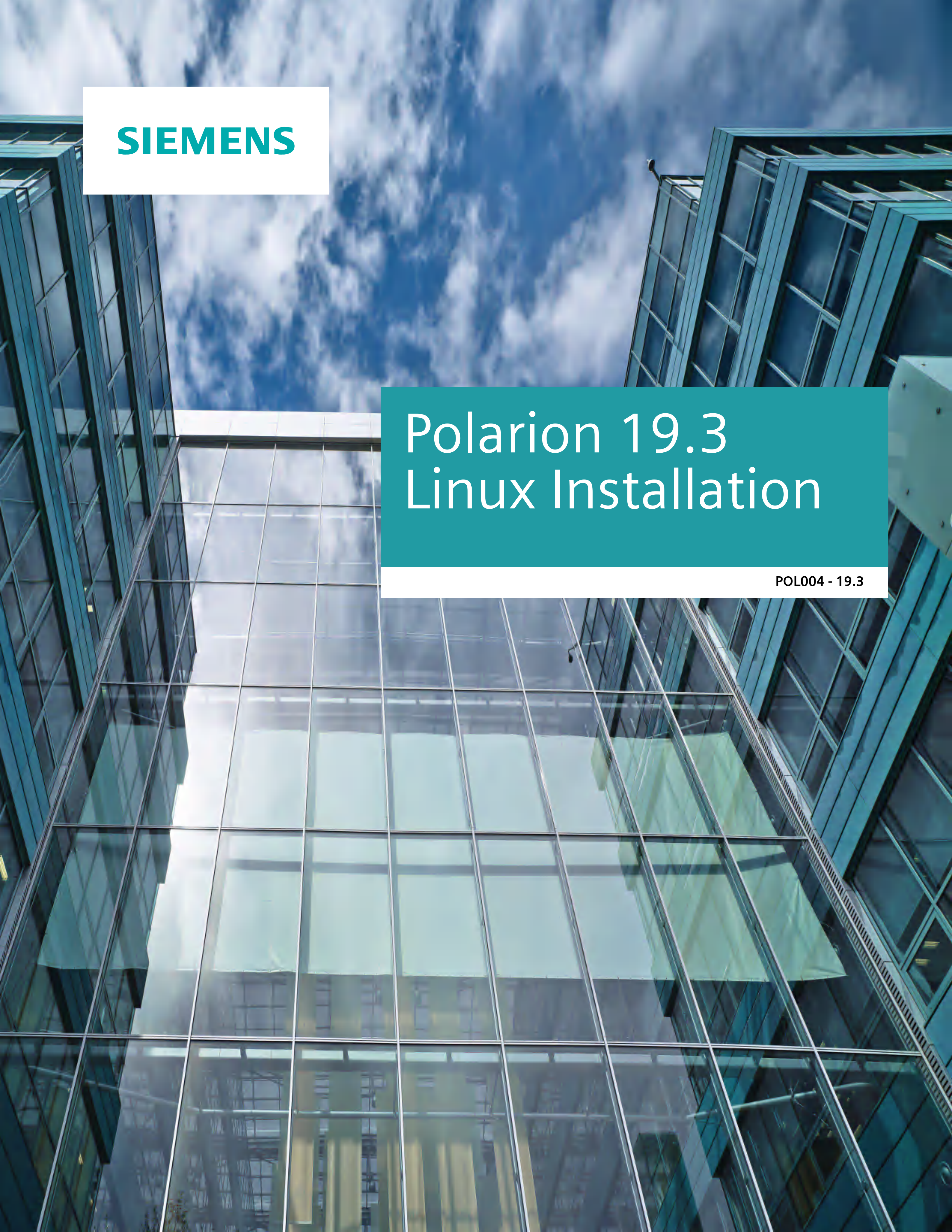


SIEMENS

Polarion 19.3 Linux Installation

POL004 - 19.3

Contents

1. About this guide

Overview

Welcome and thanks for using Polarion.

This guide covers installation information and procedures for creating a production installation for all Polarion products based on the Polarion Application Lifecycle Management Platform. The list of products covered by this guide currently includes:

- **Polarion ALM™**
- **Polarion REQUIREMENTS™**
- **Polarion QA™**

In general, the information is applicable to all the above products. Any product-specific differences will be explicitly noted. The information covers both new installations and, where applicable, updating of existing installations.

This guide applies to installation of the above Polarion products on supported Linux operating systems.

If you want to install a product on a Windows system, please see the Windows Installation guide.

Evaluation installations

If you are installing Polarion for evaluation purposes, we recommend the Polarion ALM™ Trial guide . It focuses on getting you up and running with an evaluation installation as quickly as possible, using the **Evaluation** install option of the Windows installer.

This is recommended for the initial stage of any evaluation.

Large-scale installations

If you need a large-scale server environment with multiple clustered servers and failover capabilities, multiple repositories and so forth, see Polarion ALM™ Enterprise Setup.

Topics covered there include:

- Requirements
- Installation use cases
- Configuring shared data
- Security options
- Using Resource Traceability in a cluster

2. System requirements and recommendations

Server software

Requirement	Description
Operating System	SUSE Linux Enterprise Server 12 with service pack 4 or SUSE Linux Enterprise Server 15 with service pack 1, Red Hat Enterprise Linux 6.x or 7.x (7.2 or higher) or 8.x, CentOS 6.x or 7.x (7.2 or higher) or 8.x, Debian GNU/Linux 9.x, 10.x and Ubuntu Server 16.04 LTS or 18.04 LTS. Supported architectures are x86_64, or amd64. URW fonts must be installed in the operating system. For SUSE, use the **ghostscript-fonts-std** package from Ghost Script Fonts.
Java Runtime Environment	OpenJDK 11 - See Install OpenJDK Polarion only supports the 64 bit version of Java.
Version Control System	Subversion version 1.6.x, 1.7.x, 1.8.x, or 1.9.x: (Using the latest Subversion 1.9x is recommended.) If you are compiling Subversion yourself, compile using the `--with-apxs` or the `--with-httpd` option.
Web Server	Apache HTTPD server with mod_proxy_ajp and Subversion extension (WebDAV+SVN apache modules): http://httpd.apache.org/ In general, the Polarion server should run with whatever Apache version is present on a Linux system provided it is at least the minimum required version (2.2), and **mod_proxy_ajp** and **Subversion** extension modules are also installed.
Database	**Minimum**: PostgreSQL version 8.4 **Recommended**: PostgreSQL version 11 **Note**: PostgreSQL version 9.2 or higher is required to create the new **rel_module_workitem** database table. The table contains information about Work Items both contained or referenced within a document.

Server hardware

Requirement	Description
RAM	• Minimum: 4 GB (gigabytes) for production installation. • Recommended: 8 GB or more. Tip: Set Polarion's memory allocation to 50% of your server's total RAM.
Disk Storage Space	• Minimum: 10 GB. • Recommended: 40 GB or more. There is no hard and fast rule for disk storage space. The actual amount you require depends on the number and size of projects managed with Polarion. The more projects, and the larger they are, the more disk storage you require.

Client software

Requirement	Description
Operating System	Any operating system that can run the supported web browsers with support for the Flash plugin (see below). If the client user will use a Polarion product supporting data interchange with Microsoft Office®, the client user must run a Windows operating system compatible with a supported version of the Microsoft Office application(s) used. For details, please see Appendix: Supported Microsoft Office Versions.
Web Browser	All you need to use Polarion is a web browser.
Adobe Flash	The Polarion web portal displays **Live Plan** chart data using Adobe Flash. To use this particular functionality, the client computer must have Adobe Flash Player installed. You can download it free at http://www.adobe.com/products/flashplayer/.

Client hardware

Requirement	Description
RAM	Minimum: 2 GB (4 GB recommended)
Display Resolution	Minimum: 1280 x 800 pixels
Server Connection	Not less than 1 Mbit/s

Supported browsers and versions

Polarion ALM is web-based software. For the best experience, always use a supported browser. Polarion may work with other browsers, but only those listed here have been tested and certified as supported. Polarion displays a warning message to users who log in using an unsupported browser.

Browser	Version(s)	Notes
Google Chrome	Latest	
Mozilla Firefox	68 or newer	Version 71 for users hoping to tap into the very latest features and improvements. Organizations or individuals looking for longer-term support with less frequent browser updates should use Version 68 **ESR**
Microsoft Edge	Latest	
Microsoft Internet Explorer	11	Please be sure to review the additional notes section, below, for important notes about this browser.

Additional notes for Microsoft Internet Explorer

- If running Internet Explorer on Windows Server 2012 (for example, for testing):
  - If prompted by the browser, you will need to add **about:blank** as a trusted server.
  - You may need to add the local Polarion server and any remote Polarion servers as trusted servers.
  - You need to enable JavaScript for the Polarion server.

> Note:
>
> The above points do not apply when accessing Polarion running on Windows Server 2012 from other clients.

- Users of Internet Explorer should specify their Polarion server in the Local Intranet security zone while ensuring that Compatibility View is not used.
- There can be performance issues on client computers running Internet Explorer due to browser memory requirements. Occasional restarts of the browser are recommended.

3. Additional recommendations

Use of anti-virus (AV) software

When running on server OS platforms that run instances of Polarion server, anti-virus (AV) software intercepts I/O requests to Polarion data structures in order to scan the data looking for virus signatures. This inserts latency (time delay) into all underlying file system read and write operations, which has the potential to directly impact Polarion Server performance, potentially in the magnitude of hundreds of percent.

Also, the AV software may detect false positives in Polarion data structures, which can result in data corruption when the AV software attempts to either re-write the data, or worse, quarantines data files. Any of the various methods used by AV software to deal with false positives could potentially result in data corruption.

Best practice guidance is to use caution when implementing AV software products on a server that hosts Polarion ALM, as it can impose performance and stability issues that may lead to poor response times or data corruption. Where feasible, not running AV software on well protected and/or network isolated server platforms assures that there will be no impact on Polarion server operation. Where AV software must be running, then at minimum it is strongly suggested to exclude the underlying file system supporting a Polarion server's Subversion repository and PostgreSQL database from real-time checking and/or dynamic scanning.

Appropriate security hygiene restricting outside access to the underlying file system supporting a Polarion server's Subversion repository is recommended practice that effectively moderates the need for AV data protections. Assuring that attachments to Polarion data structures (work Items, etc.) are only allowed from sources that *are* subject to AV data protections is an equally prudent security measure that effectively moderates need for AV data protections for Subversion data.

Warning:

Siemens disclaims liability for corruption of any Polarion data structure that is caused by running AV software on platforms supporting a Polarion server.

Libraries required for building the demo projects

The items described here are not critical for running and evaluating Polarion. However, the components described are needed to be able to fully utilize Polarion's capabilities.

The distribution contains several demo projects. Each of them needs its particular set of 3rd party libraries to be correctly built and have the project reports generated. Any missing libraries are automatically downloaded from the internet during project processing, so you may need a connection to the internet when you first try building the demo projects or run reports for them.

Install fonts for exporting Highchart charts

The urw-fonts package must be installed on CentOS and SuSE.

Enable email notifications

The Polarion server can send email notifications in response to various events in the system such as build completions and new **Work Items**. It can also notify users about external changes.

1. You can enable email notifications before starting the Polarion server by setting the host name in the **announcer.smtp.host** property in the **polarion.properties** file located in **$POLARION_HOME $/etc/**.

2. In the same **polarion.properties** file, set the **announcer.smtp.user** and **announcer.smtp.password** properties to a valid email account on the SMTP host specified in **announcer.smtp.host**. If your SMTP server doesn't listen on default port 25, change the port setting in **announcer.smtp.port**. You may wish to create a special account on your SMTP host for use with Polarion notifications.

3. Provide a valid email address for each user in their user account. (**Administration** → **User Management** → **Users**.) This can be automated through user self-creation of accounts, or integration with LDAP. See **Administrator's Guide: Managing Users and Permissions**in Polarion's Help.

When the configuration is correctly set up, the system sends notification emails about various events according to the notification targets configuration. For information on configuring email notifications, see **Administrator's Guide: Configuring Notifications** in Polarion's Help.

Note:

If a **Work Item** is modified outside of the Polarion portal, for example manually in the SVN, email notifications are sent as if the modification occurred in the portal.

See also, *Appendix: Enabling Email Notifications*

Enable support for Javadoc

The demo and your own projects can be configured to provide Javadoc reports.

Javadoc must also be enabled for the **descriptors.xml** file. Access it in the Repository browser: **Repository/.polarion/reports/descriptors.xml**. Refer to comments within the in the **descriptors.xml** for details on how to enable Javadoc.

Hide versions of installed components

It's a good security precaution to update Apache’s configuration to hide the exact version numbers for installed components by default.

- Once the Polarion installation is complete, add the following settings to your Apache configuration:
  ServerSignature Off
  ServerTokens Prod

The Apache configuration file names will vary depending upon the distribution.

4. Linux installation and overview

Installation types

Automated installation

The entire installation process is driven automatically by an installation script. At most you have to answer a few questions, but you do not pre-install anything or do any other manual work in order to satisfy the prerequisites before you start the script. Automated installation is possible on most, but not all, of the supported Linux platforms.

Manual installation

The automated installation process script is not able to install all the prerequisites for a platform automatically, so it requests that you to install something manually before proceeding.

See *supported platforms and installation types* for the details on the distributions they apply to.

Automated installation

The automated installer scripts detect the operating system (OS). The OS version is not checked, however, so you must ensure that you have the minimal required version of your system as specified in *Server Software Requirements*.

If your OS is supported, the automated scripts will install the prerequisite third-party software for the specific supported Linux platform from existing package repositories on your system during the Polarion installation process. They will then install the Polarion platform itself. Ensure that you have set up the package repository defaults provided for your system.

If you have a different version of the OS from the supported distributions, it is probably still possible to perform an automatic installation. However, during the process you will need to manually install the required third-party software before you respond **No** to installation default dependencies.

Supported Linux versions for automated installation

If you have one of the supported Linux platforms, you will find installation on Linux easier, faster and smoother. Each supported platform comes with predefined configurations of the recommended version of third-party software. If the installer script finds that your operating system is not one of the supported variants, it will inform you and allow you to install Polarion manually.

The table below lists the Linux platforms that are currently fully supported. Installation support for other platforms may become available. Be sure to check the list of available installers on the web page where you download Polarion.

We highly recommend using stable repositories and installing tested versions of third-party software rather than installing newer, untested versions.

Platform	Type	Default Repositories Necessary
SUSE	Automated	All default repositories including SDK.
RedHat	Automated	Default repositories from installation. For more information about mirrors and repositories see: **http://www.centos.org/download/mirrors/**
Ubuntu	Automated	Main, Universe and Multiverse. For more information see:**https://help.ubuntu.com/community/Repositories/Ubuntu**
Debian	Automated	Main, updates.
All Others	Manual	Not applicable

Automated installation overview

The automated installation scripts perform the following installation steps:

1. Create a special system account for Polarion.

2. Set valid permissions for Polarion.

3. Adds Polarion as a system service at the default run levels of the Linux distribution it's being installed on, and ensures that it starts after Apache.

4. Setup the default Apache configuration for Polarion and the Subversion used with it.

5. For a clean installation, create a new Subversion repository with initial or sample demo data.

6. Create symbolic links into default system places such as **/var/logs, /var/run/, /srv/polarion**, and so on.

7. Start Polarion and third-party servers.
   Automated installation steps are detailed in *Automated Installation Procedure*.

Manual installation

No automated installation script is used for a manual installation. Only the Polarion platform is installed without any of the required third-party software (SVN, Apache, and so on). Manual installation requires that you obtain all the required third-party software needed to support Polarion, install and configure them, and then install and start the Polarion server. An example of when a manual installation is necessary is if the computer does not yet have an internet connection.

For more information, see *Appendix: Manual Installation on Linux*.

5. Automated installation procedure

See the *Supported platforms and installation types* for the Linux versions that support the automated installation script procedure described below.

Warning:

If you already have one or more of the *required third-party* software packages installed, you can respond **NO** to the prompts asking if you want to install them, but be absolutely sure that you have it installed, otherwise you can break the automated process and it can be problematic to resume. If you are not sure that you have the required installation and configuration, it is better to say **YES** to the request to install the required third-party software.

1. Unpack the archive you downloaded from the Polarion web site into an empty directory.

2. If SELinux is bundled with or installed on your Linux OS, make sure it is not activated. Check the SELinux status with the **/usr/sbin/sestatus -v** command .

3. Log in to the root account.

4. Navigate into the unpacked directory.

5. Run **chmod +x install.sh** after unzipping. (Only needs to be run once.)

6. Run the installation script: **./install.sh**.

7. Continue with the installation, answering questions when prompted by the script.

8. After the installation process the Polarion server will start automatically, which you can verify by opening **http://localhost/polarion** in a supported web browser.

Note:

Before using the system in a production environment, see *Securing the Polarion activation application*.

6. System startup and shutdown

Secure the activation application

Polarion includes an activation application that makes it possible to install or update a license while the Polarion server is running. Access to this application is not protected by any username or password. For production use, it is highly recommended to secure access to this application. See *Securing the Polarion activation application* for details.

Starting Polarion

The first time you start the Polarion server, no time estimates appear in the console because there is no data on which to base the estimate. Instead, not enough data for startup estimation is written to a log file at **/var/log/polarion.log**.

The first startup after an automated installation is automatic. This section provides the procedure for subsequent startups. This includes the first startup after a manual installation.

To start the Polarion server, execute whichever of the following is applicable:

- Common command: `$POLARION_HOME$/bin/polarion.init start`
  For a system that supports systemd: `systemctl start polarion`
- On CentOS, RHEL, Debian or Ubuntu: `service polarion start`
- SUSE/SLES 11: `rcpolarion start`
- SUSE/SLES 12: The Common command (`$POLARION_HOME$/bin/polarion.init start`)

On startup and on re-index operations, Polarion estimates and reports the amount of time the operation will take. You will see this estimate in the console and log file on subsequent startups, but for the first time, no data exists on which to base the estimate. The following startup phases are reported in the console and log file:

- Platform startup
- Context recognition
- Context initialization
- Revisions processing
- Build artifacts recognition

- BIR inspection
- Data indexing
- Polarion startup

Shutting down Polarion

To shut down Polarion, execute whichever of the following is applicable:

- Common command: `$POLARION_HOME$/bin/polarion.init stop`
  For a system supporting systemd: `systemctl stop polarion`
- On CentOS, RHEL, Debian or Ubuntu: `service polarion stop`
- On SUSE: `rcpolarion stop`
- SUSE/SLES 11: `rcpolarion stop`
- SUSE/SLES 12: The Common command (`$POLARION_HOME$/bin/polarion.init stop`)

Starting and stopping the PostgreSQL database

The automated installation process creates a service for the PostgreSQL database named **postgresql-polarion**. If you manually start/restart your Polarion system, this service must be started after Apache and before the Polarion server. You can use one of the following commands to start the service:

- CentOS, RHEL, Debian or Ubuntu: `service postgresql-polarion start`
- SUSE/SLES 11: `rcpostgresql-polarion start`
- SUSE/SLES 12: `service postgresql-polarion start`

You can stop or restart the service by replacing `start` with `stop` or `restart` in the above commands.

If you install Polarion *manually*, the **postgresql-polarion** service is not present, so it is necessary to use utilities provided by PostgreSQL to start/stop the database. Starting/stopping of the PostgreSQL server is common for all Linux distributions and needs to be done on behalf of the Postgres user. You must initialize the database storage prior to running the server for the first time. (See *Configuration of third-party components*). All PostgreSQL utilities must be run on behalf of the postgres system user.

Command Syntax:

```
su postgres
```

```
pg_ctl -D <PATH_TO_PG_DATA> -l <PG_LOGFILE> start/stop/restart
```

In a typical installation this would translate to:

```
su postgres
```

```
pg_ctl -D /opt/polarion/data/postgres-data -l /opt/polarion/data/postgres-
data/log.out -o "-p 5433" start
```

(The `pg ctl` command should be written to a single command line.)

You can define additional options, for example, on which port the database should run. For an overview of options, see http://www.postgresql.org/docs/9.4/static/app-pg-ctl.html.

Integration with Systemd

On Linux systems that support **systemd**, Polarion installs support for it and uses it for system startup. Integration with **systemd** ensures that other necessary software (Apache and PostgreSQL, for example) is started before Polarion.

With systemd, the **start**, **stop**, and **restart** commands can be used. (These are also delegated to **polarion.init**.) Other commands like **reindex, demo** and so on must be used with **/opt/polarion/bin/ polarion.init reindex**. The **start/stop/restart** commands can also be used with **polarion.init** in systems supporting **systemd**.

Integration with Init System

The script **/opt/polarion/bin/polarion.init** is suitable for integration with the **init system** to start the Polarion server if **systemd** is not used. It supports start, stop and restart commands using the special system **polarion** account .

Caution:

polarion.init does not start the Apache and PostgreSQL servers. You should always make sure to start these by other means before starting Polarion server.

7. After installation

Adjust server memory allocation

The default installation uses **640 m (megabytes)** as the maximum memory allocation settings. This is fine for evaluation purposes but should be increased in production installations to avoid running out of memory.

> Tip:
>
> Set the `Xmx/Xms` values to 50% of the server's total RAM.

1. Open the `[POLARION_HOME]/etc/config.sh` file in a text editor.

2. Adjust the following values to half of the server's total RAM:

   `-Xms650m`

   `-Xmx650m`

   (Use MEGABYTES as the measure. For example, for 2 GB, specify `-Xmx2000m`.)

3. Save the changed file.

4. Restart the Polarion server.

Configure the PostgreSQL database

The following should be done immediately following the installation and initial configuration:

- Configure the PostgreSQL database
- *Optimize the PostgreSQL database*
- *Secure the Polarion Activation Application*
- *Change the default administrator password*
- *Change the password for the 'polarion' SVN user*
- *Enter an error reporting email*

The PostgreSQL database must be properly configured before you can start the Polarion server. Automated installation scripts attempt to perform basic configuration so that Polarion can run. If the script was unable to configure PostgreSQL you will need to configure it manually. See *Appendix: Manual configuration of third-party components*. Even if the script succeeds, some additional configuration of the PostgreSQL database is recommended for optimal performance.

Optimizing the PostgreSQL database

Beginning with version 2015 SR2, Polarion integrates the PostgreSQL database in all new installations. After a new Polarion installation containing this database, it is highly recommended that the administrator adjust some PostgreSQL settings to optimize performance. You should make the following changes in the **postgresql.conf** file. The database server needs to be restarted following this configuration.

Default Linux Path: /opt/polarion/data/postgres-data/

```
max_connections = 80 # should be < 10 * number of CPUs

shared_buffers = 2GB # should be 10% - 15% of total system RAM

work_mem = 10MB # should be 10MB - 100MB

maintenance_work_mem = 200MB

fsync = off

synchronous_commit = off

full_page_writes = off

wal_buffers = 256kB # should be more than size of common

# transaction

checkpoint_segments = 32

effective_cache_size = 4GB # should be approx 1/3 of total

# system RAM

max_locks_per_transaction = 100 # specific for Polarion

# Optimal planner performance setting

# For HDD, keep default setting. Otherwise, uncomment the

# applicable setting below:

# For SSD:
```

```
# random_page_cost = 1.5

# For SAN:

# random_page_cost = 2.0
```

Note:

On some Linux environments, the automatic configuration of PostgreSQL's **shared_buffers** parameter may calculate a value that exceeds the available shared memory configured by kernel parameter **SHMMAX**. In automated installations, the installer script assigns a default value of 24 MB for **shared_buffers** and posts the following message:

"NOTICE: Polarion attempted to change value of shared_buffers in postgresql.conf

to $v_shared_buffers_old but $v_shared_buffers_new was used instead because

of low value in /proc/sys/kernel/shmmax."

If you see this message during the installation, you are advised to review your **SHMMAX** configuration and adjust **shared_buffers** for PostgreSQL manually.

Securing the Polarion activation application

Beginning with version 2015, Polarion includes an activation application that makes it possible to install or update a license during runtime of the Polarion server, without the need to copy the license file manually to the target machine. Access to this application is NOT initially protected by user name and password. For production use, it is highly recommended to secure access to this application directly in the Apache configuration.

Beginning with version 2015, there is a template Apache configuration file in the Polarion installation folder: **/polarion/polarion/install/polarion.activation.conf.template**

To ensure that a user name and password is requested when accessing the activation application (**/polarion/activate/online and /polarion/activate/offline**), copy this file to the Apache configuration folder, on Linux usually **/etc/httpd/conf.d/**.

After copying the file, rename it to remove the extension **.template**. Then open the file in any text editor and modify it according to the instruction comments provided.

The template configuration is prepared for both user file authentication (like Polarion uses for Subversion by default, with user passwords data in a file) and for authentication against an LDAP server.

In a multi-instance setup (a coordinator and one or more instances, that can be clustered), it is necessary to use this configuration only on the coordinator server (the activation application runs only on the coordinator). For additional information about this type of setup, see Polarion Enterprise Setup .

Change the default system administrator password

To help ensure the security of your Polarion system, you should change the default password of the **System Administrator** user account described below, and the password for the **polarion** user account of the integrated Subversion (SVN) repository.

The default System Administrator user account has access to all administrative functions of Polarion, including read-write access to the Subversion repository. After installing Polarion for actual production use, you should change the password on the default System Administrator account. Before doing so, consider creating another account with administrator permissions for yourself, and perhaps someone else.

To change the default administrator password:

1. Log on to the Polarion portal with the default System Administrator credentials. (username: `admin`, password: `admin`.)

2. Click **My Polarion**. The **My Polarion** page for the System Administrator account loads in the content area.

3. Click ⚙ ▾ on the top right and click 👤 **My Account**.

4. In the **My Account** page click 📝**Edit**.

5. Enter the new password in the **New Password** field, and again in the **Reenter Password** field.

6. If you want to continue using this account as the main system administrator account, you may wish to add your email address in the **Email** field, and add a description for the account in the **Description** field.

7. When finished editing the System Administrator profile, click 💾 **Save**. The password is now changed and you must use it next time you log on.

Warning:

Do not lose the new password.

If you lose the changed password, you will not be able to log on as the System Administrator user. If no other accounts exist with administrator permissions, it will not be possible to change the configuration, add projects, manage user accounts, etc.

Changing the Password for SVN User 'polarion'

A Subversion repository user named polarion is created by default when you install Polarion. This user acts on behalf of the Polarion application and consequently has extensive permissions including read permission for all projects. Access to this user by unauthorized people would compromise the security of your Polarion system, so it is advisable to change this password before putting the system into production use.

The following steps assume you use passwd file authentication, which is the most common method.

1. Stop the Polarion server before changing this password.

2. Use the *htpasswd* utility to change the password for the user polarion. The utility is installed on your system together with the Apache server binaries.
   Utility Syntax: `htpasswd path/passwdfilename username`
   Example: `htpasswd /opt/polarion/data/svn/passwd polarion`

3. Next, change the value of the password property in the `polarion.properties` file to the password you set with the htpasswd utility. Typical location of this file is `/opt/polarion/etc/polarion.properties`.

Note:

For LDAP Users

The typical setup for most Polarion users is passwd file authentication for the polarion user with failover to LDAP for company users. This is also the default Polarion setup.

For such setups, you do not need to enter the polarion user to your LDAP users.

Enter an error reporting email

The email for the **error.report.email** property in the **polarion.properties** file is empty by default for new installations. Add the email you want error reports sent to.

8. Configure OLE object support and attachment preview generator

Overview

It is possible to import Microsoft Word documents that contain OLE objects. Polarion can display OLE Object thumbnails during Word document import, including EMF thumbnails for Visio diagrams but a third-party image converter must be installed and configured to work with Polarion first. While ImageMagick is recommended, you can also use other third-party image conversion tools.

OLE objects in documents must also contain their thumbnails in the `.emf` or `.wmf` file formats, and the image converter you use must support their conversion to JPEG. OLE Objects themselves are not imported, only their thumbnails.

Note:

When configuring OLE imports for DOORS and ReqIF, thumbnails will be generated on the fly.

Polarion can also display previews for common attachment file types like Word, Excel, Visio, PDF if an external image conversion application is installed and configured to work with Polarion.

Prerequisites

For the conversion server

- A computer or virtual machine running Microsoft Windows 10, Windows Server 16 or Windows Server 19 accessible as a network share to the Linux machine hosting Polarion.
- The applications that you want to view previews from. (Microsoft Word, Excel, Power Point and Acrobat Reader.)
- Teamcenter Visualization Convert & Print installed.
- An image converter: (ImageMagick is recommended but you also use an alternative.)

  Tip:

  Having trouble configuring an alternative image converter? Support can help.

- OpenSSH installed and configured.

Configuration workflow

1. Install an image converter. (ImageMagick is recommended.)
2. Install OpenSSH.
3. Configure OpenSSH.
4. Set up SMB shares.
5. Configure the client.
6. Set up scripts.
7. Configure Polarion.

Install OpenSSH

Select the OpenSSH installation method below that aligns with your server setup.

On Windows Server 2019 or Windows 10.1809

Install OpenSSH with Powershell

1. Open a **PowerShell** window as an administrator.

   (Type Powershell in the Windows menu.)

2. Type `Get-WindowsCapability -Online | ? Name -like 'OpenSSH*'` and press **Enter**.

   This should return the following:

   ```
   Name : OpenSSH.Client~~~~0.0.1.0State : NotPresent

   Name : OpenSSH.Server~~~~0.0.1.0State : NotPresent
   ```

3. Type `Add-WindowsCapability -Online -Name OpenSSH.Server~~~~0.0.1.0` and press **Enter**.

   This will install the OpenSSH Server.

4. Now you must configure OpenSSH.

Install OpenSSH on older versions of Windows

1. Download **OpenSSH**.

2. Unpack it into `C:\Program Files\OpenSSH`.

3. Run **PowerShell** as an administrator.

4. Run the following commands to install the ssh service.

   a. `Set-Location "C:\Program Files\OpenSSH"`

   b. `.\install-sshd.ps1`

5. Now you must **configure OpenSSH**.

Configure OpenSSH

1. Open a **PowerShell** window as an administrator.

2. Enter the following to start the SSHD service:

   ```
   Start-Service sshd
   ```

3. (Optional but recommended.) Set the SSHD so that it automatically starts:

   ```
   Set-Service -Name sshd -StartupType 'Automatic'
   ```

4. Confirm that the Firewall rule is configured. (It should be created automatically.)

   ```
   Get-NetFirewallRule -Name *ssh*
   ```

   The firewall rule named `OpenSSH-Server-In-TCP` should now be enabled.

5. Check permissions using the following commands:

   ```
   FixHostFilePermissions.ps1
   ```

   ```
   FixUserFilePermissions.ps1
   ```

   OpenSSH should now be configured so that it uses password verification.

6. Set PowerShell as the default for OpenSSH:

```
New-ItemProperty -Path "HKLM:\SOFTWARE\OpenSSH" -Name DefaultShell -
Value "C:\Windows\System32\WindowsPowerShell\v1.0\powershell.exe" -
PropertyType String -Force
```

You should now be able to connect using a Linux machine with the following:

```
ssh your_user@hostname Get-Process
```

7. (Optional but recommended.) Configure key verification.

   a. Open a **PowerShell** window as an administrator.

   b. Enter the following command:

   ```
   Icacls authorized_keys /remove "NT SERVICE\sshd"
   ```

   Due to issues with **PowerShell**, `NT SERVICE\sshd` should not have permission to access the `authorized_keys` file. If it does, then key-based authentication will not work. This command removes that permission.

   c. Open the following file in a text editor. `(c:\ProgramData\ssh\sshd_config file)`

   d. Comment out (#) the following lines:

   ```
   # Match Group administrators

   # AuthorizedKeysFile __PROGRAMDATA__/ssh/
   administrators_authorized_keys
   ```

   e. Create an `.ssh` file and folder in **PowerShell** `(C:\Users\your_SSH_user\.ssh)` by running the following commands:

   ```
   New-Item -ItemType Directory -Path "C:\Users\your_SSH_user\.ssh"

   Set-Location "C:\Users\your_SSH_user\.ssh"

   New-Item -ItemType File authorized_keys
   ```

   f. Insert the user public key pair that was generated on the clients into the `authorized_keys` file.

   (See **setup ssh-key pair** for details.)

   g. Enter the following commands to check the permissions.

   ```
   Set-Location "C:\Program Files\OpenSSH\"
   ```

```
FixHostFilePermissions.ps1

FixUserFilePermissions.ps1
```

8. Now you must set up the SMB shares.

Set up SMB shares and configure the client

Once you've installed and configured OpenSSH it's time to set up your SMB shares.

1. Create the following directories:

   ```
   C:\visualization\magick-tmp

   C:\visualization\tcvis-tmp
   ```

2. Configure ACL for your `ssh_user` so that they're allowed to modify permissions.

3. Enable the shares.

4. Now you must configure the client.

Configure the client

Select one of the following ways to configure the client so that OLE users can see OLE object previews.

1. ssh-key verification (Recommended)

2. password verification
   (Requires more maintenance.)

1. ssh-key verification configuration option (Recommended)

1. Set up the ssh-key pair by entering the following console commands.

   ```
   sudo -i

   su polarion

   ssh-keygen -t rsa
   ```

   (You should see `ls -la /home/polarion/.ssh`.)

   ```
   -rw------- 1 polarion www-data 1675 Jun 3 13:38 id_rsa
   ```

```
-rw-r--r-- 1 polarion www-data 401 Jun 3 13:38 id_rsa.pub
```

2. Check the permissions of the key pair files and make sure that Polarion is the owner.

3. Copy and paste the `id_rsa.pub` public key into the target user profile on your conversion server.

   (The user that will be used for the ssh connection. For example, `C:\Users\your_SSH_user\.ssh\authorized_keys`.)

4. Test your settings by entering the following commands:

   ```
   TARGET_SERVER='SSH_user_on_the_windows_side@windows_server_FQDN'
   ```

   ```
   ssh $TARGET_SERVER
   ```

   You should see the following:

   ```
      Windows PowerShell
      Copyright (C) Microsoft Corporation. All rights reserved.
   ```

5. Enter the following:

   ```
   PS C:\Users\your_SSH_user>hostname
   ```

   You should see the host name of your conversion server.

6. Exit the ssh connection.

   ```
   PS exit
   ```

7. Prepare your folders on your Linux machine as a root user by entering the following commands.

   ```
   mkdir /mnt/magick-tmp
   ```

   ```
   mkdir /opt/ole-convert
   ```

   ```
   mkdir /mnt/tcvis-preview-gen
   ```

   ```
   mkdir /opt/tcvis-preview-gen
   ```

8. Now you can set up the scripts.

2. Password verification configuration option

1. Install sshpass by entering the following console commands:

```
sudo -i

apt-get install sshpass
```

2. Prepare the target folder and files by entering the following commands:

   a. `mkdir /mnt/magick-tmp`

      ```
      mkdir -p /opt/ole-convert/pw

      vim /opt/ole-convert/pw/.sshzz
      ```

   b. Enter your ssh account password.

   c. Enter the following commands:

      ```
      chown polarion:root /opt/ole-convert/pw/.sshzz

      chmod 600 /opt/ole-convert/pw/.sshzz

      mkdir -p /opt/tcvis-preview-gen/pw

      mkdir/mnt/tcvis-preview-gen

      vim /opt/tcvis-preview-gen/pw/.sshzz
      ```

   d. Enter your ssh account password.

   e. `chown polarion:root /opt/tcvis-preview-gen/pw/.sshzz`

      ```
      chmod 600 /opt/ole-convert/pw/.sshzz
      ```

3. Now it's time to establish and test your setup.

   a. **Important!** You must switch to the `polarion` user.

      ```
      su polarion
      ```

   b. Enter the following commands as the `polarion` user.

      ```
      PWFILE=/opt/tcvis-preview-gen/pw/.sshzz

      TARGET_SERVER='SSH_user_on_the_windows_side@windows_server_FQDN'
      ```

      (And add your server as trusted.)

```
sshpass -f $PWFILE ssh $TARGET_SERVER "get-process | fl *"
```

You should see all of your SHH server's running processes.

4. Now you can set up the scripts.

Set up the scripts

1. Switch to an elevated user, then open the `oleconvert.sh` file.

   ```
   vim /opt/ole-convert/oleconvert.sh
   ```

2. Paste the following into the file and save.

   (Replacing the generic server information with your own.)

   ```
   #!/bin/sh
   infile=$1
   inname=`basename "$1"`
   outfile=$2
   outname=`basename "$2"`
   LINUX_PATH=/mnt/magick-tmp
   WIN_PATH=C:/visualization/magick-tmp
   #enable for password verification
   #PWFILE=/opt/ole-convert/pw/.sshzz
   TARGET_SERVER='SSH_user_on_the_windows_side@windows_server_FQDN'
   cp "$infile" "$LINUX_PATH/$inname"
   PWS_COMMAND="Set-Location \"C:\Program Files\ImageMagick\" ; .
   \\magick.exe convert  \"$WIN_PATH/$inname\" \"$WIN_PATH/$outname\""
   #enable for password verification
   #sshpass -f $PWFILE ssh $TARGET_SERVER $PWS_COMMAND
   #for ssh-key  verification
   ssh $TARGET_SERVER $PWS_COMMAND
   rm "$LINUX_PATH/$inname"
   mv "$LINUX_PATH/$outname" "$outfile"
   ```

3. Enter the following command:

   ```
   chmod +x /opt/ole-convert/oleconvert.sh
   ```

4. Open the `tcvis.sh` file.

   ```
   vim /opt/tcvis-preview-gen/tcvis.sh.
   ```

5. Paste the following into the file and save. (Replacing the generic server information with your own.)

```
#!/bin/sh
infile=$1
inname=`basename "$1"`
outfile=$2
outname=`basename "$2"`
LINUX_PATH=/mnt/tcvis-preview-gen
WIN_PATH=C:/visualization/tcvis-tmp
#enable for password verification
#PWFILE=/opt/tcvis-preview-gen/pw/.sshzz
TARGET_SERVER='SSH_user_on_the_windows_side@windows_server_FQDN'
cp "$infile" "$LINUX_PATH/$inname"
PWS_COMMAND="Set-Location \"C:/Program Files/Siemens/Teamcenter11.2/
Visualization/VVCP\"
 ; Start-Process prepare.exe -ArgumentList \"-png -overwrite
$WIN_PATH/$inname -out $WIN_PATH/$outname -page 1 -size 1600x?px\"
-Wait -PassThru"
echo running $PWS_COMMAND
#for password verification
#sshpass -f $PWFILE ssh $TARGET_SERVER $PWS_COMMAND
#enable for ssh-key verification
ssh $TARGET_SERVER $PWS_COMMAND
rm "$LINUX_PATH/$inname"
mv "$LINUX_PATH/$outname" "$outfile"
```

6. Enter the following command:

   ```
   chmod +x /opt/tcvis-preview-gen/tcvis.sh
   ```

7. Mount the SMB shares by entering the following:

   ```
   apt-get install cifs-utils
   ```

   ```
   vim /etc/fstab
   ```

8. Insert rows by entering the following:

   ```
   //conversion_server/tcvis-tmp /mnt/tcvis-preview-gen cifs
   vers=2.1,_netdev,uid=999,gid=33,rw,exec,auto,iocharset=utf8,sec=ntlm,cre
   dentials=/var/pw/.cifs 0 0
   ```

   ```
   //conversion_server/magick-tmp /mnt/magick-tmp cifs
   vers=2.1,_netdev,uid=999,gid=33,rw,exec,auto,iocharset=utf8,sec=ntlm,cre
   dentials=/var/pw/.cifs 0 0
   ```

   ```
   mkdir /var/pw
   ```

   ```
   vim /var/pw/.cifs
   ```

And input the share password in the following format:

```
username=msusername
password=mspassword
```

9. Secure it by entering the following:

   ```
   chown root:root /var/pw/.cifs
   ```

   ```
   chmod 600 /var/pw/.cifs
   ```

10. Mount the drives with:

    ```
    mount -a
    ```

11. Check the mounted drives with:

    ```
    df -h
    ```

12. All that's left is to configure Polarion.

Configure Polarion

1. Open the `polarion.properties` file in a text editor by entering the following command:

   ```
   vim /opt/polarion/etc/polarion.properties
   ```

2. Past the following into the open `polarion.properties` file.

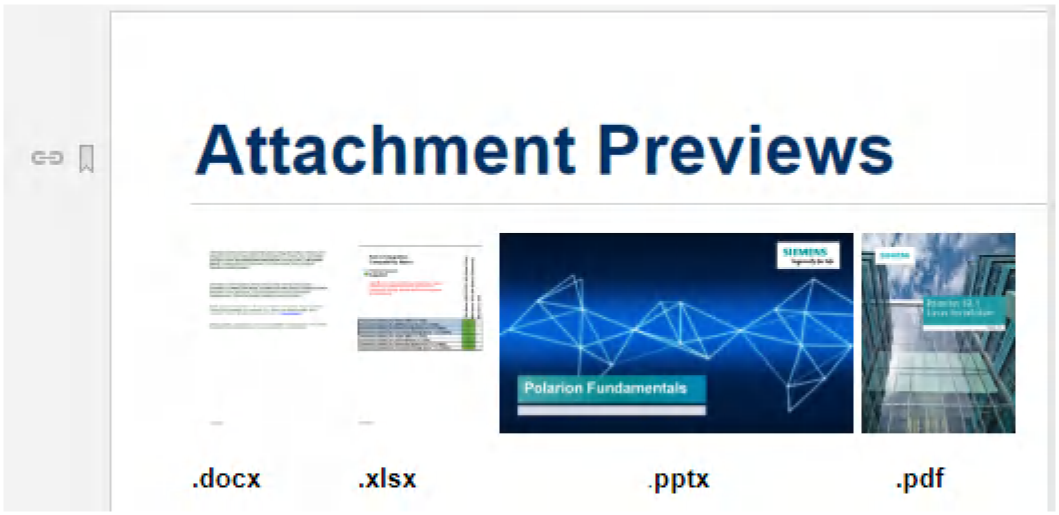
   ```
   com.siemens.polarion.previewgenerator.external.app=
   /opt/tcvis-preview-gen/tcvis.sh
   com.siemens.polarion.previewgenerator.external.extensions=
   pdf,docx,doc,xlsx,xls,ppt,pptx
   com.siemens.polarion.previewgenerator.external.param10=1600x?px
   com.siemens.polarion.previewgenerator.external.param1=$in
   com.siemens.polarion.previewgenerator.external.param2=$out

   com.polarion.oleconverter.usefiles=true
   com.polarion.oleconverter.app=/opt/ole-convert/oleconvert.sh
   com.polarion.oleconverter.param1=$in
   com.polarion.oleconverter.param2=$out
   com.polarion.oleconverter.convertedImageFormat=png
   ```

3. Save the file then restart Polarion with:

```
    systemctl restart polarion
```

You should now see a preview of inserted attachments rather than icons.



9. Licensing and activation

Overview

In order to use Polarion you must obtain a license. A license with the necessary key and file is normally delivered by email to the address provided by the person who purchased the license. If you need help obtaining a license please contact sales@polarion.com.

Polarion installs with a 30-day evaluation license. After obtaining a license for production use, you must activate your Polarion installation. The login page provides options leading to online and offline activation instructions. You will need the information provided by Polarion to complete the activation.

Using different license types

Several different license types are available - **Evaluation**, **Site**, **User-limited**, and so on. If you begin using Polarion with one type of license key (Evaluation, for example), and want to continue using it with a different license type, simply remove the current license key file from the license folder and copy the new license key file there. If Polarion server is running, you will need to restart it for the new license to take effect. You may install multiple license keys for different license types and/or Polarion products on the same server.

Assigning named and concurrent users

If your license provides for named and/or concurrent users, you will need to add assignments for each type of user in the appropriate section of the users file. By default this file is located in the license folder of your Polarion installation. If you change the location for license key files, be sure to move the users file to the same folder that stores your license key file.

You can edit it in the **License** topic in **Global Administration** in the portal. The file contains comments with complete instructions on how to find the user IDs of your named/concurrent users, and make the relevant assignments. Be sure that write permission is set for the **/opt/polarion/polarion/license** folder .

License usage log file

Administrators and managers can monitor license usage by checking the license usage log file **log4j-licensing-TIMESTAMP.log**. This file is located in the **/opt/polarion/data/workspace/.metadata** directory by default.

(The **/opt/polarion/data** location is configurable during installation.)

When a concurrent user logs in/out, a license usage statistics report is written to the licensing log.

Note:

Concurrent licensing is not supported for all products.

The following example shows one user currently using an enterprise concurrent license type, the greatest number of users of this license during the current server session (peak), and the maximum number of users allowed by the license (limit).

```
2008-05-14 11:12:29,609 [TP-Processor2] INFO PolarionLicensing -
STATS:enterpriseConcurrentUsers,current:1,peak:2,limit:20
```

10. Subversion optimization

Polarion uses a subversion (SVN) repository as its main data storage. There are two topics in the Administrator's Guide component of Polarion's online Help that provide guidance for administrators about optimizing subversion for best performance. It is recommended that you review them before going into production with a new or updated installation.

- **Administrator's Guide → Advanced Administration→Topics→ Optimizing Subversion**
- **Administrator's Guide→ System Maintenance→ Topics→ Maintaining Subversion (SVN)**

Tip:

You should always set up and use the svn:// protocol for system user access.

11. Multiple repository setup

There are two Polarion features that enable you to work with multiple repositories, but they are fundamentally different. You need to understand the basics of each feature before deciding which approach to multiple repositories best meets your needs.

The **External Repository** feature gives you the ability to link Polarion artifacts stored in Polarion's integrated repository with source code changes (revisions) stored on one or more external SVN or Git repositories. After installation, you can configure Polarion to use one or more external repositories in addition to the SVN repository bundled and installed with Polarion. See **Administrator's Guide: Configuring Repositories** for more information.

The **Clustering** feature enables you to run Polarion on multiple servers, either physical, virtual, or a combination of both. The topography can be set up to host multiple Polarion servers running on separate machines each with its own Polarion repository, and/or multiple machines all accessing a single Polarion repository. (Polarion servers on any node can optionally be configured to access external repositories, as described above.)

Special installation and configuration procedures beyond the scope of this guide are required to set up a clustered multi-server environment. See Polarion® ALM™ Enterprise Setup for more information.

12. Accessing the Polarion Portal

Open a supported web browser and enter the following URL:

http://localhost/polarion/

On your first login after installation, you can login with the default system administrator credentials:

- User ID: **admin**
- Password: **admin**

13. LDAP authorization

In a new installation, users are authorized using the Subversion integrated policy access functions (directives **AuthzSVNAccessFile** and **AuthUserFile** in **polarionSVN.conf** file). If you have an LDAP infrastructure, you can make Polarion authorize users against the LDAP database.

Information on performing this configuration, together with some examples, is provided in the **polarionSVN.conf** configuration file. The file is located at: **[POLARION_HOME]\bundled\apache\conf \extra\polarionSVN.conf**

The file is located one of the following paths, depending on your Linux distribution:

- **/etc/apache2/conf.d**
- **/etc/httpd/conf.d**

After modifying the configuration file, the Apache server must be restarted to reflect the changes.

For more information about the Apache LDAP modules and their capabilities, visit these web pages:

- **https://httpd.apache.org/docs/2.4/mod/mod_authnz_ldap.html**
- **https://httpd.apache.org/docs/2.4/mod/mod_ldap.html** .

You can find information on configuring Polarion to work with LDAP in the Polarion *Help* topic **Administrator's Guide → User Management → Integrating Polarion Server with LDAP/Active Directory**.

14. Next steps after installation

Once you have installed Polarion and logged in to the Portal, consider taking a look at the demo projects (assuming you installed demo data). Click on the drop-down control in the **Navigation panel** on the left, select **Open Project or Project Group**, and open any project in the **Demo Projects** group. See the **User Guide** → **Getting Started with Projects** section in Polarion's Help for tips.

You may want to do some initial global customizations such as custom **Work Item** types, **Workflows**, **Reports**, **SSL Support** and more. You will find topics on these configurations in the **Administrator's Guide** section of Polarion's Help.

Once you have your Polarion system running, and any global customizations done, you are ready to begin setting up your own projects and user accounts. Look up the following topics in the **Administrator's Guide: Creating and Managing Projects** and **Managing Users and Permissions** section in Polarion's Help.

