

VISULOX

VISULOX 4

VISULOX4_InstallationGuide

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amitego



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1 Preface

The **VISULOX Installation Guide** provides information about installation, configuration, upgrading and removing of this version of VISULOX. Instructions on how to get started using VISULOX is also provided. This document is intended for consultants and system administrators.

1.1 How this manual is organized

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1.2 Legend

| |
|--|
|  Useful information |
|  Recommended setting |
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1.3 VISULOX documentation

| Application | Title | Format |
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| Release Notes | <i>VISULOX Release Notes</i> <i>Platform Support and Release Notes</i> | HTML |
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| Administration | <i>VISULOX Admin Guide</i> <i>Administration Guide</i> | HTML |

| Application | Title | Format |
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 The VISULOX Online Documentation is available at: <https://portal.visulox.com/wiki>

1.4 Documentation feedback

Submit comments about this document by sending a mail to: support@visulox.com

2 Requirements

2.1 General

- The recommended platform is **Oracle Linux / Red Hat 9** (for other versions contact amitego) with at least 10Gbyte for the OS, 20Gbyte for VISULOX PORTAL Service and 30 Gbyte for the VISULOX Service free space on the hard disc (small installation)
- The **/opt** directory must NOT be mounted with **-nosuid** parameter
- VISULOX can be virtualized, the disk must NOT have "**Thin provisioning**" enabled
- **umask 022** is needed for installation and start of the VISULOX PORTAL Service
- Symbolic links are not supported
- If **autofs** is used with **transit mapping**, Selinux has to be disabled
- The users ttasys and ttaserv are placed in the **/home** directory during installation.
- The recommended VISULOX version is the latest VISULOX 4 release
- The recommended user repositories are all repositories, that are supported by VISULOX PORTAL Service
- Firewall configured properly or disabled
- /etc/hosts should look like: 127.0.0.1 localhost localhost.localdomain
- NTP **or** Chrony enabled
- For ports, see: [Network communication within VISULOX](#)



Make sure that correct hostnames are used for the servers in the environment.
Hostnames **must not** contain underscores (because of RFC 952 and domain names with underscores)!
The **FQDN** of the host **must not** exceed 50 characters!
Capital letters **must not** be used in hostnames!
Changing hostnames after installation of VISULOX **is not** supported!
Checking the hostname (must be identical):

```
nslookup $(hostname -f) --> Hostname and IP address is displayed
nslookup <IP address> --> IP address and hostname is displayed

getent ahosts $(/opt/tarantella/bin/bin/ttahostname) --> IP address and hostname is displayed
```

```
getent hosts <IP address> --> IP address and hostname is displayed
```

```
getent ahost localhost --> IP address is displayed (127.0.0.1)
```

```
getent hosts 127.0.0.1 --> IP address (127.0.0.1) and hostname (localhost) is displayed
```

2.2 Required packages

Choose **Server** or **Server with GUI** for the base environment.

i The basic server installation contains all necessary software for VISULOX. Additional software should not be installed on a VISULOX server. Runlevel 3 multi-user target is recommended.

i The recommended OS is **Oracle Linux 9**. As an alternative Red Hat Linux could be used, which will possibly need some other packages as listed here. For other OS versions please contact amitego.

i For **Oracle Linux 9** the following adjustment is necessary after an array installation:
Delete **SHA1** in `/etc/crypto-policies/back-ends/java.config`:

```
jdk.certpath.disabledAlgorithms=MD2, MD5, DSA, RSA keySize < 2048
```

This setting should be checked again after yum update.

2.3 Disk layout

The platform disk layout can be as usual. We recommend at least 10 Gbyte for the OS,

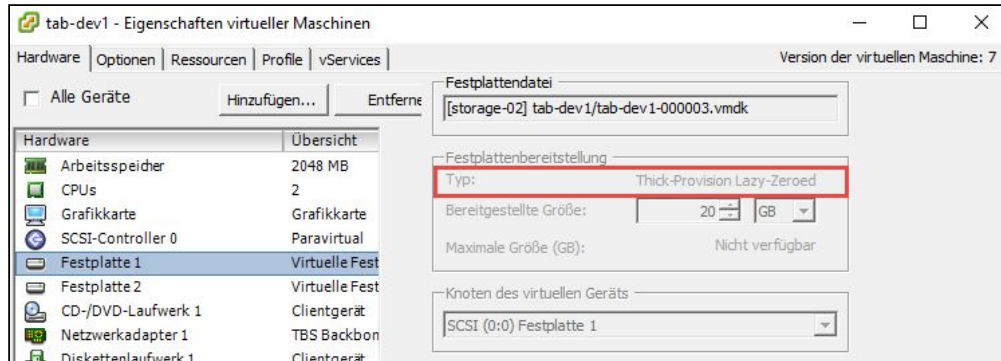
Further we recommend to have a partition of 20Gbyte under `/opt/tarantella`, 30Gbyte under `/opt/visulox` (60Gbyte with Archive) in a small environment.

For a large environment we recommend to have at least 50Gbyte under `/opt/visulox` (100Gbyte with Archive).

An additional partition for File store is also recommended, which is mounted under `/opt/visulox/data/filestore/0`.

⚠ VISULOX can be virtualized, the disk must NOT have "**Thin provisioning**" enabled. (See also: [How to use VISULOX on virtualized VMWare disks](#), [VISULOX disk space protection](#))

⚠ The **/opt** directory must NOT be mounted with **-nosuid** parameter.



Diskspace of VLX_DATADIR must have at least 2.5 of size of the database available because VACUUM creates a copy of the database.

For example: a 4GB database needs 6 GB free disk space. The disk space is checked with integrity check.

2.4 Libraries needed for VISULOX on Oracle Linux 8

oracle_appstream_latest ol8-epel

```
dnf repolist
This system is receiving updates from Unbreakable Linux Network or Spacewalk.

repo id                                repo name
ol8-codeready                           ol8-codeready
```

```
ol8-epel
ol8_addons
ol8_appstream_latest
ol8_x86_64
```

```
ol8-epel
ol8_addons
ol8_appstream_latest
ol8_x86_64
```


ol8-codeready is needed for transitmapping.

For the Epel repository on Red Hat 8 use:

```
dnf install https://dl.fedoraproject.org/pub/epel/epel-release-latest-8.noarch.rpm
```

```
dnf install java-11-openjdk
dnf update
```

Installing VISULOX 4 on Linux platforms, the yum / dnf command has to be used to ensure that any package dependencies are resolved automatically. This means that yum must be configured to use a suitable Linux package repository. Make sure that and are in yum repolist as well.

 **yum update** is recommended before installing the new packages!

2.5 Platform modification during installation

2.5.1 VISULOX PORTAL Service

Before installation of the VISULOX PORTAL Service, the following libraries should be installed: xterm xclock xauth

umask 022 is recommended for installation and start of the VISULOX PORTAL Service.

VISULOX PORTAL Service must be installed **without** symlinks.

During VISULOX PORTAL Service installation two users and a group will be created:

```
uid=500(ttasys) gid=500(ttaserv) groups=500(ttaserv)
uid=501(ttaserv) gid=500(ttaserv) groups=500(ttaserv)
```

VISULOX PORTAL and VISULOX service are also adding files for PAM authentication: **/etc/pam.d/tarantella** and **/etc/pam.d/visulox**.

⚠ With **visulox portal admin -user <unixuser>** a Unix user can be activated as VISULOX Portal Administrator. It is recommended to set a different user than root!.

2.5.2 VISULOX Service

The default VISULOX installation directory is **/opt/visulox**.

On group **vlxgroup** is generated on startup

On default 102 users are generated in for following sequence: VISULOX user (**vlx**), VISULOX webservice user (**vlxwebservice**) and 100 Jump Users (**vlx000 .. vlx099**).

The users can be removed and recreated with an admin command by and a new start UID can be applied.

During VISULOX Service installation the following users and groups are created:

Primary VISULOX user and group

```
vlx:x:503:503:VISULOX user:/opt/visulox:/bin/bash
```

⚠ The **vlxgroup** **must** be a local group!

On every VISULOX Access Node, the VISULOX Service is attached to the VISULOX PORTAL Service and the webservice user is created with:

```
visulox portal attach
```

VISULOX PORTAL connection user

```
vlxwebservice:x:610:500:VISULOX Admin User in VISULOX PORTAL:/opt/visulox/var/vlxwebservice:/sbin/nologin
```

If the webservice user should be created with a given name and UID on a VISULOX Access Node, the following parameters have to be adjusted:

```
visulox config -name portal.admin
```

| changed | key | value |
|---------|-------------------|---------------|
| | portal.admin.uid | 610 |
| | portal.admin.user | vlxwebservice |

✘ This VISULOX webservice user is created with an unknown password that never expires and **cannot** be modified!

