

# VIVO 1.15 (rel-1.15-maint) Installation on Ubuntu

Tomcat 9 + Solr 9.6.1

Host: vivo-test-yk IP: 172.28.33.178

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## Scope and Notes

This guide reproduces the successful installation the way it was completed on the Humboldt cloud VM. It includes the exact commands, the directories, and the files created/edited. