

# CAST AIP for Dashboards - Software requirements

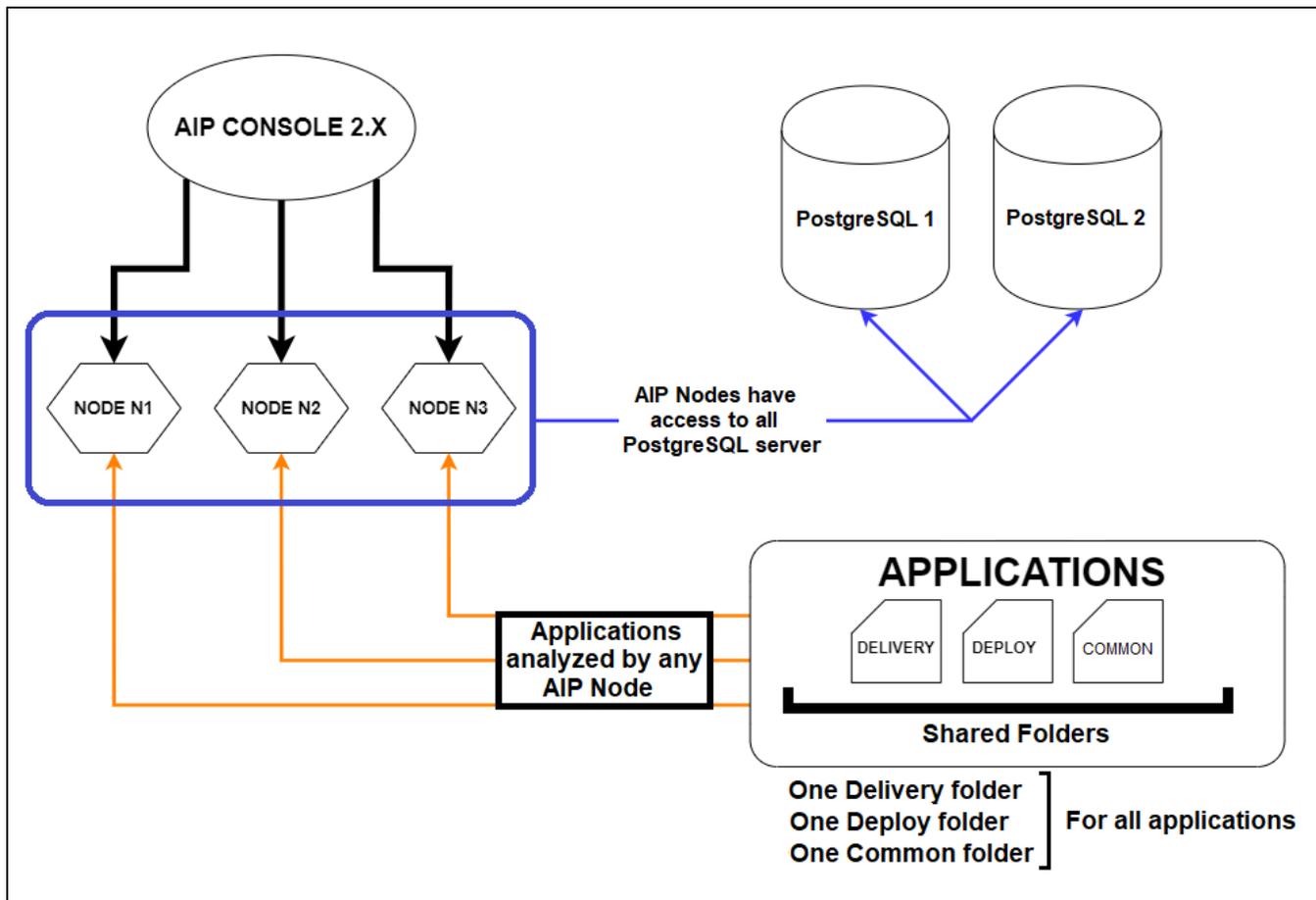
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**i** Summary: information to help you plan your CAST AIP for Dashboards installation.