100 VISULOX jump users

```
vlx000:x:<next available user id>:503:Visulox transit user:/opt/visulox/users/vlx000:/bin/bash  
...  
vlx099:x:<next available user id>+100:503:Visulox transit user:/opt/visulox/users/vlx099:/bin/bash
```

i The group is the same of the vlx user. The VISULOX group

A VISULOX PID is generated on each VISULOX Node. This **vlxpid** is always **vlxgroup+1**.

During VISULOX Service installation, the set-user-id bit is set on the following binaries:

```
-r-sr-xr-x 1 root vlxgroup 18760 Sep 17 14:14 vlxchown  
-r-sr-xr-x 1 root vlxgroup 38007 Sep 17 14:14 vlxsu  
-r-sr-xr-x 1 root vlxgroup 16276 Sep 17 14:14 vlxsudo
```

i Code for security review is available on request.

A file with the maximum number of processes and opened files for the vlx group is added: **/etc/security/limits.d/90_visulox.conf**

```
@vlx hard nproc 16000  
@vlx soft nproc 4000  
@vlx hard nofile 8000  
@vlx soft nofile 2000
```

During setup, a log rotation entry for VISULOX is added: **/etc/logrotate.d/visulox**

2.6 Optional enhancements

2.7 VISULOX addons

The following VISULOX addons can be used, if the according packages are installed on the server:

2.7.1 VISULOX Firefox

Firefox

```
yum install firefox
```

2.7.2 VISULOX VNC

VNC Viewer

```
yum install tigervnc
```

2.7.3 Telnet

Telnet

```
yum install telnet
```

2.7.4 Checksum in File Transfer

To display the checksum of transferred files in the VISULOX Transit Area in the user's Workspace it is necessary to install **rhash**, which is available in the Epel repository.

3 Installing VISULOX

Installing VISULOX 4.x on Linux platforms, the yum / dnf command has to be used to ensure that any package dependencies are resolved automatically. This means that yum must be configured to use a suitable Linux package repository. Make sure that **oracle_appstream_latest** and **ol8-epel** are in yum repolist as well.


```
dnf repolist
This system is receiving updates from Unbreakable Linux Network or Spacewalk.

repo id                                repo name
ol8-codeready                          ol8-codeready
ol8-epel                                ol8-epel
ol8_addons                              ol8_addons
ol8_appstream_latest                   ol8_appstream_latest
ol8_x86_64                              ol8_x86_64
```

ol8-codeready is needed for transitmapping.

For the Epel repository on Red Hat 8 use:

```
dnf install https://dl.fedoraproject.org/pub/epel/epel-release-latest-8.noarch.rpm
```

 RPM package signatures can be used for the VISULOX RPM packages.
For more information see also: [QuickInstallGuide_OL8](#) and/or contact the VISULOX Support Team.

On VISULOX Access Nodes:

Installation packages

```
dnf install java-11-openjdk
dnf update
```

```
dnf install visulox-rte-1.2.0-1.el8.x86_64.rpm
dnf install visulox-4.3.2-1.el8.x86_64.rpm visulox-portal-4.3.2-1.el8.x86_64.rpm
```

With local VISULOX Gateway add:
visulox-gateway-4.3.2-1.el8.x86_64.rpm

i On external VISULOX Gateways, use the following command to add the VISULOX Portal Array:

```
visulox-gateway server add-array --name osgd --serverurl <https://fqdn of the primary portal server>
```

The server URL has to be used only, without ".../sgd/" at the end.

⚠ If the following message is displayed: "The signature verifier is not available." -> Gateways must be registered again.

i After setup of the VISULOX Gateway, the load balancer probing template file is available.
(See also: [How to create a feedback page for Load Balancers in the VISULOX GATEWAY configuration](#))

On VISULOX Nodes:

Installation packages

```
dnf install java-11-openjdk
dnf update

dnf install visulox-rte-1.2.0-1.el88.x86_64.rpm
dnf install visulox-4.3.2-1.el8.x86_64.rpm
```

During the VISULOX installation, the acceptance of all license agreements is requested.

VISULOX generates a key during installation. The key is always unique per node.

The key file needs to be copied from one server to all other VISULOX servers, so that the VISULOX Nodes can communicate among themselves.

Copy key from the first server to the other servers

```
scp $VLXDIR/etc/key root@<server2>:$VLXDIR/etc/  
scp $VLXDIR/etc/key root@<server3>:$VLXDIR/etc/
```

The file must have the correct permissions:

```
-rw-r--r-- 1 vlx vlxgroup 16 Dec 17 11:29 key
```


3.1 Attaching VISULOX Service to VISULOX PORTAL

On VISULOX Access Nodes, the VISULOX Service is attached to the VISULOX PORTAL with:


```
visulox portal attach
```

3.2 Attaching the VISULOX Nodes

On the first VISULOX Node, the other VISULOX Nodes are attached with:

```
 visulox attach vlx-server2.domain  
visulox attach vlx-server3.domain
```

Depending on the current database, the replication service needs time to insert all data into the new node`s database.

 After installation of VISULOX it is a good idea to restart the VISULOX PORTAL Service once!

3.3 Manual installation of the VISULOX PORTAL examples

```
visulox portal attach -examples
```

Normally the VISULOX PORTAL examples are installed during attaching the VISULOX Service.

4 Updating VISULOX

Each VISULOX installation can be updated with a newer version provided by amitego engineering as long as the underlying database structure has not been changed.

Please have a look at the release notes of the new version before update.

⚠ The update has to be done with root permissions.

✖ After update of VISULOX the VISULOX PORTAL Service and the VISULOX Service must be restarted once!

⚠ Firewall settings should be checked after an update.
See also: [Network communication within VISULOX](#)

Updating VISULOX

```
dnf install visulox-rte-1.2.0-1.el8.x86_64.rpm
dnf install visulox-4.3.2-1.el8.x86_64.rpm visulox-portal-4.3.2-1.el8.x86_64.rpm
```

On pure VISULOX Service Nodes only the RTE and the VISULOX package is needed.

The RTE package is only needed, if there is a newer version available.

On environments with a local Gateway, the Gateway package is needed.

⚠ In case of a new installation of the Gateways with imported certificates, the old entries of the Gateways have to be removed on the VISULOX Portal Servers before the add-array command.

On each VISULOX PORTAL, the VISULOX Service has to be re-registered.

```
visulox portal attach
```

⚠ After the update it has to be checked, if there are policies without a timeprofile or missing links to scripts. The following commands can be used:

Example checks

```
visulox policy login list -fields basicname,pin_script,login_script  
visulox policy access list -fields basicname,timeprofile,region,acc_script  
visulox policy application list -fields basicname,kbi_general_script,app_script  
visulox policy transit list -fields basicname,ft_script,scan_script
```

If errors are displayed, the according settings have to be adjusted manually (via VISULOX Cockpit or command line).

See also: [How to control regions from the command line](#), [How to control timeprofiles from the command line](#), [How to control access from the command line](#), etc

✘ If it is necessary to adjust changed fields in policies, this must be done, when all nodes are active.

✘ After installation of VISULOX, the VISULOX PORTAL Service and the VISULOX Service must be restarted once!

In case of log entries affecting the etcd instances, the node has to be reconfigured:

```
visulox etcd node reconfigure -verbose
```

⚠ During an update in larger environments it is possible, that some of the VISULOX etcd nodes are offline. If there are not enough nodes for the quorum, needed configuration parameters can not be set. There is a possibility to force the start of etcd on offline nodes to reach the number of nodes needed for the quorum. Please contact the system integrator in this case.

See also:

- [Attaching VISULOX Service to VISULOX PORTAL Service](#)
- [Migrating VISULOX 3.x to 4.x](#)

5 VISULOX Hotfix

It can be reasonable to install an available hotfix for VISULOX instead of using the VISULOX update mechanism.

/opt/visulox/setup/hotfix.sh checks the status of all files on all VISULOX Nodes, applies the hotfix files and creates a backup of the original files.

Requirement for VISULOX Hotfix

Hotfix has to be applied on each node.

Depending on the hotfix, the following scenarios are possible:

- Total restart is needed
- Service kill is needed
- No restart is needed

See attached Release Notes for the hotfix.


(See also: [Manual restart of a missing VISULOX service](#))

Usage:

```
sh /opt/visulox/setup/hotfix.sh <hotfix-file>
```

The backup files are copied to **/opt/visulox/setup/hotfix/hotfix-backup-*<date of installation>*.tgz** and can be re-established with VISULOX Hotfix.

The backup history can be found in **/opt/visulox/setup/hotfix/history**.

 After a VISULOX update to a new version, **/opt/visulox/setup/hotfix** will be deleted.

6 Uninstalling VISULOX

With the following yum command, the VISULOX components can be removed:

```
yum remove visulox-rte
```

With this command VISULOX RTE, VISULOX PORTAL, VISULOX Service will be removed.

On **VISULOX Access Nodes** with local VISULOX GATEWAY installed:

```
yum remove visulox-gateway
```

i The folder **/opt/visulox** still contains some VISULOX files, e.g. VLX keys, database, etc - with these files the VISULOX environment can be setup again. The folders **/opt/tarantella** and **/opt/SUNWsgd** contain VISULOX Portal and VISULOX Gateway files. If a complete uninstallation of VISULOX is wanted, then these folders should be removed as well.

7 VISULOX License Agreement

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The service period shall be renewed in each case for the same contractual period as the license agreement if the service agreement is not cancelled by one contracting party in writing at the end of the initial or each succeeding contractual period. The period of notice shall in this respect be three months. If the service is terminated without cancellation of the license agreement and the licensee would reconsider to start service again, the service period from the end of the last paid service period to the actual date shall be paid with an amount of 50% of the regular service fee. This shall not affect the right of each contracting party to extraordinary termination of the agreement without a period of notice for cause. The support and maintenance agreement shall include the supply of cost-free updates of the SOFTWARE, email support at support@visulox.com and telephone support pursuant to the particular support agreement separately concluded in this regard.

7.7 7 Guarantee

The parties are in agreement that according to the current state of technology it is not possible to develop standard software free of defects for all application conditions. AMITEGO shall in the meantime be liable for ensuring that the software substantially corresponds with the functions described in the manual and that it is free of defects that cancel or reduce its value or its suitability for the purpose contractually stipulated purpose or the usual purpose. AMITEGO shall not be liable for insignificant deviations or reductions.

In the event of considerable defects, AMITEGO shall be entitled and obliged to eliminate the defects at its expense or provide an equivalent replacement. (Subsequent specific performance). AMITEGO shall be entitled to make the choice. If the subsequent specific performance or replacement delivery fails a second time, the licensee may at its discretion either rescind the agreement or reduce the agreed payment.

The guarantee period shall be one year, calculated from the day of delivery / download of the software.

7.8 8 Liability restriction and contributory negligence

AMITEGO shall only be liable for losses arising other than through injury to life, limb and health if these losses are based on intent or gross negligence or culpable infringement of an essential contractual obligation by AMITEGO or its agents. An obligation shall be contractually essential if its fulfilment is what makes proper implementation of the agreement possible in the first place and on whose fulfilment the customer may normally rely.

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AMITEGO shall only be liable for those losses that are foreseeable or typical in the event of ordinary negligence. . The limitations set forth in this section 8 shall not apply to (i) Amitego's obligations under, (i) Amitego's obligations under section 9 (confidentiality), (iii) Amitego's gross negligence or willful misconduct.

7.9 9 Price adjustments

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7.10 10 Miscellaneous

Activation of the software licence shall only occur after complete payment of the usage fee for the licensed software and – if agreed – the additional fees. Swiss law shall apply to the exclusion of UN commercial law (CISG). The legal venue shall be Zurich.

The contractual language shall be English; versions in other languages shall merely serve as additional information.

7.11 11 Confidentiality

Each party agrees that during the term of this Agreement, it may disclose Confidential Information to the other party and that the party who receives the Confidential Information will not disclose it except as may be set forth herein. Confidential Information shall not include information that the receiving party can demonstrate: (a) is, as of the time of its disclosure, or thereafter becomes part of the public domain through a source other than the receiving party without an obligation of confidentiality; (b) was known to the receiving party prior to the time of its disclosure without an obligation of confidentiality; (c) is independently developed by the receiving party without use of, or reference to, the providing party's Confidential Information; or (d) is subsequently learned from a third party not under a confidentiality obligation to the providing party. If a receiving party is required by applicable law, regulation, court order or legal process to disclose any Confidential Information, the receiving party will provide the disclosing party with prompt notice of such request or requirement, and the receiving party will use reasonable efforts to ensure that all Confidential Information so disclosed is treated confidentially. Such disclosure of Confidential Information in accordance with the foregoing sentence will not violate the terms of this Section.

7.12 12 Miscellaneous

Activation of the software licence shall only occur after complete payment of the usage fee for the licensed software and – if agreed – the additional fees.

8 VISULOX and Session Cookies

VISULOX requires altogether four cookies, which are needed for **technical session controlling**. They are only used for functional purpose.

These cookies are used to assign a server side session to the user. This is a **basic** and **essential functionality** of the VISULOX software.

Client or personal data is **not** collected/stored and **no** tracking to our company or to other services is done.

i Session cookies fall under the categorization of strictly necessary cookies under the General Data Protection Regulation (GDPR), applicable in the European Union and the UK. Strictly necessary cookies like session cookies are **exempt** from the consent requirements underlined in the GDPR. Therefore, session cookies are **GDPR compliant**.
Strictly necessary cookies are essential to navigate a website and use its features and functionalities. Without them, a user wouldn't be able to use basic services like logging in on a website or adding items to a shopping cart etc. GDPR **exempts** these cookies from consent requirements as they do **not** gather any personal information about users.

If a customer nevertheless wants to have a cookie consent, this can be done with a **VISULOX extended login consent**.

See: [How to setup a standard form contract to commit on login \(consent\)](#)

9 Appendix_I

9.1 Appendix

Reference Card and Glossary

- [Appendix](#)
 - [Events](#)
 - [VISULOX Service Events](#)
 - [VISULOX PORTAL Service Events](#)
 - [Script Interface & Variables](#)
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 - [VISULOX-GATEWAY Command](#)
 - [Integrity-Check](#)
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9.1.1 Events

VISULOX Service Events

| Type | Event | Description | Event variable |
|-------|----------------------------------|---|-----------------------|
| Login | Multiple login failures detected | Default warning setting for failed login attempts: 5 per minute, 20 per hour and 50 per day | multipleloginfailures |

| Type | Event | Description | Event variable |
|----------------|------------------------------------|---|----------------------------|
| Login | Access PIN accepted | Login with Access PIN accepted | 2faPinAccepted |
| Login | Access PIN requested | Access PIN for login requested | 2faPinRequested |
| Login | Access PIN rejected | Access PIN was rejected | 2faPinRejected |
| Login | OTP requested | One Time Passcode for login requested | otpRequested |
| Login (Webtop) | Logged out by supervisor | Application session ended by supervisor via VISULOX Cockpit | webtopSessionEndedByAdmin |
| Application | Application started | Application session has been started with session controller | sessionControllerStarted |
| Application | Application started (uncontrolled) | Application session has been started without session controller | sessionUncontrolledStarted |
| Application | Application ended | Application session ended | sessionControllerEnded |
| Application | Session locked | Application session locked | lock |
| Application | Session unlocked | Application session unlocked | unlock |
| Application | Session locked by supervisor | Application session locked by supervisor via VISULOX Cockpit | lockedbyadmin |

| Type | Event | Description | Event variable |
|--------------|--------------------------------|---|------------------------|
| Application | Session unlocked by supervisor | Application session unlocked by supervisor via VISULOX Cockpit | unlockedbyadmin |
| Application | Ended by supervisor | Application session ended by supervisor via VISULOX Cockpit | sessionEndedByAdmin |
| Application | Message sent | Message from supervisor is sent via Cockpit to the user | message |
| Application | Accepted by user | Message, recording, etc. acknowledged by the user | accept |
| Application | Rejected | Recording rejected by user | reject |
| Notification | Notification sent | A notification was sent based on the selected script | scriptsend |
| Access | Access will expire | Warning, that access to applications will expire soon | |
| Access | User request | Access requested by the user | accessRequestedByUser |
| Application | Remark by user | Session annotation created by the user | annotationByUser |
| Application | Remark by supervisor | Annotation created by the supervisor in the VISULOX Cockpit for the session | annotationBySupervisor |
| Cooperation | Assistance request | Request for a cooperation | assistrequested |
| Cooperation | Assist observe | Assist mode switched to observe | assistobserve |

| Type | Event | Description | Event variable |
|------------------|-----------------------------|---|---------------------------------|
| Cooperation | Assist interact | Assist mode switched to interact | assistinteract |
| Cooperation | Assist Standby | Assist mode switched to standby | assiststandby |
| Cooperation | Dual Control | Dual Control cooperation started | dualcontrol |
| Cooperation | Assistance closed | Cooperation closed | assistclosed |
| Recording | Manual recording | Manual recording of the session started by the supervisor via VISULOX Cockpit | sessionManuallyRecordingStarted |
| Recording | Recording stopped | Manual recording stopped by the supervisor via VISULOX Cockpit | sessionManuallyRecordingStopped |
| Recording | Recording started by Policy | Predefined recording started by Application Policy | sessionRecordingStarted |
| Keyboard control | In use | Input changed to this user | inputFocusChanged |
| Keyboard control | Inputline | The user entered a line of characters | keyboardControlInputline |
| Keyboard control | Responsible | Input changed to this user | inputResponsibility |

| Type | Event | Description | Event variable |
|------------------|--------------------------------|---|-----------------------------|
| Keyboard control | Idle | Keyboard idle | InputFocusIdle |
| Keyboard control | Keyboard control started | Keyboard input detection started | keyboardControlStarted |
| Keyboard control | Keyword detected | Keyword detected by keystroke detection control | keywordDetected |
| Checkout | Checkout | Session checkout via Cockpit | checkout |
| Checkout | Checkout with keystrokes | Checkout of the session information in a ZIP file with displayed keystrokes | checkoutwithkeystrokes |
| Checkout | Report in browser | Report created via Cockpit and displayed in browser | reportGeneratedByGuiBrowser |
| Checkout | Report via eMail | Report created via Cockpit and sent via eMail | reportGeneratedByGuiEmail |
| Checkout | Player started | Browser-based player started via Cockpit | player |
| Checkout | Player with keystrokes started | Browser based player with displayed keystrokes started | playerwithkeystrokes |
| System | Auto accepted | Accepted automatically by the system | autoaccept |
| System | Auto rejected | Rejected automatically by the system | autoreject |

| Type | Event | Description | Event variable |
|---------------|------------------------------|---|----------------|
| System | Object created | A VISULOX object has been created | objectNew |
| System | Object copied | A VISULOX object has been copied | objectCopied |
| System | Object changed | A VISULOX object has been changed | objectChanged |
| System | Object deleted | A VISULOX object has been deleted | objectDeleted |
| System | Object attached | A VISULOX object has been attached | objectAttached |
| System | Object detached | A VISULOX object has been detached | objectDetached |
| File Transfer | Synced to folder | Files synchronized with the folder | syncput |
| File Transfer | Synced to Transit Zone | Files synchronized with the Transit Zone | syncget |
| File Transfer | Transfer to server | File transferred from Transit Zone to the application server via SFTP/FTP | ftput |
| File Transfer | Transfer to Transit Zone | File transferred from application server to the Transit Zone via SFTP/FTP | ftget |
| File Transfer | Upload (internal web page) | File uploaded via internal web page | webput |
| File Transfer | Download (internal web page) | File downloaded via internal web page | webget |

| Type | Event | Description | Event variable |
|---------------|------------------------|--|----------------|
| File Transfer | Upload | File uploaded from client into Transit Zone | userput |
| File Transfer | Download | File transferred from Transit Zone to the client | userget |
| File Transfer | File checked | Transferred file has been checked | checked |
| File Transfer | Approved | Transferred file has been approved | approved |
| File Transfer | File rejected | File rejected after check | rejected |
| File Transfer | Pending | File not approved yet | pending |
| File Transfer | Conditionally accepted | File accepted depending on endpoint rules | tmpaccepted |

VISULOX PORTAL Service Events

| Type | Event | Description | Event variable |
|--------|----------------|--|------------------|
| Server | Server started | Server has been started / details | serverStart |
| Server | Server stopped | Server was stopped / details | serverStop |
| Server | SSL started | VISULOX PORTAL Security SSL has been started | securitySSLStart |

| Type | Event | Description | Event variable |
|-----------------------|-------------------------------|--|-----------------------------|
| Server | SSL stopped | VISULOX PORTAL Security SSL has been stopped | securitySSLStop |
| Login | Login rejected | VISULOX PORTAL login was rejected for the user / details | loginResultRejected |
| Login | Login ambiguous | Login information ambiguous, common name needed | loginResultAmbiguous |
| Login | Anonymous login not supported | Login failed, Anonymous login not supported | loginResultAnonymous |
| Login | Unresolveable user | Login failed, unresolveable user | loginResultUnresolveable |
| Workspace | Workspace opened | Workspace session has been started / details | webtopSessionStartedDetails |
| Workspace | Workspace closed | Workspace session has been stopped / details | webtopSessionEndedDetails |
| Application | Application session started | Application session has been started / details | sessionStartedDetails |
| Application | Application session stopped | Application session was stopped / details | sessionEndedDetails |
| VISULOX PORTAL Object | Object modified | VISULOX PORTAL object has been changed | modifySuccess |
| VISULOX PORTAL Object | Object created | A new VISULOX PORTAL object was created | createSuccess |
| VISULOX PORTAL Object | Object create failed | Creating an VISULOX PORTALobject failed | createFailure |


| Type | Event | Description | Event variable |
|-----------------------|-------------------|--|----------------|
| VISULOX PORTAL Object | Rename successful | VISULOX PORTAL object renamed successfully | renameSuccess |
| VISULOX PORTAL Object | Object deleted | An VISULOX PORTAL object was deleted | deleteSuccess |

9.1.2 Script Interface & Variables

Available script categories

| Category | Used as |
|--------------|--|
| Notification | These action scripts can be chosen, where application notifications are used (Application Policy). |
| Pin | These action scripts deliver information for the Multi Factor Authentication (Login Policy). |
| Report | These are report actions scripts. |
| Validate | These action scripts can be chosen for validation. |
| * | These action scripts are available everywhere scripts can be used. The setup provides one script in this category, which allows to dump all variables provided to an action script. This is helpful for testing. |

Notification script variables (examples)

 The following list contains some useful examples for script variables.

To get the complete list of available variables for a certain action script, the dump script should be used.

| Variable | Description |
|-----------------------|---|
| VLXFULLNAME | Full name of the user |
| VLXSURNAME | Surname of the user |
| VLXEMAIL | eMail address of the user |
| VLXSMS | SMS address of the user |
| VLXOWNER | Owner of the application |
| VLXGROUPLIST | Group list |
| VLXUSERPROFILE | Profile of the user |
| VLXPIN | PIN for Multi Factor Authentication |
| VLXPIN_FMT | Formatted PIN for Multi Factor Authentication |
| VLXPIN_SEQUENCE | Sequence number for PIN |
| VLXPIN_EXPIRATIONTIME | Expiration time with date for the PIN |

| Variable | Description |
|-----------------|-------------------------|
| VLXPIN_LIFETIME | Lifetime for the PIN |
| VLXPIN_TEXT | PIN text |
| VLXACCESSPOIN | Access Point |
| VLXCREATETIME | Creation time |
| VLXLOG | Path to logs |
| VLXLOGINUSER | Logged in user |
| VLXMANAGER | Manager of the user |
| VLXObject | Name of the object |
| VLXOWNERID | Owner ID |
| VLXOWNERSHORT | Short name of the owner |
| VLXPOLICY | VISULOX policy |
| VLXREMOTEIP | Remote IP |

| Variable | Description |
|------------------------|-------------------------------------|
| VLXSMS | SMS of the user |
| VLXLISTHASH | Hash |
| VLXCLIENTIP | Client IP address |
| VLXLANG | Language |
| VLXSESSIONHOST | Host, where the session was started |
| VLXCREATETIME_FMT | Time of creation (readable) |
| VLXSESSIONSTARTTIME | Start time of the session |
| VLXSESSIONDURATION | Duration of the session |
| VLXSESSIONDURATION_FMT | Duration of the session (readable) |
| VLXSESSIONENDTIME | Endtime of the session |
| VLXSESSIONENDTIME_FMT | Endtime of the session (readable) |
| VLXAPPLICATION | Application name |

| Variable | Description |
|--------------------|--|
| VLXRECIPIENT | Recipient |
| VLXTICKETID | Ticket ID of the user |
| VLXLOGINSCRIPT | Login script |
| VLXAPPLICATIONUSER | User of the application |
| VLXBADWORD | Detected keyword in Keyboard recording |
| VLXEVENTINFO | Event info |
| VLXCREATEDBY | Created by |
| VLXCREATEDBYSHORT | Short name of creator |

See also:

- [Variables in notifications](#)
- [Transit script variables](#)
- [How to control action scripts from the command line](#)

9.1.3 Exit Codes

In the following table all VISULOX Exit Codes are listed with a short description and the meaning of the code.

| Exit code | Short description | Comment |
|------------------|--------------------------|---|
| 0 | SUCCESS | Success |
| 1 | FAILURE | Failure |
| 2 | WARNING | Warning |
| 3 | REJECT | Policy |
| 4 | ACCEPT | Policy |
| 5 | PASSON | Policy |
| 6 | APPLY | Policy |
| 7 | EXCLUDE | Policy |
| 8 | APPROVAL | Rule |
| 9 | ALLOW | Rule |
| 10 | ALLOWSPONTAN | Rule |
| 11 | ALLOWENDPOINT | Transit rule matches, but endpoint has to be taken into account |

| | | |
|-----------|-----------------|--|
| 12 | DENY | Deny action |
| 13 | DENYTOOLARGE | Transit: file is too large |
| 14 | DENYDIRECTION | Transit: file can not be transferred in this direction |
| 15 | DENYFORENDPOINT | Transit: file cannot be handled with this endpoint |
| 16 | DENYVIRUS | Transit: file has a virus |
| 17 | DENYEMPTY | Transit: file is empty |
| 18 | DENYPASSON | Transit: script denies Passon |
| 19 | NOMATCHPOLICY | Policy |
| 20 | USAGE | Command line usage error |
| 21 | DATAERR | Data format error |
| 22 | NOINPUT | Cannot open input |
| 23 | UNKNOWNUSER | User unknown |
| 24 | UNKNOWNHOST | Host name unknown |