Tip:

Polarion supports Single Sign On (SSO) authentication using Security assertion markup language 2.0 (SAML), Kerberos tokens and Teamcenter security services. See Single Sign On (SSO) with Polarion on Polarion's Doc Center portal for details.

15. Removing Polarion

An automated uninstaller script **uninstall.sh** is provided for Linux platforms.

Remove the **/var/log/polarion folder and /var/run/polarion.pid**.

Polarion should then be uninstalled.

Warning:

Polarion's Subversion repository is stored in the **/opt/polarion** folder. Be sure this repository does not contain production data that must be preserved! If it does, be sure to make a backup before uninstalling Polarion.

16. Technical support

Polarion is problem-free for most people... at least that's been our experience. However, it's impossible to anticipate all the conditions and environments where Polarion may be used. If an arises, Polarion’s Technical Support team maintains the Customer Self-service Portal which includes an extensive knowledge base of common problems and solutions and troubleshooting information, as well as the possibility to submit, manage, and review your own specific support cases.

For information about the portal and technical support options, please visit: **https://polarion.plm.automation.siemens.com/techsupport/resources**

17. Appendix

Default users and groups

OS	User	Group	Passwd Utility
RedHat (CentOS)	apache	apache	htpasswd
Debian	www-data	www-data	htpasswd
Ubuntu Server	www-data	www-data	htpasswd
SUSE	wwwrun	www	htpasswd2

Enabling email notifications

If you did not configure email notification settings in the installation program, you can do this after installation by setting the host name in the **announcer.smtp.host** property in the **polarion.properties** file located in **[POLARION_HOME]\polarion\configuration**. There you should also set the **announcer.smtp.user** and **announcer.smtp.password** properties to a valid email account on the SMTP host specified in **announcer.smtp.host**. You may want to create a dedicated email address on your SMTP host for use by the Polarion notifications system.

When this configuration is correctly set up, the system will send notification emails about various events according to the notification targets configuration. For information on configuring email notifications, see the **Administrator's Guide: Configuring Notifications** in Polarion's Help.

Manual installation on Linux

It is highly recommended that you run Polarion on one of the supported Linux operating systems and use the automated installation scripts provided in the product distributions for Linux.

There may be cases when Polarion must be installed manually. For example, perhaps an automated installation script doesn't recognize your system as one of the supported Linux systems due to customization or other factors. Or possibly, your server does not yet have an internet connection, so various packages downloaded during the automated installation are not accessible. Therefore, automated installation cannot proceed. (Scripts inform you if automated installation is not possible).

System requirements and recommendations

Before starting with a manual installation, go over the information listed below:

- *Server software requirements* (OS, OpenJDK 11, VCS, web server).
- *Server hardware requirements* (RAM, disk storage).
- *Client software requirements* (OS, web browsers, Adobe Flash).
- *Client hardware requirements* (RAM, display, connection).

Required third-party software components

In order to run Polarion, you need to have several other software components installed and configured:

- **Apache HTTP Server version 2.2** or later. (The latest 2.4.x is recommended.)
- Subversion server version 1.6.x, 1.7.x, 1.8.x or 1.9.x
- **OpenJDK 11** (**Recommended version**: AdoptOpenJDK 11 LTS)
- **PostgreSQL**.
  Recommended: PostgreSQL version 11
- Fonts package **urw-fonts** (on SUSE and CentOS)

Apache server

Apache HTTP Server is a required application for Polarion. We highly recommend installing it first.

You can download the appropriate distribution at the Apache website at:

http://httpd.apache.org/.

Installation Help for Apache HTTP server is available from Apache at:

http://httpd.apache.org/docs/2.4/install.html.

htpassword Utility

After installation you must ensure that the **htpasswd** utility is executable. The **apache/bin** folder must be present among other paths in PATH system variable, or the full path needs to be specified in the system configuration file **polarion.properties**.

Note:

On SUSE the utility may be called **httpasswd2**

Subversion

The Subversion version control system (versions 1.6.x, 1.7.x, 1.8.x or 1.9.x) is also required for Polarion. You can download the appropriate distribution at **http://subversion.apache.org/**. Full user/administrator documentation is available on a third-party website at **http://svnbook.red-bean.com/**.

PostgreSQL

In new installations beginning with version **2015 SR2**, Polarion server cannot start if PostgreSQL is not installed and configured. Please use your distribution's package manager to download these two packages: **postgresql** and **postgresql-contrib**. On RedHat you will need the **postgresql-server** package instead of the **postgresql** package.

You can follow the instructions posted online at **http://www.postgresql.org/download/** or use one of the following command sets:

CentOS, RedHat:

- `yum install postgresql`
- `yum install postgresql-contrib`

Debian, Ubuntu:

- `apt-get install postgresql`
- `apt-get install postgresql-contrib`

SUSE: Available from openSuse Build Service (**https://build.opensuse.org/**) in the server:**database:postgresql project**:

- `yast --install postgresql`
- `yast --install postgresql-contrib`

After installing PostgreSQL, you must configure it and Polarion. This configuration is covered in the *Configuration of third-party components*.

Install OpenJDK 11

Tip:

Recommended OpenJDK 11 distribution: AdoptOpenJDK 11 (LTS) .

Warning:

- Backup the Java Keystore before installing OpenJDK and reimport it once it and the Polarion installation are complete.
- When installing or upgrading to AdoptOpenJDK 11 (LTS) make sure the default file encoding matches the same encoding used by the previous version of Java.
- As of **Polarion 19** Oracle Java SE Development Kit 8 is no longer supported.

1. Go to AdoptOpenJDK 11 (LTS) .

   (AdoptOpenJDK 11 (LTS) is the recommended OpenJDK distribution because it's continuously tested with Polarion and offers long-term support.)

2. Select the **HotSpot** implementation for the **Linux x64** platform and download the **JDK** archive with your preferred tool and extract the files to a preferred location.

3. Set the `JDK_HOME` and `JAVA_HOME` environment variables. (Refer to the manual for your Linux distribution.)

4. You can test the configuration by executing `$JDK_HOME/bin/java -version` and `$JAVA_HOME/bin/java -version`

   (This should display the information about **AdoptOpenJDK 11**)

Match default file encoding:

1. Search for the `file.encoding` property in the main log file (`/opt/polarion/data/logs/main/`).

2. If the default file encoding for the new Open JDK 11 differs, then define it explicitly as a Java Runtime property by adding the following property to the `config.sh` file:
   (Default location: `/opt/polarion/etc/config.sh`.)

   - `-Dfile.encoding=file_encoding`
     Replace `file_encoding` with the one you use.

Fonts Package

Phantom JS, used for previewing and exporting highcharts in PDF, is installed on all OS platforms. On SUSE and CentOS, URW fonts must be explicitly installed (see *Server software requirements*), otherwise exported diagrams rendered by Phantom JS will display rectangles instead of letters.

Import a certificate to the Java Keystore

You will need to import a certificate to the Java Keystore if:

- You are not using a SSL certificate that is signed by an authority trusted by Java.
  Use of a trusted certificate is preferred and recommended because using an untrusted certificate, such as a self-signed certificate, will cause web services communication to fail with the `SSLHandshakeException` error.

- Before making the switch from Oracle JDK8 to OpenJDK 11.

The information is important only if you are not using a SSL certificate that is signed by an authority trusted by Java. Use of a trusted certificate is preferred and recommended because using an untrusted certificate, such as a self-signed certificate, will cause web services communication to fail with the `SSLHandshakeException` error. If you do opt to use an untrusted certificate, then you must import it into the Java keystore. The general import procedure is described below, followed by examples for Linux and Windows.

1. Copy the default keystore `$JDK_HOME/lib/security/cacerts` as `$JDK_HOME/lib/security/jssecacerts`.

   This will leave the original `cacerts` file available as a backup. JSSE will use the `jssecacerts` file, if present, instead of `cacerts`. `Jssecacerts` needs to start as a copy of `cacerts`, which it overrides rather than extends.

2. Import the certificate to the `jssecacerts` keystore using the following command, replacing variables as noted below:

   ```
   $JDK_HOME/bin/keytool -importcert -file $CERT -alias $ALIAS
   -keystore
   $JRE_HOME/lib/security/jssecacerts -storepass changeit
   ```

   a. Replace `$JDK_HOME` with your actual JDK home path.

   b. Replace `$CERT` with the path to your certificate the you previously installed to the system.

   c. Replace `$ALIAS` with the preferred alias to be used in the keystore.

   d. Note that `changeit` is the default password for Java's `cacerts` file. Check whether it has been changed on your system.

3. When prompted, check the certificate and confirm that it should be trusted. The prompt to verify and confirm the certificate can be suppressed by adding option `-noprompt`.

Windows example:

The following command should be written as a single line. It must be run as Administrator. If the Java paths on your system contain spaces, they must be contained in a pair of double straight quotes, as shown.

```
"C:\Program Files\Java\jdk-11.0.1\bin\keytool" -importcert -file
C:\Polarion\bundled\apache\conf\certificate.crt -alias labs.polarion.com
-keystore "C:\Program Files\Java\jdk-11.0.1\lib\security\jssecacerts"
-storepass changeit
```

Linux Example (CentOS)

This example following command should be written as a single line:

```
/usr/java/jdk-11.0.1/bin/keytool -importcert -file /etc/pki/tls/certs/
cert.pem
-alias labs.polarion.com -keystore /usr/java/jdk-11.0.1/lib/security/
jssecacerts -storepass changeit
```

Depending on your operating system and version, additional command parameters may be necessary.

(See https://www.cloudera.com to learn more.)

Keytool Commands

Here are some potentially useful keytool commands:

```
keytool -list -keystore %JAVA_HOME%\lib\security\jssecacerts -storepass
changeit

keytool -delete -alias mykey -keystore %JAVA_HOME%\lib\security
\jssecacerts
-storepass changeit

keytool -importcert -help

keytool -help
```

Configure third-party components

This section covers various configuration requirements for third-party software that enable Polarion to run with it.