## Typical architecture

2.x

[Click to enlarge](#)



## Deployment modes

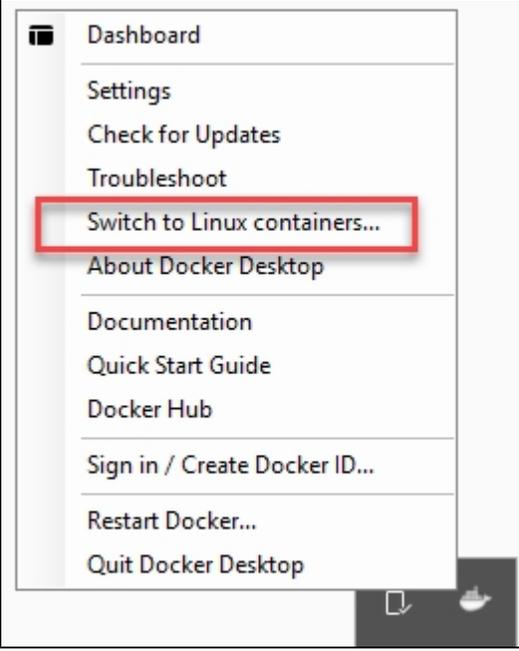
Before beginning the installation process, you should be aware of the various deployment methods available:

Release	Deployment mode	Deployment scenario	Details
2.x	Enterprise	Docker for Linux or Docker Desktop for Microsoft Windows	<p><b>Enterprise mode using Docker</b> is highly recommended wherever possible:</p> <ul style="list-style-type: none"> <li>This mode uses <b>microservices architecture</b>: all <b>Console front-end</b> services (authentication, UI, Node registration etc.) are provided either: <ul style="list-style-type: none"> <li>as Docker containers</li> <li>or can be installed via Java JAR installers where Docker cannot be used</li> </ul> </li> <li>When using Docker/Docker Desktop: <ul style="list-style-type: none"> <li>the deployment of CAST Dashboards is entirely automatic and no manual configuration is required</li> <li>upgrades to new releases of Console is simple - pull/rebuild new images for the containers</li> </ul> </li> <li>The Node service is provided as a Java JAR installer for installation on Microsoft Windows</li> </ul>
	Enterprise	Java JAR installers (multiple)	
	Standalone	Java JAR installer (single) for Microsoft Windows only	<p><b>Standalone mode</b> is targeted at deployments on <b>Microsoft Windows</b> on <b>one single machine</b>, specifically and only for demo or POC requirements. The installer includes all required services in <b>one single Java JAR installer</b>:</p> <ul style="list-style-type: none"> <li>Console front-end service</li> <li>One single Node back-end service</li> </ul> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> <p> Note that this mode has some limitations which are explained in <a href="#">2.x - Standalone mode - Installation of AIP Console front-end in standalone mode</a>.</p> </div>
1.x	-	Java JAR installer (single)	<p>In 1.x, one single Java JAR installer is provided containing:</p> <ul style="list-style-type: none"> <li>Console front-end service</li> <li>Node back-end service</li> </ul>

## Console (front end) package requirements

### 2.x - Docker install

Software	Required	Notes
Host Operating System	✔	<p><b>Microsoft Windows</b></p> <ul style="list-style-type: none"> <li>See the Docker Desktop for Windows system requirements: <a href="https://docs.docker.com/docker-for-windows/install/#system-requirements">https://docs.docker.com/docker-for-windows/install/#system-requirements</a>.</li> </ul> <p>See <a href="https://docs.docker.com/desktop/windows/install/">https://docs.docker.com/desktop/windows/install/</a>.</p> <p><b>Linux</b></p> <ul style="list-style-type: none"> <li>all Linux distributions based on (or derived from) Red Hat.</li> </ul>
Third-party software required for install on Docker (Linux and Windows)	✔	<p><b>Docker on Linux</b></p> <ul style="list-style-type: none"> <li><b>Docker Engine 18.0</b></li> <li><b>docker-compose</b> latest stable release recommended</li> <li><a href="#">curl</a></li> </ul>

		<p><b>Docker on Microsoft Windows</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Docker Desktop for Windows</a> - latest version recommended, or one that provides: <ul style="list-style-type: none"> <li>• <b>Docker Engine 19.03.5</b></li> <li>• <b>docker-compose</b> latest stable release recommended</li> <li>• <b>Containers for Linux</b> must be enabled:</li> </ul> </li> </ul>  <ul style="list-style-type: none"> <li>• <b>Resources for Docker:</b> <ul style="list-style-type: none"> <li>• Ensure that you configure Docker for Windows using the <b>Resources &gt; Advanced</b> tab with a <b>minimum of 16GB of RAM</b> and <b>4 x CPUs</b> (recommended). See <a href="https://docs.docker.com/docker-for-windows/#resources">https://docs.docker.com/docker-for-windows/#resources</a> for more information.</li> </ul> </li> </ul>
<p><b>Access to at least one CAST Storage Service /PostgreSQL</b></p>	<p>✓</p>	<p>An installation of the <a href="#">CAST Storage Service/PostgreSQL</a>, which must be accessible over the network. This is used to host the schemas required for storing analysis results - <b>these schemas do not need to be pre-installed</b> as Console will manage their installation.</p> <ul style="list-style-type: none"> <li>• You can use one single CAST Storage Service/PostgreSQL for all Nodes and Measurement schema</li> <li>• You can use multiple CAST Storage Services/PostgreSQL - one dedicated server per Node and one dedicated server for the Measurement schema for example</li> </ul>
<p><b>Ports</b></p>	<p>✓</p>	<p>The following ports must be opened inbound on the host server. These correspond to each Docker container required by Console (front-end). This is so that remote Node instance can access the required services:</p> <ul style="list-style-type: none"> <li>• 2281 (Service Registry)</li> <li>• 2285 (Node database (PostgreSQL))</li> <li>• 8081 (Gateway)</li> <li>• 8086 (Keycloak OAuth 2 Server)</li> <li>• 8087 (embedded Dashboards - available from 2.0.0-beta2)</li> <li>• 8088 (Service Registry)</li> </ul> <p>These ports can be customized if required.</p>
<p><b>User permissions</b></p>	<p>✓</p>	<p>To run the Docker install, <b>Administrator privileges</b> are required:</p> <ul style="list-style-type: none"> <li>• <b>Microsoft Windows</b> - local Administrator privileges</li> <li>• <b>Linux</b> - user in the sudoers list</li> </ul>
<p><b>Access to <a href="https://hub.docker.com">hub.docker.com</a></b></p>	<p>✓</p>	<p>All Docker containers are pulled direct from <a href="https://hub.docker.com/">https://hub.docker.com/</a>, therefore the host server must have access to this.</p>
<p><b>Global CAST License</b></p>	<p>✓</p>	<p>Console requires a global CAST <b>license key</b>. This key will be applied to all Node packages that you install.</p>

<b>CAST Extend</b>	✓	<p>In order to <b>install any CAST AIP Extensions automatically</b>, Console needs to <b>connect</b> to CAST's managed service known as "Extend" over the public internet. You will also need <b>login credentials for Extend</b> - i.e. you will need to register an account.</p> <p>Access to the following URL on port <b>443</b> via <b>TCP</b> is required:</p> <ul style="list-style-type: none"> <li>• <a href="https://extend.castsoftware.com">https://extend.castsoftware.com</a></li> </ul> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> <p><b>i</b> Note that if (due to security concerns) your organization cannot interact over the public internet with CAST's managed services, you can alternatively use <b>CAST Extend Offline/Proxy</b>.</p> </div>
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## 2.x - Multiple JAR install

**i** The JAR installers are an alternative to a Docker deployment. See [2.x - Enterprise mode - Installation of AIP Console front-end via Java JAR installers](#).

Software	Required	Notes																								
<b>Host Operating System</b>	✓	<p>Supported versions of Windows:</p> <ul style="list-style-type: none"> <li>• Windows Server 2019</li> <li>• Windows Server 2016</li> <li>• Windows Server 2012 R2 Standard</li> <li>• Windows Server 2012 Standard</li> <li>• Windows Server 2008 R2 SP1 Standard</li> <li>• Windows 10</li> <li>• Windows 8.1</li> </ul> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> <p><b>i</b> Installations of Windows Server using only <b>Server Core</b> (i.e. without a GUI) are not supported.</p> </div> <ul style="list-style-type: none"> <li>• Recommended versions of Linux: <ul style="list-style-type: none"> <li>• all Linux distributions based on (or derived from) Red Hat</li> </ul> </li> </ul>																								
<b>Java (JRE/JDK)</b>	✓	<p>A <b>64bit Java JRE</b> or <b>JDK</b> is required to install and run Console.</p> <p>Most Java variants certified by the <b>OpenJDK Community Technology Compatibility Kit</b> are compatible with Console (you can verify if a company has access to the TCK <a href="#">on the OpenJDK website</a>). However, CAST highly recommends using the following LTS releases which are known to function with v. 2.0:</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Provider</th> <th>Java 8 64bit</th> <th>Java 11 (LTS) 64bit</th> <th>Java 17 (LTS) 64bit</th> </tr> </thead> <tbody> <tr> <td>Oracle JDK (<a href="http://jdk.java.net/">http://jdk.java.net/</a>)</td> <td>✓</td> <td>✓</td> <td>✓ (see note below)</td> </tr> <tr> <td>AdoptOpenJDK/Eclipse Temurin</td> <td>✓</td> <td>✓</td> <td>✓ (see note below)</td> </tr> <tr> <td>Amazon Corretto</td> <td>✓</td> <td>✓</td> <td>N/A</td> </tr> <tr> <td>Eclipse OpenJ9</td> <td>✓</td> <td>✓</td> <td>N/A</td> </tr> <tr> <td>Azul Zulu</td> <td>✓</td> <td>✓</td> <td>✓ (see note below)</td> </tr> </tbody> </table>	Provider	Java 8 64bit	Java 11 (LTS) 64bit	Java 17 (LTS) 64bit	Oracle JDK ( <a href="http://jdk.java.net/">http://jdk.java.net/</a> )	✓	✓	✓ (see note below)	AdoptOpenJDK/Eclipse Temurin	✓	✓	✓ (see note below)	Amazon Corretto	✓	✓	N/A	Eclipse OpenJ9	✓	✓	N/A	Azul Zulu	✓	✓	✓ (see note below)
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<b>Access to at least one CAST Storage Service /PostgreSQL</b>	✓	<p>An installation of at least one <b>CAST Storage Service/PostgreSQL</b>, which must be accessible over the network. This is used to host various items required by Console/Nodes:</p> <ul style="list-style-type: none"> <li>• One dedicated <b>database</b> called "<b>keycloak</b>". This database must be created and available on the CAST Storage Service /PostgreSQL instance BEFORE installation is started. This is required by the <b>SSO Java installer</b>.</li> <li>• Two dedicated <b>schemas</b> called "<b>aip-config</b>" and "<b>aip-node</b>". These schemas will be created during the service startup and can be stored in any database, however, storage in the "<b>postgres</b>" database is recommended. These are required by the <b>Service Registry Java installer</b>.</li> <li>• For each Application managed in Console, <b>various schemas (Management, Analysis, Dashboard)</b> are required for analysis/snapshot storage requirements. These schemas are created when the Application is added into Console. In addition, one schema (<b>Measurement</b>) is required to consolidate snapshot results from all Applications.</li> </ul> <p>You can use one single CAST Storage Service/PostgreSQL to host all required items, or dedicated CAST Storage Service /PostgreSQL instances to host each item. Note that the CAST Storage Service/PostgreSQL instance defined in the <b>Service Registry Java installer</b> will also be made available for use as storage for application analysis/snapshot requirements.</p>																								

<b>Ports</b>	✓	<p>The various services run on the following ports by default:</p> <ul style="list-style-type: none"> <li>• 2281 (Service Registry)</li> <li>• 8081 (Gateway)</li> <li>• 8086 (Keycloak OAuth 2 Server)</li> <li>• 8087 (embedded Dashboards - available from 2.0.0-beta2)</li> <li>• 8088 (Service Registry)</li> </ul> <p>These ports can be customized if required.</p>
<b>User permissions</b>	✓	<p>To run the setup start and run the Console package on the server, the follow user permissions are required:</p> <ul style="list-style-type: none"> <li>• <b>Microsoft Windows</b> - local Administrator privileges</li> <li>• <b>Linux</b> - user in the sudoers list</li> </ul>
<b>Global CAST License</b>	✓	<p>Console requires a global CAST <b>license key</b>. This key will be applied to all Node packages that you install.</p>
<b>CAST Extend</b>	✓	<p>In order to <a href="#">install any CAST AIP Extensions automatically</a>, Console needs to <b>connect</b> to CAST's managed service known as "Extend" over the public internet. You will also need <b>login credentials for Extend</b> - i.e. you will need to register an account.</p> <p>Access to the following URL on port <b>443</b> via <b>TCP</b> is required:</p> <ul style="list-style-type: none"> <li>• <a href="https://extend.castsoftware.com">https://extend.castsoftware.com</a></li> </ul> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> <p> Note that if (due to security concerns) your organization cannot interact over the public internet with CAST's managed services, you can alternatively use <a href="#">CAST Extend Offline/Proxy</a>.</p> </div>

## 1.x - JAR install

Software	Required	Notes
<b>Host Operating System</b>	✓	<p>The Console package can be installed on <b>both Windows</b> and <b>Linux</b> operating systems:</p> <ul style="list-style-type: none"> <li>• Supported versions of Windows: <ul style="list-style-type: none"> <li>• Windows Server 2019 (supported in <b>Console 1.10.0</b>)</li> <li>• Windows Server 2016</li> <li>• Windows Server 2012 R2 Standard</li> <li>• Windows Server 2012 Standard</li> <li>• Windows Server 2008 R2 SP1 Standard</li> <li>• Windows 10</li> <li>• Windows 8.1</li> </ul> </li> </ul> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> <p> Installations of Windows Server using only <b>Server Core</b> (i.e. without a GUI) are not supported.</p> </div> <ul style="list-style-type: none"> <li>• Recommended versions of Linux: <ul style="list-style-type: none"> <li>• all Linux distributions based on (or derived from) Red Hat</li> </ul> </li> </ul>