| | | |
|-----------|-------------|--|
| 25 | UNAVAILABLE | Service unavailable |
| 26 | SOFTWARE | Internal software error |
| 27 | LICENSE | License error |
| 28 | OSERR | System error (e.g. can't fork) |
| 29 | OSFILE | Critical OS file missing |
| 30 | CANTCREAT | Can't create (user) output file |
| 31 | IOERR | Input/output error |
| 32 | TEMPFAIL | Temp failure; user is invited to retry |
| 33 | PROTOCOL | Remote error in protocol |
| 34 | NOPERM | Permission denied |
| 35 | CONFIG | Configuration error |
| 36 | INIT | Initialization error |
| 37 | SCRIPTERROR | Script execution with error |


| | | |
|-----------|----------------|------------------------------------|
| 38 | DATABASE | Error during database interaction |
| 39 | TIMEOUT | Timeout |
| 40 | REGISTRATION | Error on registration |
| 41 | XAUTH | Error on setting x11 cookie |
| 42 | ZMQERROR | ZeroMQ error |
| 43 | CRYPTOERROR | Crypto error |
| 44 | STARTREJECTED | Start rejected |
| 45 | ALREADYRUNNING | Program already running |
| 46 | NOTIMPLEMENTED | Not implemented |
| 47 | UNDEFINED | Operation has no defined state yet |
| 48 | EXHAUSTED | No resource available anymore |
| 49 | LOOKUP | Item not found |
| 50 | EMPTY | Unexpected empty result |

| | | |
|-------------|------------------|--|
| 51 | RESTART | Restarting... |
| 52 | RETRY | Try again |
| 53 | OLDREQUEST | Received reply to a previous request |
| 54 | TRANSPORT | Error in transport layer |
| 55 | QUORUM | No etcd leader |
| 56 | ACCESSPOINTCHECK | Access validation |
| 57 | BUSY | Resource temporarily unavailable |
| 100 | ACCESSREQUEST | Access Policy Request |
| 200 | DISABLED | LDAP cannot get data, because the datasource is disabled |
| 210 | APPROVALPASSON | Rule |
| 1000 | INFO | Info line in integrity test |

9.1.4 Command Line Parameter

VISULOX Command

```
visulox <command> [<command-specific args>]
```

 During installation **/usr/sbin/visulox** is created, which makes it possible to execute the VISULOX Service Command without using the whole path.

Available parameters

| Command | Description | Additional commands / args |
|-------------|--|--|
| addon | Command Line Interface to VISULOX Addons | cmdconnect, cmdguard, ftclient, host, script, template |
| admin | Manage the VISULOX Administration | cockpit, action, message, region, timeprofile |
| archive | Manage VISULOX Archive Node | -node <>, -set |
| assignments | Check assignments in policies and applications | app, datastore, policy |
| attach | Attach a node to the VISULOX Cluster | <hostname>, -location, -zone |
| cluster | Builds a VISULOX Cluster | data, layout, build -f <> -template |

| Command | Description | Additional commands / args |
|------------|--|--|
| cockpit | Start of the VISULOX Cockpit | title <>, lang <>, roles <>, grant <>, groupaccess <>,owner <>, ksr, cdm, kiosk, personal |
| config | Manage the VISULOX configuration | accesspoint, datasources, dump, edit, env, list, locations,logo, mynodename, rebuild, reset, vap |
| database | Query the VISULOX Database | list, backup, restore, fields, query, integrity, status -vacuum, rename <>, node <>, table <>, timeout <> |
| datasource | Manage the VISULOX Datasources | add, check, copy, delete, edit, list |
| detach | Detach a node from the VISULOX Cluster | server <>, timeout <> |
| end2end | VISULOX end2end check | off, on, status |
| etcd | Manage ETCD instances | benchmark, client, del, get, instance, member, node, put, test |
| export | Export from VISULOX | events, files, sessions |
| integrity | VISULOX Integrity-Check | sys, lib, cmd, users, portal, ulimit, store, recorder, datasources, license |
| license | Manage the VISULOX License | list, replace, test, usage (-component <users sessions recorders hostcontrols> -unit <week month year>) |
| log | Query VISULOX log database | since <>, until <>, loglevel <>, follow |

| Command | Description | Additional commands / args |
|-----------|---|---|
| online | VISULOX online status | getpin, fields (list available fields), -i (ignore case), -object <> (owner or group mask), -application <>, -fields <>, sortby <> (sort by field) |
| otp | Manage the VISULOX OTP configuration | check <>, key, reset <>, set <> |
| passcache | Manage the VISULOX Passcache | list, fields, edit, delete |
| ping | Ping local master or designated worker | id <> (outdated) |
| policy | Command line interface to the VISULOX Policies | external, login, internal, access, application, transit |
| portal | Attach / detach VISULOX Service from VISULOX PORTAL Service (See also: VISULOX PORTAL ATTACH Command) | array, config, discover, drop, admin, mode, etc (see: VISULOX-PORTAL Command) visulox portal --help shows all available VISULOX PORTAL and VISULOX commands. With visulox portal admin -user <unixuser> a Unix user can be activated as VISULOX Portal Admin (⚠ It is recommended to set a different user than root!) |
| pwdmgmt | Manage / list account passwords | expired, mustchange, notify <>, warn |
| report | Command line interface to VISULOX Report | title <>, mctitle <>, name <>, type <>, xslt <>, metadata <>, query <>, tframe <>, -from<>. -to <>, sql <>, lang <>, filename <>, mailto <>, mailsubject <>, maildescription <>, maildescriptionfile <>, archive <> |

| Command | Description | Additional commands / args |
|---------|--|---|
| reset | Reset local cluster state | |
| restart | Restart VISULOX Service (locally) <div style="border: 1px solid red; padding: 5px; margin-top: 10px;">❌ Use with caution, all sg, sc and scx will be stopped.</div> | -service <>, -timeout <> |
| start | Start VISULOX Service (locally) | debug |
| status | Query VISULOX status | diskfree, features, load, monitor, next, servers, services, sessions, uptime, usage, users, workers, server <>, serverfilter <>, print, fields <> |
| stop | Stop VISULOX Service (locally) | id <> |
| store | Manage the VISULOX store | attach, changed, detach, disable, enable, extras, get, migrate, missing, next, put, status, slot <> |
| support | Gather information for support (-info: short report) | directory <>, sys, dump, etc, rt, logs, net, integrity, config, tta |
| transit | Command line interface to VISULOX Transit Zone (list, import) | list, import, owner, path, rtime |
| version | Display versions of installed VISULOX packages | |

i With **-help** or **-?** the detailed options for a basic command can be displayed.

If more parameters are needed for a command, the available options are always displayed by entering the basic command.

General commands

| Parameter | Description |
|-----------------|---|
| -format <value> | Format of output (text,xml,csv,json,tcl) / Default: <text> |
| -log <value> | Set loglevel to error, verbose, info or debug / Default: <> |
| -verbose | More messages on stdout |
| -run | Run an operation (use only on application request) |
| -stdin | Get arguments from stdin |
| -- | Forcibly stop option processing |
| -help / -? | Display commands |

Usage

The following examples show the usage of the VISULOX Service Command:

Show VISULOX status

```
visulox status
```

Show license information

```
visulox license
```

Replace license

```
visulox license replace -file <path to license file>
```

List sessions

```
visulox status sessions  
visulox online
```

List unassigned applications

```
visulox database query -sql "select vlxapplication from external_applications WHERE vlxapplicationgroups = '' AND  
vlxapplicationusers = ''" -format csv -raw
```

Transit import & list

```
visulox transit import -path /tmp/file.txt -owner "o=Tarantella System Objects/cn=TestUser"
```

```
visulox transit list -owner "o=Tarantella System Objects/cn=TestUser"
```

Detach VISULOX Node

```
visulox detach <vlx-node.domain>
```

VISULOX PORTAL ATTACH Command

```
visulox portal attach [<command-specific args>]
```

i During installation **/usr/sbin/visulox** is created, which makes it possible to execute the VISULOX Service Command without using the whole path.

Available parameters

| Command | Description |
|-----------|--|
| -all | Install all (default) |
| -portal | Modify VISULOX PORTAL only, write configuration |
| -examples | setup examples |
| -attach | Attach VISULOX Service to VISULOX PORTAL Service |
| -expect | Install expect script only |

| Command | Description |
|------------------------|---|
| -webtop | Install webtop script only |
| -jspconfig | Create VISULOX JSP configuration file |
| -apacheport <value> | Local port to address Apache. If empty, discovered by webservice configuration <> |
| -externalport <value> | External port to address Apache. If empty, discovered by httpd.conf <> |
| -serviceonline <value> | Enable/disable Webtop Enhancements <true> |
| -adminuser <value> | UNIX user for the VISULOX webservice user in VISULOX PORTAL<vlxwebservice> Deprecated! Configuration parameter portal.admin.user should be used instead. |
| -adminuid <value> | User ID for the VISULOX admin user in VISULOX PORTAL <610> Deprecated! Configuration parameter portal.admin.uid should be used instead. |
| -adminpwd <value> | Password for the VISULOX admin user in VISULOX PORTAL <generate> |
| -adminou <value> | OrgUnit for Webservice user cn=<host name>/<adminou> <> |
| -version <value> | Force VISULOX PORTAL version <> |

General commands

| Parameter | Description |
|-----------------|--|
| -format <value> | Format of output (text,xml,csv,json,tcl) / Default: <text> |
| -verbose | More messages on stdout |
| -run | Run an operation (use only on application request) |
| -- | Forcibly stop option processing |
| -help / -? | Display commands |

Usage

The following examples show the usage of the attach command:

Attaching VISULOX Service to VISULOX PORTAL Service

```
visulox portal attach
```

This command checks if login-ens is enabled. If this is the case a local user vlxwebservice (610) with group ttaserv (500) was added to the system. A password was also generated and stored secure.