For further inspiration you may also inspect supported OS configurations located in

[Polarion_Unpack_Dir]/libinstall/predefined/[OS]/**

Apache HTTPD

1. Apache must be compiled with the WebDAV module (mod_dav.so).

2. Modules from Subversion must be properly installed (**mod_authz_svn.so** and **mod_dav_svn.so**) The following lines must be added into an Apache configuration file into the **LoadModule** section. This can be the default configuration file **httpd.conf ([Apache2_Dir]/conf/httpd.conf)**, or any other **conf** file, including a new one you create for the purpose. Lines:

   ```
   LoadModule dav_svn_module modules/mod_dav_svn.so
   LoadModule authz_svn_module modules/mod_authz_svn.so
   ```

3. Add the following lines to your **httpd.conf**:

   ```
   <Location /repo>
   DAV svn
   SVNPath "/opt/polarion/data/svn/repo"
   # our access control policy
   AuthzSVNAccessFile "/opt/polarion/data/svn/access"
   # try anonymous access first, resort to real
   # authentication if necessary.
   Satisfy Any
   Require valid-user
   # How to authenticate a user. (NOTE: Polarion does not
   # currently support HTTP Digest access authentication.)
   AuthType Basic
   AuthName "Subversion repository on localhost"
   AuthUserFile "/opt/polarion/data/svn/passwd"
   SVNAutoversioning on
   </Location>
   #polarion specific configuration of apache for svn
   # and maven2 repo
   # Maven 2 shared repository
   <Directory "/opt/polarion/data/shared-maven-repo">
   Options Indexes
   Order allow,deny
   Allow from all
   </Directory>
   Alias /maven2 "/opt/polarion/data/shared-maven-repo"
   ```

   Pay attention to the name of repository (**/repo**) in the first tag (**<Location/repo>**). It's the name (an alias) of your subversion repository.
   Don't forget to specify the correct paths to the real repository folder in the **SVNPath** parameter, to the access file in the **AuthzSVNAccessFile** parameter, and to the **passwd** file in the **AuthUserFile** parameter.
   Pay attention to the paths used in the **httpd.conf** example above. They must be the same as those used by default by the **libinstall/default.sh** script. This script won't work if different paths are used.

4. Create a file named **workers.properties** in your Apache server's configuration directory (where the **httpd.conf** file resides), with the following:
```
worker.list=worker1
worker.worker1.type=ajp13
worker.worker1.host=127.0.0.1
worker.worker1.port=8889
worker.worker1.lbfactor=50
worker.worker1.cachesize=50
worker.worker1.cache_timeout=600
worker.worker1.socket_keepalive=1
worker.worker1.recycle_timeout=300
```

5. Create a file named **polarion_mounts.properties** in your Apache server's configuration directory (where the **httpd.conf** file resides). Add the following lines:
```
/polarion/*=worker1
/polarion=worker1
/svnwebclient/*=worker1
/svnwebclient=worker1
```

Subversion

Either the subversion binary (**svn**) must be on PATH or the **javahl** libraries must be properly installed.

JDK

The configuration requires several files from the JDK.

- The environment variable **JDK_HOME** must be properly set.
  (Remember to update the **JDK_HOME** variable in **/opt/polarion/etc/config.sh**.)

Warning:

(Do not update to a new major JDK version until support for it by Polarion is officially announced.)

Java Virtual Machine memory limit

If you allocate too much memory for the Java Virtual Machine (JVM), the operating system will not initialize it. Diagnosing the issue can be difficult because the service simply does not start and no error log is written. On some Linux versions, a message may appear in the console indicating that the Java Virtual Machine could not be initialized, but without indicating the reason.

The amount of memory you can allocate to the JVM depends on what OS you have and how much total memory exists on the computer. The more total memory the more you can allocate to the JVM before the operating system imposes a limit the better.

Update Java

It's good to update OpenJDK regularly for security reasons, but check the **README.html** file to ensure that major Java version updates are officially supported by Polarion before updating to them.

Warning:

Oracle's Java SE Development Kit 8 is no longer supported.

Warning:

If you added extra GC related runtime parameters for Java, you will need to update so that they'll work with **OpenJDK 11**. (If you don't, the Java Virtual Machine may fail to start.)

Tip:

Not sure how to update your custom GC related runtime parameters?

The following links will help:

http://openjdk.java.net/jeps/158

http://openjdk.java.net/jeps/271

Still stuck?

Contact SIEMENS' GTAC support system.

Please take the usual steps specific to your distribution.

When updating Java please remember to update variable **JDK_HOME** in `/opt/polarion/etc/config.sh`.

Warning:

When installing or upgrading to OpenJDK 11 **make sure the default file encoding matches** the same encoding used by the previous version of Java.

Postgre SQL

The location of PostgreSQL utilities depends on the specific Linux distribution. The command examples below assume that the folder containing PostgreSQL binaries is added to your system PATH variable.

The OS user postgres is normally created as a result of the PostgreSQL installation. To be able to use the psql utility, you must access it as this user.

A) Create the PostgreSQL database storage:

1. Create a folder to store PostgreSQL data and make the postgres user the owner of this folder on Linux. Any location will be fine, as long as the postgres user owns the folder. You can use the following example where the folder for PostgreSQL data is: **/opt/polarion/data/postgres-data**
   mkdir /opt/polarion/data/postgres-data
   chown postgres:postgres /opt/polarion/data/postgres-data

2. As the **postgres** user, initialize the database using the **initdb** command. The syntax differs for PostgreSQL versions, as shown in the following examples, with our **/opt/data/postgres-data** folder. Use **psql --version** to check for the version.
   For PostgreSQL version 9.1 and earlier:
   su postgres
   initdb -D /opt/polarion/data/postgres-data -E utf8
   For PostgreSQL versions after 9.1:
   initdb -D /opt/polarion/data/postgres-data -E utf8
   --auth-host=md5
   In some cases, **initdb** is not available immediately after the installation, and you need to add to your path. You can use the locate command to find the location of psql. If it cannot be found, use the **updatedb** command and search for it again. More information about **initdb** can be found at: http://www.postgresql.org/docs/9.4/static/app-initdb.html.

3. Start the PostgreSQL server. Remember that all PostgreSQL utilities must be run on behalf of the postgres system user, and you must initialize the database storage as described in step 2 above prior to running the server for the first time.
   su postgres
   pg_ctl -D /opt/polarion/data/postgres-data -l /opt/polarion/data/postgres-data/log.out -o "-p 5433" start
   (The **pg ctl** command should be written to a single command line.) You can define additional options, such as the port on which the database should run. Check http://www.postgresql.org/docs/9.4/static/app-pg-ctl.html for an overview of options.

B) Connect to the Root Database of PostgreSQL:

For configuration of Polarion databases, you need to connect to the root database of PostgreSQL postgres using your favorite SQL client, for example Squirrel), or just use PostgreSQL's built in the **psql** tool.

1. On Linux, the operations with PostgreSQL database must be run on behalf of the **postgres** user: **su postgres**

2. Connect to the PostgreSQL postgres root database on behalf of the postgres user (or the database's superuser): **psql -p <port> postgres**

The syntax for psql is: **psql -p <port> -U <user> <database>**

Example: **psql -p 5433 -U polarion polarion_history**

C) Create the Polarion User and the Databases:

Polarion uses two databases, **polarion** and **polarion_history**, which will be owned by the polarion user, so the first step is to create the polarion user. To do this, execute the following three SQL statements using your SQL client:

1. Create the **polarion** user and replace the **<your-password>** with a password of your choice: (The password cannot contain any of the following characters: @, :, \, ', " or leading/trailing spaces.) **CREATE USER polarion WITH PASSWORD '<your-password>' CREATEROLE;**

2. Create the Polarion database: **CREATE DATABASE polarion OWNER polarion ENCODING 'UTF8';**

3. Create the polarion_history database: **CREATE DATABASE polarion_history OWNER polarion ENCODING 'UTF8';**

4. Quit the **psql** utility using the **\q** command.

D) Install dblink Extension and PLPGSQL Language:

After you have created the two databases for Polarion, you need to install the DBLink extension on both of them. The DBLink extension is used to enable Lucene queries within SQL queries. Some functions used by Polarion use the PLPGSQL language, which needs to be installed as well.

1. Connect to the polarion database via psql client as postgres database user (or the superuser): **psql -p 5433 polarion**

2. Create the DBLink extension.

   a. If your PostgreSQL version is 9.1 or later, just execute the following SQL command: **CREATE EXTENSION dblink;**

   b. If your PostgreSQL version is 9.0 or earlier, use the psql tool to set up the extension using the following command:
   - If not connected to psql: **psql -p <port> polarion -f dblink.sql**
   - If already connected: **\i dblink.sql;**

The **dblink.sql** file was installed during your installation of PostgreSQL. The location depends on your Linux distribution. You can use the locate command to find it.

3. To verify that the dblink extension was successfully installed, execute this SQL query in your database client:
   ```
   SELECT p.proname
   FROM pg_catalog.pg_namespace n
   JOIN pg_catalog.pg_proc p
   ON p.pronamespace = n.oid
   WHERE n.nspname = 'public';
   ```
   It should return rows containing **db_link** as a prefix.

4. Install the PLPGSQL language by executing the following SQL command:
   CREATE LANGUAGE plpgsql;

5. Quit the **psql** utility (**\q**) and repeat the above steps for the **polarion_history** database.

6. If you did not run the initialization of the database with **--auth-host=md5**, open **[PG_DATA]/pg_hba.conf** and change all the host entries with trust to md5, then restart PostgreSQL. (In our examples, **[PG_DATA]** was **/opt/polarion/data/postgres-data** (the location on which the database was initialized).

E) Optimize the PostgreSQL Database:

Optimization is the same as described for automated installation.

(See *After installation: optimizing the PostgreSQL database*.)