Java (JRE /JDK)	✓	<p>A <b>64bit Java JRE or JDK</b> is required to install and run Console.</p> <p>Most Java variants certified by the <b>OpenJDK Community Technology Compatibility Kit</b> are compatible with Console (you can verify if a company has access to the TCK <a href="#">on the OpenJDK website</a>). However, CAST highly recommends using the following LTS releases which are known to function with v. 1.14.0:</p> <table border="1" data-bbox="402 262 1162 514"> <thead> <tr> <th>Provider</th> <th>Java 8 64bit</th> <th>Java 11 (LTS) 64bit</th> <th>Java 17 (LTS) 64bit</th> </tr> </thead> <tbody> <tr> <td>Oracle JDK (<a href="http://jdk.java.net/">http://jdk.java.net/</a>)</td> <td>✓</td> <td>✓</td> <td>✓ (see note below)</td> </tr> <tr> <td>AdoptOpenJDK</td> <td>✓</td> <td>✓</td> <td>✓ (see note below)</td> </tr> <tr> <td>Amazon Corretto</td> <td>✓</td> <td>✓</td> <td>N/A</td> </tr> <tr> <td>Eclipse OpenJ9</td> <td>✓</td> <td>✓</td> <td>N/A</td> </tr> <tr> <td>Azul Zulu</td> <td>✓</td> <td>✓</td> <td>✓ (see note below)</td> </tr> </tbody> </table> <div data-bbox="407 535 1485 835" style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p> • If you have multiple JDK versions installed on a Linux server, you can set the default using the following command:</p> <pre style="border: 1px solid #ccc; padding: 5px; margin: 5px 0;">sudo update-alternatives --config java</pre> <p>• <b>Java 17 (LTS)</b> is more restrictive regarding java library use and limits some elements to specific modules that are not enabled by default. As a result of this, although supported for use with Console, the start up batch/script files delivered with the installer for the Console front-end and back-end Node must be modified before they can be used to launch Console or an Node. See <a href="#">Configuring start up services and scripts for use with Java 17 and above</a>.</p> </div>	Provider	Java 8 64bit	Java 11 (LTS) 64bit	Java 17 (LTS) 64bit	Oracle JDK ( <a href="http://jdk.java.net/">http://jdk.java.net/</a> )	✓	✓	✓ (see note below)	AdoptOpenJDK	✓	✓	✓ (see note below)	Amazon Corretto	✓	✓	N/A	Eclipse OpenJ9	✓	✓	N/A	Azul Zulu	✓	✓	✓ (see note below)
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Access to Node(s)	✓	<p>The <b>Console package</b> requires access to the <b>analysis nodes</b> on which the <b>Node package/AIP Core</b> has been installed:</p> <ul style="list-style-type: none"> <li>• <b>Console package version number</b> and the <b>Node package version number</b> must be <b>identical</b>.</li> <li>• If you are installing the <b>Node</b> package on multiple analysis nodes, then you need to ensure that the Console package can access the Nodes via the defined URLs - i.e. you may need to adjust <b>firewall rules on the Nodes</b> to allow access on the defined port.</li> </ul>																								
Access on port 8081	✓	<p>The Console package runs by default on port <b>8081</b> (although you can customize this if required - CAST recommends <a href="#">enabling secure HTTPS connection</a>) therefore you will need to <b>adjust firewall rules</b> on the host server to allow access to the appropriate port so that users can access Console in their browser.</p>																								
Global CAST License	✓	<p>The Console package requires a global CAST <b>license key</b>. This key will be applied to all Node packages that you install.</p>																								
CAST Extend	✓	<p>In order to <a href="#">install any CAST AIP Extensions automatically</a>, Console needs to <b>connect</b> to CAST's managed service known as "Extend" over the public internet. You will also need <b>login credentials for Extend</b> - i.e. you will need to register an account.</p> <p>Access to the following URL on port <b>443</b> via <b>TCP</b> is required:</p> <ul style="list-style-type: none"> <li>• <a href="https://extend.castsoftware.com">https://extend.castsoftware.com</a></li> </ul> <div data-bbox="407 1459 1485 1543" style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p> Note that if (due to security concerns) your organization cannot interact over the public internet with CAST's managed services, you can alternatively use <a href="#">CAST Extend Offline/Proxy</a>.</p> </div>																								