VISULOX-PORTAL Command

```
visulox-portal <command> [<command-specific args>]
```

i During installation **/usr/sbin/visulox-portal** is created, which makes it possible to execute the VISULOX PORTAL Service Command without using the whole path.

Available parameters

| Command | Description |
|-----------------|--|
| array | Creates and manages arrays of VISULOX PORTAL servers |
| config | Edits array-wide and server-specific configuration |
| discover | Discover available resources |
| drop | Drop discovered resources |
| emulatorsession | Lists and controls emulator sessions |
| gateway | Manipulates the VISULOX GATEWAY store |
| help | Displays this list of commands |
| info | Shows status information for the local server |

| Command | Description |
|----------------|--|
| object | Manipulates objects in the datastore |
| passcache | Manipulates the password cache |
| restart | Restarts VISULOX PORTAL services |
| role | Configures role occupants and their extra webtop links |
| security | Controls security services, manages certificates |
| serverrename | Change the server's peer or external DNS name |
| service | Edits service object configuration |
| start | Starts VISULOX PORTAL services |
| status | Shows the current status of VISULOX PORTAL array members |
| stop | Stops VISULOX PORTAL services |
| tokencache | Manipulates the token cache |
| version | Displays versions of installed VISULOX PORTAL packages |

| Command | Description |
|---------------|--|
| webserver | Controls the VISULOX PORTAL Web Server |
| webtopsession | Lists and controls webtop sessions |

i With **visulox-portal <subcommand> --help** the detailed options for a command can be displayed. If more parameters are needed for a command, the available options are always displayed by entering the basic command.

Usage

The following examples show the usage of the VISULOX-PORTAL Command:

Show VISULOX PORTAL status

```
visulox-portal status
```

Show version information

```
visulox-portal version
```

List webtop sessions

```
visulox-portal webtopsession list
```

List VISULOX Array members


```
visulox-portal array list
```

Join VISULOX Array member

```
visulox-portal array join --primary <hostname> --secondary <hostname>
```

VISULOX-GATEWAY Command

```
visulox-gateway <command> [<command-specific args>]
```

 During installation **/usr/sbin/visulox-gateway** is created, which makes it possible to execute the VISULOX GATEWAY Command without using the whole path.

Available parameters

| Command | Description |
|---------|--|
| start | Start VISULOX GATEWAY |
| stop | Stop VISULOX GATEWAY |
| restart | Restart VISULOX GATEWAY |
| config | Configuration options: create, list, edit, enable, disable |

| Command | Description |
|------------|--|
| server | Server options: add, add-array, remove, list, list-array |
| status | Show VISULOX GATEWAY status |
| version | Show VISULOX GATEWAY version |
| sslcert | Export, print sslcert |
| sslkey | Import, export sslkey |
| cert | Export the VISULOX GATEWAY certificate |
| clientcert | Import, list, remove clientcert |
| key | Import private key and its corresponding certificate |
| patch | Add, remove, list VISULOX GATEWAY patches |
| connection | List connections |
| support | VISULOX Gateway Support Report |



With **visulox-gateway <subcommand> --help** the detailed options for a command can be displayed.
 If more parameters are needed for a command, the available options are always displayed by entering the basic command.

Usage

The following examples show the usage of the VISULOX-GATEWAY Command:

Show VISULOX GATEWAY status

```
visulox-gateway status
```

Show version information

```
visulox-gateway version
```

List VISULOX PORTAL Servers / certificates

```
visulox-gateway server list
```

Show VISULOX GATEWAY configuration

```
visulox-gateway config list
```

Add the VISULOX Portal Array on external Gateway

```
visulox-gateway server add-array --name osgd --serverurl <https://fqdn of the primary portal server>
```

Integrity-Check

The Integrity-Check is started automatically during installation of VISULOX to make sure, that all requirements are met for a properly running system. However Integrity-Check can also be used in an already running environment for diagnose purpose.

Integrity-Check can be started via the visulox command:

```
visulox integrity
```

In the quiet mode no shell output and no log entries in **/tmp/visulox-integrity.log** are written.

Only the Integrity-Check exit code will be returned:

```
visulox integrity -quiet
```

Available Integrity-Check commands

| Command | Description |
|---------|--|
| -sw | Check of online software status |
| -vlx | Check the VLX Services and cluster ports |
| -sys | Check the system environment |

| Command | Description |
|----------------|--|
| -lib | Check for missing libs |
| -cmd | Check command for missing libraries |
| -disk | Check disk |
| -users | Check VISULOX transit users |
| -portal | Check the VISULOX PORTAL Service |
| -cert | Check certificates within VISULOX and VISULOX PORTAL |
| -store | Check store |
| -recorder | Check recorder |
| -datasources | Check datasources |
| -assignments | Check datastore assignments and dynamic applications |
| -license | Check license |
| -policies | Check policies (VISULOX must be online) |

| Command | Description |
|-------------|--------------------------|
| -index | Check index |
| -scripts | Check scripts |
| -x11forward | Check x11forward |
| -gate | Check gate config |
| -mail | Check mail configuration |

General commands

| Command | Description |
|-----------------|---|
| -format <value> | Format of output (text,xml,csv,json,tcl) <text> |
| -verbose | More messages on stdout |
| -- | Forcibly stop option processing |
| -help | Print this message |

| Command | Description |
|---------|--------------------|
| -? | Print this message |

Usage

```
visulox integrity

Please wait ....
Integrity-Check: amitego engineering - in house license / beta2-3.1.1 / 2016-07-12 12:46:32 UTC
-----
| option | cat | info | returnCode |
-----
| -license | check | Evaluation | WARNING(2) |
| -sys | Script /opt/visulox/tools/filecheck.sh | not configured | WARNING(2) |
| -sys | Script /opt/visulox/tools/event.sh | not configured | WARNING(2) |
| -portal | 5.60 Warnings | see logfile | WARNING(2) |
-----

ExitCode: WARNING
Check the warnings. For more information see /tmp/visulox-integrity.log
```

i Only warnings and errors are displayed by default. All Integrity checks can be shown with the **-verbose** parameter.

visulox integrity -portal

```
-----
| option | cat | info | returnCode |
```

```

-----
| -portal | core          | PORTAL 5.60          | SUCCESS(0) |
| -portal | connect      | yes                  | SUCCESS(0) |
| -portal | webtop       | ok                   | SUCCESS(0) |
| -portal | var          | security-xsecurity  | SUCCESS(0) |
| -portal | var          | xpe-maxsessions ok  | SUCCESS(0) |
| -portal | var          | xpe-maxusers ok     | SUCCESS(0) |
| -portal | role         | administrator is root | WARNING(2) |
| -portal | array        | P: mp-vlx32-ol7.tbsol.de | SUCCESS(0) |
| -portal | security-gateway | mp-vlx32-ol7.tbsol.de is good | SUCCESS(0) |
-----

```

visulox integrity -cert

```

-----
| option | cat          | info                                                         | returnCode |
-----
| -cert  | SSL-CERT    | issuer = /C=de/ST=de/O=amitego/CN=test.tbsol.de           | SUCCESS(0) |
| -cert  | SSL-CERT    | subject = test.tbsol.de                                    | SUCCESS(0) |
| -cert  | SSL-CERT    | serial = EA8628EF3B3A7F44                                  | SUCCESS(0) |
| -cert  | SSL-CERT    | from   = 2016-12-16 09:12                                   | SUCCESS(0) |
| -cert  | SSL-CERT    | until  = 2017-12-16 09:12                                   | SUCCESS(0) |
| -cert  | SSL-CERT    | remain = 360d 21h                                          | SUCCESS(0) |
| -cert  | PEER-CERT   | issuer = /CN=mp-ol6u3-devel.tbsol.de CA Cert              | SUCCESS(0) |
| -cert  | PEER-CERT   | subject = test.tbsol.de CA Cert                            | SUCCESS(0) |
| -cert  | PEER-CERT   | serial = 9F3D8E05D8800F22                                  | SUCCESS(0) |
| -cert  | PEER-CERT   | from   = 2013-07-15 12:20                                   | SUCCESS(0) |
| -cert  | PEER-CERT   | until  = 2023-07-13 12:20                                   | SUCCESS(0) |
| -cert  | PEER-CERT   | remain = 2395d 23h                                         | SUCCESS(0) |
| -cert  | SSL-CA      | issuer = /C=de/ST=de/O=amitego/CN=test.tbsol.de           | SUCCESS(0) |
| -cert  | SSL-CA      | subject = test.tbsol.de                                    | SUCCESS(0) |
| -cert  | SSL-CA      | serial = EA8628EF3B3A7F44                                  | SUCCESS(0) |
| -cert  | SSL-CA      | from   = 2016-12-16 09:12                                   | SUCCESS(0) |
-----

```

```

| -cert | SSL-CA | until = 2017-12-16 09:12 | SUCCESS(0) |
| -cert | SSL-CA | remain = 360d 21h | SUCCESS(0) |
-----

```

Integrity check with the parameter **-cert** shows the status of the both VISULOX PORTAL certificates. PEER-CERT and SSL-CERT.