F) Configure Polarion to use PostgreSQL database:

Add the following property to the **polarion.properties** system configuration file:

com.polarion.platform.internalPG=polarion:<password>@<hostname>:<port>

For example:

com.polarion.platform.internalPG=polarion:polarion@localhost:5433

If you have the polarion and polarion_history databases running on different servers, you can use these two properties rather than the above property:

com.polarion.platform.sql.internalDB.head.url=jdbc:postgresql:

//<hostname>:<port>/polarion?user=<userName>&password=<password>

com.polarion.platform.sql.internalDB.historical.url=jdbc:postgresql:

//<hostname>:<port>/polarion_history?user=<userName>&password=<password>

Caution:

Each property should be written in a single line.

After you have set the system properties, reindex your Polarion installation so that the PostgreSQL database will be populated. Using any SQL client after the reindex, you should see the database filled in the *polarion* schema.

G) (Optional) Allow remote connections to the PostgreSQL server:

By default the PostgreSQL database is only available on **localhost** after a fresh install. If you need to have access from outside the host machine, please follow these steps to allow remote access:

1. Change the listener addresses in the `postgresql.conf` file. This file can be found in the `PostgreSQL` data folder, the one you have defined under Starting/Stopping PostgreSQL. In this file, change: `#listen_addresses='localhost' to listen_addresses='*'`

2. In the same folder, you will find the `pg_hba.conf` file. Open it in a text editor and add the following line: `host all all 0.0.0.0/0 md5`

   Warning:

   If you allow for external connections to the database, an external user has blanket access to the entire database content and effectively to all Polarion data - all projects, the HEAD revision as well as history. There is no further access control. All Polarion user names will also be visible. (Polarion user passwords will not be visible as those are not stored in a database or SVN.) Access is read-only.

   Administrators are advised to consider carefully before opening database access in a system in use on a production level.

H) Check Shared Buffers Configuration

Check that the value of the `shared_buffers` parameter in **postgresql.conf** does not exceed the available shared memory configured by the *SHMMAX* kernel parameter .

Install Polarion

After the required third-party software is installed and configured, you are ready to install Polarion.

The Linux distribution comes in a ZIP archive. The archive file name includes the version number and the word **linux**. For example: **PolarionALM_nnnn_linux.zip** (where *n* is a number from 0-9).

Installation steps

1. Be sure that all required third-party components are properly installed and configured.

2. Unpack the distribution ZIP archive to a temporary location.

3. Change current directory to **Polarion**.

4. If SELinux is bundled with/installed on your Linux OS, make sure it is not activated. Check the status of SELinux with the **/usr/sbin/sestatus -v.** command

5. Create a Unix system account named **polarion** for the Polarion server.

6. Review the path variables defined in **libinstall/default.sh**. Set up **v_web_user** and **v_web_group**.

7. Execute (under root):
   chmod +x manual_install.sh; ./manual_install.sh

This will install Polarion into the standard **/opt/polarion** location . Data will be installed into the standard **/opt/polarion/data** location .

Setting permissions

After manual installation you need to set up permissions on unpacked folders.

The standard permissions are:

- Read only for everybody, owner and group root: root on the following folders and their subfolders:
  /opt/polarion/polarion
  /opt/polarion/maven

- Writeable on the **/opt/polarion/datafolder** and its subfolders.

For **"polarion":"web user"**, where **polarion** is a system account that you must create manually and **web user** is user used by Apache.

For more details, see the **setPermissions()** function in **[UnpackDir]/libinstall/helper_functions.sh**.

Notes on a manual installation

If Polarion is already installed, any user data (repository, builds, reports) will not be overwritten. However, it is recommended to back up any changed files in **/opt/polarion** (typically **polarion.properties** and any customized shell scripts), because they will be overwritten.

Possible changes include:

- Change the value of the **host.name** parameter from **localhost** to the host name specified in **httpd.conf**.
- Check that the repository alias in the **svn.url** parameter corresponds to the one in the **httpd.conf** file. (See Required Configuration.)
- Check that the correct paths to the **passwd** and **access** files are specified in the relevant **svn.passwd.file** and **svn.access.file** parameters.
- You may need to reconfigure the **htpasswd.path** parameter and set it to **/usr/sbin/htpasswd2** instead of the usual **/usr/local/apache2/bin/htpasswd**.
- Check Apache's htpasswd utility path in the **htpasswd.path** parameter.
- Check that the port specified in the **tomcat.ajp13-port** parameter corresponds to the port specified in the **worker.worker1.port** parameter of the **workers.properties** file.
- Specify the correct SMTP host in the **announcer.smtp.host** parameter.

Configure Polarion

1. Execute commands from installation temporary directory to create new Subversion repository:
   ```
   svnadmin create /opt/polarion/data/svn/repo –fs-type fsfs
   chown –R "webuser":"webgroup" /opt/polarion/data/svn/repo
   ```
   The items **webuser** and **webgroup** are the user and group under them on the Apache server.

2. Import either the production data or demo data configuration. You cannot import both. You can only execute both scripts on a fresh repository.
   ```
   [POLARION]/bin/polarion.init init
   ```
   or
   ```
   [POLARION]/bin/polarion.init demo
   ```

   Note:

   Parameters could be different on your OS. For example **User** and **Group** directive values from **httpd.conf**: The **Group** value in the standard Apache distribution is *#-1*, the numerical *group ID -1*, can't be used. Use **apache/apache** as **User** and **Group** instead.

   Warning:

   Once the (**[POLARION]/bin/polarion.init init**, or **[POLARION]/bin/polarion.init demo**) scripts have been executed, it is not possible to install demo data without deleting the subversion repository in **/srv/polarion/data/svn/repo**.

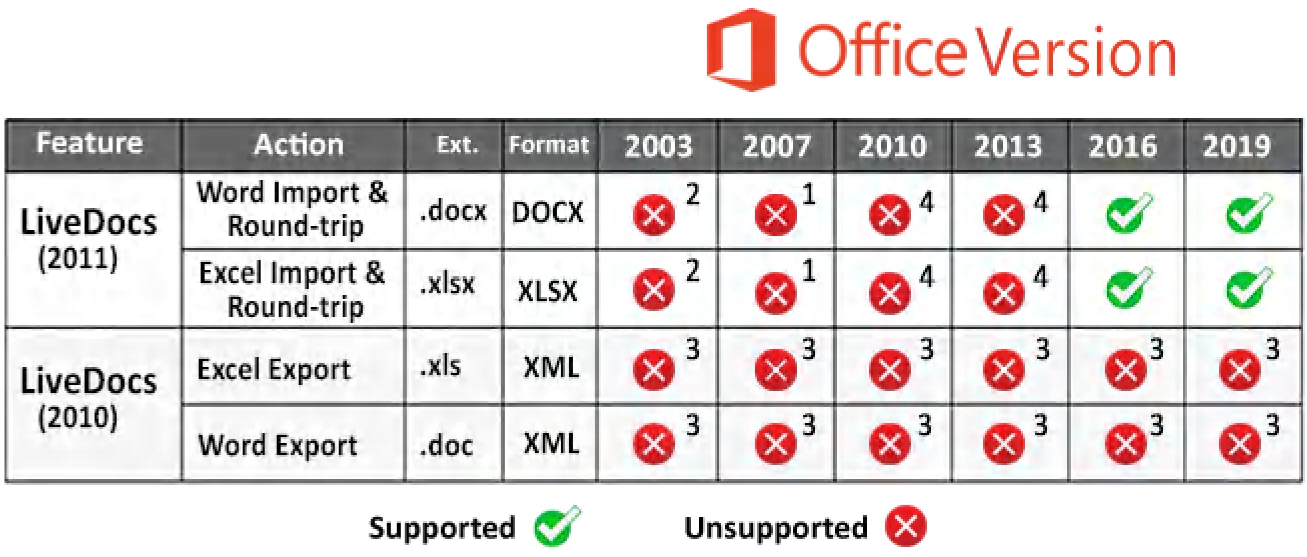
3. Before using the system for production, see *Securing the Polarion activation application* and perform the recommended configuration as described.

Next steps

After completing a manual installation, review the following topics.

- *System Startup and Shutdown*
- *After Installation*
- *Appendix: Default Users and Groups*
- *Appendix: Enabling Email Notifications*

18. Supported Microsoft Office versions



Office Version

Feature	Action	Ext.	Format	2003	2007	2010	2013	2016	2019
LiveDocs (2011)	Word Import & Round-trip	.docx	DOCX	✗[2]	✗[1]	✗[4]	✗[4]	✓	✓
	Excel Import & Round-trip	.xlsx	XLSX	✗[2]	✗[1]	✗[4]	✗[4]	✓	✓
LiveDocs (2010)	Excel Export	.xls	XML	✗[3]	✗[3]	✗[3]	✗[3]	✗[3]	✗[3]
	Word Export	.doc	XML	✗[3]	✗[3]	✗[3]	✗[3]	✗[3]	✗[3]

Supported ✓ Unsupported ✗

- Beginning with Polarion 18, Microsoft Office 2007 is no longer supported in Polarion LiveDocs™.

> Caution:
>
> (The only exception is Polarion's internal templates. If updated in Microsoft Word, they should still be saved in the 2007 .docx format to ensure that content like shapes import/export as expected.)

- Beginning with Polarion version 2014-SR1, Microsoft Office 2003 is no longer supported in Polarion LiveDocs™.

- Prior to Polarion version 2011, **Live Documents** referred to Microsoft Office Word and Excel documents based on special document templates that could define and store Polarion **Work Items**. Beginning with version 2011, the technology was completely refactored, but backward compatibility was maintained. Beginning with Polarion version 2014-SR1, support for this legacy format was dropped completely and the feature was renamed as **LiveDocs**.

- Beginning with Polarion 19, Microsoft Office 2010 and 2013 are no longer supported in Polarion LiveDocs™.