## Node (back end) package requirements

Software	Required	Notes
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<b>Host Operating System</b>		<p>The Node package must be installed on a <b>Windows host operating system</b> since it requires the presence of <b>AIP Core</b>. Supported versions of Windows:</p> <ul style="list-style-type: none"> <li>• Windows Server 2019 (supported in <b>Console 1.10.0</b>)</li> <li>• Windows Server 2016</li> <li>• Windows Server 2012 R2 Standard</li> <li>• Windows Server 2012 Standard</li> <li>• Windows Server 2008 R2 SP1 Standard</li> <li>• Windows 10</li> <li>• Windows 8.1</li> </ul>														
<b>AIP Core</b>		<p>A standard installation (i.e. run from the AIP Core setup) of <b>AIP Core 8.3.6</b> is required on the target node.</p> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;">  <ul style="list-style-type: none"> <li>• from <b>v. 1.16</b>, Console can manage multiple <b>Nodes</b> using <b>different releases of AIP Core</b>. In previous releases, the <b>same release of AIP Core</b> must be used across all Nodes managed in the same Console installation.</li> <li>• CAST recommends the most recent release of AIP Core to take full advantage of all available features.</li> <li>• The installation path for AIP Core is referred to as <b>&lt;CAST_AIP_install&gt;</b> in the rest of this document. By default, the path is <b>C:\Program Files\CAST\&lt;version&gt;\</b> on each Node.</li> </ul> </div>														
<b>CAST Storage Service /PostgreSQL</b>		<p>An installation of the <b>CAST Storage Service/PostgreSQL</b>, which must be available either on the <b>target node</b> or on another <b>dedicated server</b> accessible over the network. This is used to host the schemas required for storing analysis results - <b>these schemas do not need to be pre-installed</b> as Console will manage their installation.</p> <ul style="list-style-type: none"> <li>• You can use one single CAST Storage Service/PostgreSQL for all Nodes and Measurement schema</li> <li>• You can use multiple CAST Storage Services/PostgreSQL - one dedicated server per Node and one dedicated server for the Measurement schema for example</li> </ul>														
<b>Java (JRE /JDK)</b>		<p>A <b>Java JRE</b> or <b>JDK</b> is required to install and run Node. See <b>Java (JRE/JDK)</b> above for more information about requirements.</p>														
<b>Data storage folders</b>		<p>The following folders are required by the Node and must be accessible. CAST recommends the use of a common network share for all Nodes. Note however that in v. 1.x, these folder will be located, by default on each Node.</p> <table border="1" data-bbox="430 1077 1482 1577"> <thead> <tr> <th data-bbox="430 1077 630 1129">Folder</th> <th data-bbox="630 1077 1482 1129">Description</th> </tr> </thead> <tbody> <tr> <td data-bbox="430 1129 630 1199"><b>delivery</b></td> <td data-bbox="630 1129 1482 1199">A location for storing successive and compressed versions of an application's source code provided during a source code delivery.</td> </tr> <tr> <td data-bbox="430 1199 630 1268"><b>deploy</b></td> <td data-bbox="630 1199 1482 1268">A location used to store the most recent version of the application's source code for analysis in uncompressed format.</td> </tr> <tr> <td data-bbox="430 1268 630 1346"><b>common-data (v 2.x only)</b></td> <td data-bbox="630 1268 1482 1346">A common location used to store backup, sherlock, upload and other folders used by the Node.</td> </tr> <tr> <td data-bbox="430 1346 630 1423"><b>backup (v. 1.x only)</b></td> <td data-bbox="630 1346 1482 1423">Used for storing backups of the Application made from Console.</td> </tr> <tr> <td data-bbox="430 1423 630 1501"><b>sherlock (v. 1.x only)</b></td> <td data-bbox="630 1423 1482 1501">Used for storing Sherlock exports of the Application made from Console.</td> </tr> <tr> <td data-bbox="430 1501 630 1577"><b>upload (v. 1.x only)</b></td> <td data-bbox="630 1501 1482 1577">A folder on the target node is required for user uploads - i.e. components that may need to be added to an analysis (for example).</td> </tr> </tbody> </table> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;">  <ul style="list-style-type: none"> <li>• All folders must be writable by the Windows user installing the Node package.</li> <li>• All folders must be empty.</li> <li>• Optional: if using mapped drives, the shared folder must be mapped to all Nodes (Microsoft Windows servers) with the same drive letter, for example R:</li> <li>• In <b>v. 2.x</b>, these folders are defined for all Nodes and this is done before the front-end Console is deployed - see <a href="#">AIP Console - front-end installation</a> and <a href="#">Configure AIP Node storage folder locations - optional - v. 2.x</a></li> <li>• In <b>v. 1.x</b>, these folders are defined per Node - see <a href="#">Configure AIP Node storage folder locations - optional - v. 1.x</a></li> </ul> </div>	Folder	Description	<b>delivery</b>	A location for storing successive and compressed versions of an application's source code provided during a source code delivery.	<b>deploy</b>	A location used to store the most recent version of the application's source code for analysis in uncompressed format.	<b>common-data (v 2.x only)</b>	A common location used to store backup, sherlock, upload and other folders used by the Node.	<b>backup (v. 1.x only)</b>	Used for storing backups of the Application made from Console.	<b>sherlock (v. 1.x only)</b>	Used for storing Sherlock exports of the Application made from Console.	<b>upload (v. 1.x only)</b>	A folder on the target node is required for user uploads - i.e. components that may need to be added to an analysis (for example).
Folder	Description															
<b>delivery</b>	A location for storing successive and compressed versions of an application's source code provided during a source code delivery.															
<b>deploy</b>	A location used to store the most recent version of the application's source code for analysis in uncompressed format.															
<b>common-data (v 2.x only)</b>	A common location used to store backup, sherlock, upload and other folders used by the Node.															
<b>backup (v. 1.x only)</b>	Used for storing backups of the Application made from Console.															
<b>sherlock (v. 1.x only)</b>	Used for storing Sherlock exports of the Application made from Console.															
<b>upload (v. 1.x only)</b>	A folder on the target node is required for user uploads - i.e. components that may need to be added to an analysis (for example).															