The serials can be displayed on the local VISULOX GATEWAY with the command **visulox-gateway server list** and have to match with the serials of the VISULOX PORTAL certificates.

Integrity check shows a warning, when the lifetime is lower than 30 days or an error when the lifetime is expired.

visulox integrity -disk

```

Please wait ...Integrity-Check: VISULOX EVALUATION / xdevelopment / development
-----

```

| option | cat | info | returnCode |
|--------|--------------|---|------------|
| -disk | Diskspace | ok in base (base threshold at 2.0GB has 39.67GB) | SUCCESS(0) |
| -disk | Diskspace | ok in var (var threshold at 5.0GB has 39.67GB) | SUCCESS(0) |
| -disk | Diskspace | ok in data (data threshold at 20.0GB has 39.67GB) | SUCCESS(0) |
| -disk | Diskspace | ok | SUCCESS(0) |
| -disk | DB Partition | ok fileserver.tbsol.de:/home/users/xxx | SUCCESS(0) |
| -disk | DB Partition | needs atleast 157.30MB - has 39.67GB | SUCCESS(0) |

```

ExitCode: SUCCESS
-----

```

Among the checks also the diskspace for the database is checked. VLX_DATADIR must have at least 2.5 of size of the database available because VACUUM creates a copy of the database.

For example: a 4GB database needs 6 GB free diskpace. The diskpace is checked with integrity check.

Troubleshooting

• VISULOX PORTAL connect failure

On servers, where VISULOX Service is installed together with VISULOX PORTAL Service, the connection to the VISULOX PORTAL Service can be checked with a small tool:

```
/opt/visulox/lib/utils/sgd.tcl check

Check connections

-----
|                                     scottasessionid |                                     scottasessionowner
|
-----
| test-ol6u5.tbsol.de:1434362892796:1108252004568201775 | {.../_ens/o=Tarantella System Objects/ou=Visulox/cn=test-ol6u5}
|
-----
```

The following command reinstalls the necessary VISULOX PORTAL Service components on the server and mostly fixes connection errors:

```
visulox portal attach
```

• VISULOX PORTAL Service warnings

More details can be found in visulox-integrity.log. The Java tuning values should be adjusted for the environment.

Mostly, the following settings will be adequate:

- tuning-jvm-initial: 1024
- tuning-jvm-max: 2048

- tuning-jvm-scale: 150

Adjust the values, with:

```
visulox-portal config edit --tuning-jvm-initial 2048  
visulox-portal config edit --tuning-jvm-max 2048  
visulox-portal config edit --tuning-jvm-scale 150
```

The following VISULOX PORTAL Service default values should also be checked:

- sessions-timeout-always
- sessions-timeout-session
- webtop-session-idle-timeout

i Changes of VISULOX PORTAL Service configurations is known to VISULOX after "**visulox portal attach -portal**".

- **"Administrator is root" warning**

The warning can be disabled by adding a new administrator to VISULOX PORTAL:

Add a user

```
useradd <name of the new portal administrator>  
passwd <name of the new portal administrator>
```

Add the new administrator to the VISULOX PORTAL administrators

```
visulox-portal object edit --name "/o=tarantella system objects/cn=administrator" --user admin
```

After changes to the VISULOX PORTAL, VISULOX needs to be reregistered

```
visulox portal attach
```

Doing a VISULOX Integrity-Check again, the warning has disappeared. root can be removed from the administrators list.

- **event.sh and filecheck.sh missing**

The files event.sh.template and filecheck.sh.template in **/opt/visulox/tools/** must be copied to event.sh and filecheck.sh, if needed. The correct permission (**0550 / vlx:vlxgroup**) has to be set as well for these files.

```
cd /opt/visulox/tools
cp events.sh.template events.sh
cp filecheck.sh.template filecheck.sh
chown vlx: events.sh filecheck.sh
chmod 0550 events.sh filecheck.sh
```

9.1.5 Glossary

| Expression | Description |
|------------------------|--|
| 3PA | Third Party Authentication / 3rd Party Authentication |
| Access Branding | With Access Branding it is possible to display different login page designs for different users according to their access point. |

| | |
|------------------------------|--|
| Access Management | Enhanced VISULOX Concept for administrating the access of users |
| AD | Active Directory |
| AIP | Adaptive Internet Protocol: Client communication protocol from the VISULOX PORTAL Service |
| Ambiguous login | The situation where an authentication mechanism has found more than one match for a user and cannot distinguish between them without further information from the user |
| Annotation | A short text, that can be entered before a recorded session is confirmed, during a recorded session or in VISULOX Cockpit / Archive for closed sessions |
| API | Application Programming Interface |
| Application server | A server which provides applications, that can be accessed via the VISULOX PORTAL |
| Application session | See: emulator session |
| Args | The arguments an application is started with |
| Assist / Assistance | See: Assisting Cooperation |
| Assisting cooperation | Within the VISULOX Cockpit, the user can select an application and press assist to join the application. The owner of the application selects the cooperation mode |
| Chapter | A chapter equals 20 minutes film of a recorded session |

| | |
|---------------------------|--|
| CLI | Command Line Interface |
| CMD | The command / path an application is started with |
| Cooperation | When two or more users are watching or working with the same application in realtime on their own desktop |
| Cooperation master | The user, who has started the application (owner) will be the master of this application in a Cooperation |
| Cooperation member | A user, who is not owner of an application and who is not able to switch the cooperation modes |
| Cooperation modes | <p>On hold: Member is assigned to a Cooperation, but does not participate</p> <p>Observe: Member is able to watch the Cooperation application, but can not interact</p> <p>Interact: Member can interact with the application</p> |
| CP | Short form for Cooperation |
| Datastore | Internal VISULOX PORTAL Service database, where all defined objects (users, hosts, applications) are stored. A VISULOX PORTAL Array replicates the datastore between all members simultaneously |
| DMZ | Demilitarized zone (Perimeter zone) |
| DSI | Directory Service Integration |
| Dual Control | Cooperation enforcing a real four-eye-principle |

| | |
|------------------------------|---|
| ELU | Extended License Usage - When ELU has expired, its not possible to start more recorders or display more users than allowed under MD / Status, max users / recorders |
| Emulator session | The running session, when an application is started with the Workspace on an application server |
| Expect script | VISULOX PORTAL connection script started during the launch of an application |
| External DNS name | The name by which an VISULOX PORTAL Server is known to a client device. A VISULOX PORTAL Server can have multiple external DNS names. |
| File Exchange | File Transfer web access for transferring files between a client and the Transit Zone for users without access to the VISULOX PORTAL |
| File Transfer Client | VISULOX Component for transferring files securely from Transit Zone to application servers and back |
| Film | Summary of the recorded chapters |
| Forced authentication | When VISULOX PORTAL prompts for a user name or password, by displaying an authentication dialog box For example, if a user holds down the Shift key when clicking on an application's link on the Workspace |
| FQDN | Fully Qualified Domain Name - The full name of a system, containing its hostname and its domain name. For example: portal.visulox.com, where portal is the hostname of a server, and visulox.com is the domain name |
| Group Access | Group Access is used to define an Access Policy for a specific list of users. This is needed when users are working together in a project and the project is represented by a group object in the repository |
| Host object | Host objects can be assigned to File Transit, Command Guard and Command Connect groups. |

| | |
|------------------------------------|---|
| Host Connect | See: VISULOX Command Connect / VISULOX Command Guard |
| IAR | I ntelligent A rray R outing |
| ICA | I ndependent C omputing A rchitecture: Client communication protocol from Citrix |
| Integrity-Check | Tool to check the VISULOX components and services |
| Internal / external message | The VISULOX Service supplies an external message for the login page and an internal message for the user's Workspace |
| Kiosk mode | VISULOX PORTAL display mode, where an application is displayed in full-screen |
| LDAP | L ightweight D irectory A ccess P rotocol |
| LDAPS | L ightweight D irectory A ccess P rotocol over S SL. Used for secure connections to an LDAP directory. |
| LID | Short form for L icense I D - Contains the date, the license started |
| Management Console | See: VISULOX Cockpit |
| MFA | M ulti F actor A uthentication |
| Native Client | A VISULOX PORTAL component that can be installed on client devices. The client maintains communication with the VISULOX PORTAL Server and is required to run applications The Native Client is provided by Oracle. |

