critical to the operation of the grid. Loss of the database or corruption to the data will result in the inability to operate the grid and therefore consideration must be given to the infrastructure, security, and maintenance of the database server.

It is highly recommended that the database server be prepared for production purposes in that some or all of the following principles are employed. Please note that these are only intended as guidelines to enforce the need to consider the requirements that the grid database be highly available:

• Disks are configured in a RAID array employing redundancy (for example, RAID 1, 5 or 10)
• Database server is clustered either active-active or active-passive to cope with single server failure
• Database server employs multiple network interfaces with a common address
• Regular point-in-time backups are taken and their ability to be restored is validated at each occasion

Changing the database settings

Use the following procedure to change the user or password for the grid database connection.

1. Stop the grid.
2. Stop the bootstrap service.
3. Run this CLI command:

   ```
   grid_installation_dir/tools> java -jar grid-cli.jar database config -user <new-user> -password <new-password>
   ```

   This is an example, use the help parameters to view all options.

4. Start the bootstrap service.
5. Repeat steps 2–4 for each Grid host.
6. Start the grid.
The Grid and how it is stored on disk

Each instance of a grid has a folder on disk on each host that is part of that grid instance. This folder is called a grid configuration area. It contains the runtime artifacts of the grid, configuration data, and the applications deployed to that host.

The configuration area is located within `grid_root_installation_path`.

When looking within a configuration area, you will find a set of subfolders, some of which are:

- `grid/applications`: All applications that are deployed in this host will reside here in a subfolder of their own
- `config`: Configuration data used by the grid
- `grid/log`: Log files from all application grid nodes running on this host

Backing up and restoring important Grid files

In a grid, certain files are essential to the communication within and to that grid. It is recommended to perform a backup of these files in case of data loss or corruption. Backups should be performed for all hosts in a grid.

To locate the grid files area, see The Grid and how it is stored on disk on page 89.

**Note:** When backing up the grid files, the applications will be backed up as well. However, from the applications’ perspective, that may not be enough. Consult the documentation for each application regarding backup procedures.

**Note:** When you back up the grid files, be sure to apply file security to them so that they are protected similarly to how the live production grid files are protected.

What Grid files should be backed up?

Listed below are the directories that should be backed up.

**Installation /secure directory**

The contents of the `grid_root_installation_path/secure` directory should be backed up.

After restoring the contents of this folder, restart the host.

**Installation /config directory**

The contents of the `grid_root_installation_path/config` directory should be backed up.

After restoring the contents of this folder, restart the host.