<b>Network access</b>		<p><b>v. 2.x</b></p> <p>The Node instance requires <b>outbound</b> access via the following default ports to the server hosting Console:</p> <ul style="list-style-type: none"> <li>• 2281</li> <li>• 2285 (Docker install only - this is the PostgreSQL instance provided as a Docker container and which is required for Keycloak and other schema requirements)</li> <li>• 8081</li> <li>• 8086</li> <li>• 8087</li> <li>• 8088</li> </ul> <p>In addition, <b>outbound</b> access to any CAST Storage Service/PostgreSQL instances configured for Analysis/Snapshot/Measurement storage requirements is required.</p> <p><b>v. 1.x</b></p> <p>The Node package runs by default on port <b>8082</b> (although you can customize this if required - CAST recommends <b>enabling secure HTTPS connection</b>) and this port is used for communication from Console to the Node(s), therefore you will need to <b>adjust firewall rules</b> on the Node instance to allow <b>inbound</b> access from Console.</p> <p>In addition, <b>outbound</b> access to any CAST Storage Service/PostgreSQL instances configured for Analysis/Snapshot/Measurement storage requirements is required.</p>
<b>CAST Extend</b>		<p>In order to <b>install any CAST AIP Extensions automatically</b>, each Node needs to <b>connect</b> to CAST's managed service known as "Extend" over the public internet. You will also need <b>login credentials for Extend</b> - i.e. you will need to register an account:</p> <p>Access to the following URL on port <b>443</b> via <b>TCP</b> is required:</p> <ul style="list-style-type: none"> <li>• <a href="https://extend.castsoftware.com">https://extend.castsoftware.com</a></li> </ul> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> <p> Note that if (due to security concerns) your organization cannot interact over the public internet with CAST's managed services, you can alternatively use <b>CAST Extend local server</b>.</p> </div>
<b>User permissions</b>		<p>To run the setup and start/run the Node package on the server, <b>local Administrator privileges</b> are required.</p>

## Requirements for end users accessing Console

### Browsers

The following browsers are supported when run on Linux, macOS or Microsoft Windows. We regularly test with a subset of the available versions, and aim to fix issues found with any of them.

Browser	Supported	Notes
Microsoft Edge		Minimum supported release: 44 and above
Mozilla Firefox		Minimum supported release: 65 and above
Google Chrome		Minimum supported release: most recent only
Safari		Minimum supported release: 12 and above