| | |
|-----------------------------------|--|
| NEP | Short form for Network Entry Point |
| Network Entry Point | See: RIP |
| NFS | Network File System |
| Notifications | Implemented notification system for access, Workspace / File Transfer and emulator sessions in the VISULOX Services |
| Object | A self-contained entity, defined by a number of attributes and values. VISULOX PORTAL Objects have different types, such as an X application. The available attributes for each type are defined by a schema |
| One Time Passcode | The One Time Passcode is used for authentication and will become invalid after usage. A provided OTP is based on a secret key and the time via a smartphone APP |
| Organization object | A VISULOX PORTAL Object used to represent the top level of an organizational hierarchy. Organization objects can contain OU= or user profile objects. Organization objects have an O= naming attribute. |
| Organizational hierarchy | The collection of objects in the VISULOX PORTAL Datastore, descending from one or more organization or domain component objects. Represents the collection of people, application servers, and applications within an organization. |
| Organizational unit object | A VISULOX PORTAL Object used to distinguish different departments, sites, or teams in an organizational hierarchy. Organizational unit (OU) objects can be contained in an organization or domain component object. Organizational unit objects have an OU= naming attribute |
| OTP | Short form for One Time Passcode |

| | |
|-------------------------|---|
| Peer DNS name | The name by which an VISULOX PORTAL Server is known to other VISULOX PORTAL Servers in the same array |
| Primary server | The VISULOX PORTAL Server that acts as the authoritative source for global information, and maintains the definitive copy of the VISULOX PORTAL Datastore |
| RDP | Remote Desktop Protocol : Client communication protocol from Microsoft |
| Remote IP | Remote IP address, the information, from where a client request is coming |
| Report | The VISULOX Service is collecting data about workspace sessions, emulator sessions, recordings and cooperations. The information can be clearly arranged in reports. In VISULOX Cockpit a variety of possible reports can be created on several pages |
| Resume | To redisplay an application session that has been suspended. See also: suspend |
| RIP | Short form for Remote IP address |
| RVA | Remote Vendor Access |
| S & M | Short form for Support and Maintenance |
| Secondary server | An array member that is not the primary server. The primary server replicates information to secondary servers. |
| Session | The VISULOX PORTAL generates a session for any X11 or RDP application, which has a unique session ID |
| SIEM | Security Information and Event Management |

| | |
|-----------------------------|---|
| SOX | Short form for Sarbanes-Oxley Act |
| SSL certificate | A digital passport that establishes credentials on the web. In VISULOX PORTAL Service, allows client devices to trust the identity of a VISULOX PORTAL Server |
| Suspend | To pause an application session. A suspended application is not closed, it can be resumed. See also: resume |
| TAP | Short form for Temporary Access PIN , part of the Multi Factor Authentication (MFA) |
| TCC | Short form for Tarantella Client Component : Component for login into the VISULOX PORTAL via Native Client |
| TCL | Programming Language. Most of the VISULOX products are based on TCL |
| Temporary Access PIN | VISULOX method for the Multi Factor Authentication (MFA) |
| TFN | Tarantella Full Naming, X.500 format to address a VISULOX PORTAL object |
| Transit Zone | Zone, where files are transferred from/to application servers/clients |
| VAP | Short form for Virtual Access Point |
| Virtual Access Point | VISULOX method to get an independent URL of the VISULOX Access Nodes for reliability and Workspace balancing |
| VISULOX Access Node | Node running the VISULOX PORTAL Service and the VISULOX Service |
| VISULOX Base | Single VISULOX Node |

| | |
|---------------------------------------|--|
| VISULOX Cluster | Two or more VISULOX Nodes, that are joined together because of scalability, redundancy and load balancing |
| VISULOX Cockpit | Central VISULOX application to control sessions, access, recording, cooperations and to generate reports |
| VISULOX Command Connect | VISULOX component, which provides the possibility to connect to multiple hosts and to open an X-Client on these hosts. The connection method can be SSH, RDP or telnet. Former: Host Connect |
| VISULOX Command Guard | VISULOX component, which provides the possibility to connect to multiple hosts and to open an X-Client on these hosts Command Guard has command level controls for the application. It allows and denies the usage of certain commands by the user Additionally server side scripts can be issued either to multiple endpoints or to a single one |
| VISULOX Common Access Platform | The whole environment, that is built with the VISULOX GATEWAY, VISULOX Portal Service, VISULOX Service and databases |
| VISULOX Data | VISULOX Database and VISULOX Filestore |
| VISULOX Filestore | File system which stores the films. 5 MByte per user and per hour. Recommended for VISULOX is a local disk with 150-250 GB, for VISULOX Archive Node depending on the lifetime of films, up to x TB on a NAS/SAN storage |
| VISULOX GATEWAY | The VISULOX GATEWAY is a proxy server designed to be deployed in front of a VISULOX PORTAL Array in a demilitarized zone (DMZ). This enables the VISULOX PORTAL Array to be located on the internal network of an organization. Additionally, all connections can be authenticated in the DMZ before any connections are made to the VISULOX PORTAL servers in the array. The VISULOX GATEWAY manages load balancing of HTTP connections for the VISULOX PORTAL Servers in the array. |
| VISULOX Host Connect | See: VISULOX Command Connect |

| | |
|--|---|
| VISULOX Hotfix | Tool to check the software status in the cluster, backup and apply hotfixes |
| VISULOX keystroke recording with analyzing engine | In this recording mode all user keyboard interactions are registered and can be checked for unwanted entries (analyzing engine) |
| VISULOX Node | Node running the VISULOX Service to control sessions, films and recorders |
| VISULOX PAM | VISULOX Privileged Access Management |
| VISULOX PORTAL Array | Two or more VISULOX Access Nodes, that are joined together because of scalability, redundancy and load balancing |
| VISULOX PORTAL Benchmark | Tool to create a defined number of demo-users, who log into the VISULOX PORTAL and start recorded applications automatically. All settings can be configured easily within a GUI |
| VISULOX PORTAL Console | Web-based management console for the VISULOX PORTAL Service (Former: Administration Console) |
| VISULOX PORTAL Web Server | A pre-built web server installed and configured along with the VISULOX PORTAL Service, contains Apache, mod_ssl for HTTPS support, and Tomcat for Java Servlet and JSP support |
| VISULOX PORTAL Web Services | An API collection that allows developers to build their own applications to work with the VISULOX PORTAL Service. The APIs can be used to authenticate users, launch applications, and interact with the VISULOX PORTAL Datastore |
| VISULOX Revision Server | VISULOX Node which replicates the production database into Revision Server database and transfers the films from the production filestore into the Revision Server filestore (also known as Archive Server) |
| VISULOX Service Group | See: VISULOX Cluster |

| | |
|-------------------------------------|---|
| VISULOX Short Support Report | A Short Support Report to send via eMail created with visulox support -info . The Short Support Report should be sent to the VISULOX Support Team every time a new Support Request is opened |
| VISULOX Support Report | Package generated by the visulox support command, containing all information, necessary for support |
| VISULOX Transit Area | File Transfer component embedded in the Workspace to transfer files between client and Transit Zone |
| VISULOX Transit Mapping | To setup the VISULOX Transit Zone on Unix application servers, that are not a VISULOX Node, an RPM file is available for installation. |
| VISULOX Videolog Player | Player to view the recorded films inside the VISULOX Cockpit or checked out films in a browser |
| VISULOX Webservice User | Each VISULOX Service needs this user in the datastore to read the webservices on the VISULOX Access Nodes. The VISULOX webservice user has to be setup once in the datastore |
| VISULOX_Setup.xls | Excel-sheet, which has to be filled out in the planning phase by the responsible project leader, together with the amitego consultant |
| vlxMode | VISULOX variable set in the VISULOX PORTAL Console |
| VLX Password SelfService | Active Directory (AD) and Oracle Unified Directory (OUD) users are able to change their password by themselves with this application assigned. |
| Webtop | In the current version, the Webtop is called the Workspace . A Workspace is the term used to describe a user's applications, documents, and desktops. See: Workspace |
| WM | Short form for Window Manager |

| | |
|----------------------------|---|
| Workspace | The Workspace is displayed after logging into the VISULOX PORTAL. It is a special web page, that lists the applications that are assigned to the user |
| Workspace balancing | VISULOX load balancing mechanism including a virtual access point |
| Workspace session | The running session, after a user has logged into the VISULOX PORTAL via browser or Native Client |
| X11 forwarding | The process of forwarding, or tunneling, the windows of a remotely started X application to a client desktop |
| X Window System | A distributed window system for UNIX platform operating systems, based on the X11 protocol. Also called X11, or X Windows |
| X.509 certificate | See: SSL certificate |