## CAST RESTAPI requirements (for embedded dashboards)

	<b>CAST RESTAPI</b>	<p><b>AIP Console 1.25</b></p> <p>A <b>bootable ZIP</b> called <b>cast-integrated-health-engineering-dashboard.zip</b> is provided in the installation media <b>.ZIP file</b> (along side the <b>.JAR</b> installer for the AIP Console) and is partly pre-configured for use with AIP Console. This does not require a web application server such as Apache Tomcat. A minimum release of <b>2.0.1</b> is required.</p>
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	<p><b>AIP Console 1.24</b></p> <p>The <b>CAST-RESTAPI-integrated.war</b> is provided in the installation media <b>.ZIP file</b> (alongside the .JAR installer for the AIP Console) and is partly pre-configured for use with AIP Console. This requires a web application server (Apache Tomcat). A minimum release of <b>1.9.0</b> is required.</p>
✓ <b>Application Server</b>	<p><b>Only required when using AIP Console 1.24</b></p> <p>The <b>CAST RESTAPI</b> requires a host web application server. The following are supported for use with any release of the CAST RESTAPI:</p> <ul style="list-style-type: none"> <li>• Apache Tomcat 7.0.x 64-bit (where x = 20)</li> <li>• Apache Tomcat 8.0.x 64-bit</li> <li>• Apache Tomcat 8.5.x 64-bit</li> <li>• Apache Tomcat 9.0.x 64-bit (cannot be used with the <b>CAST-RESTAPI-integrated.war</b> delivered in <b>AIP Console 1.15</b>)</li> </ul>
✓ <b>Host Operating System</b>	<p>The <b>CAST RESTAPI</b> can be hosted on <b>both Windows</b> and <b>Linux</b> host Operating Systems.</p>
✓ <b>JDK / JRE</b>	<p>A JDK / JRE must be installed on the target server for the host web application server or for the CAST RESTAPI:</p> <p><b>AIP Console 1.25</b></p> <ul style="list-style-type: none"> <li>• Java JRE 8 is required.</li> </ul> <p><b>AIP Console 1.24</b></p> <ul style="list-style-type: none"> <li>• Apache Tomcat 7 is designed to run on Java JRE 6 and later</li> <li>• Apache Tomcat 8 and 8.5 are designed to run on Java JRE 7 and later</li> </ul> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p> Note that if you have multiple JDK versions installed on a Linux server, you can set the default using the following command:</p> <pre style="border: 1px solid #ccc; padding: 5px; display: inline-block;">sudo update-alternatives --config java</pre> </div>
✓ <b>Access to CAST Storage Service / PostgreSQL</b>	<p>The <b>CAST RESTAPI</b> requires network access to all the <b>CAST Storage Services/PostgreSQL instances</b> used to host the schemas required for the functioning of AIP Console, including the Measurement schema.</p>
✓ <b>Access from the AIP Console</b>	<p>The <b>AIP Console package</b> requires network access to the <b>CAST RESTAPI</b>.</p>
✓ <b>CAST Dashboard Service schema license key</b>	<p>Access to data in the <b>CAST Dashboard Service schema</b> (for use with the <b>CAST Engineering Dashboard</b>) is governed by a <b>license key</b> - see <a href="#">Dashboard Service license key configuration</a>. You must have a valid license key in your possession before you begin. An <b>UNRESTRICTED</b> license is required.</p>

## CAST Extend Offline/Proxy (optional) requirements

See:

- [CAST Extend Offline - Prerequisites](#)
- [CAST Extend local server - Prerequisites](#)

## CAST Storage Service / PostgreSQL storage

See:

- [CAST Storage Service and PostgreSQL - Deployment requirements](#)

## Supported features of Directory Service systems

The following section lists the features of Enterprise Directories (such as Active Directory) that are supported by the CAST AIP Console/Dashboards:

Feature	Supported	Notes
Directory Services		<ul style="list-style-type: none"> <li>• Microsoft Active Directory is full supported.</li> <li>• Other Directory Services are supported in AIP Console, CAST Health and CAST Engineering Dashboards but will generally require additional configuration.</li> </ul>
Microsoft Active Directory Lightweight Directory Services	Partially	Microsoft AD LDS does not have all the information in the server itself, but may provide a pointer to another server where that information is stored. Depending on what is stored, authentication and authorization may fail if pointing to a AD LDS server and not enough information is present. If this occurs, the configuration should be modified to point to a full Microsoft Active Directory server.
Global Catalog Servers (GCS)		Sometimes required if an Active Directory or other Directory Services server contains multiple domains or domains and sub-domains. as the Global Catalog Server contains LDAP information for all domains. In this case the LDAP URL should point to the GCS server URL (normally same as LDAP URL with port 3268 for LDAP and 3269 for LDAPS)
Proxies	Partially	<ul style="list-style-type: none"> <li>• If the proxy has no authentication configured, then they are supported.</li> <li>• No support for any Single Sign On (SSO) proxies.</li> </ul>
Referrals	Partially	If a referral is used, the machine name needs to be able to be resolved the Doman Name Service (DNS) process. This may require that DNS or a local hosts file is modified to ensure that it occurs.
SSO (Single Sign On)		<p>Supported for AIP Console/Health/Engineering Dashboards/RestAPI via SAML</p> <div style="border: 1px solid #ccc; border-radius: 10px; padding: 10px; margin-top: 10px;">  Note that SAML is not supported for connections to the dashboard RestAPI made via CAST Report Generator. </div>
Nested Groups		-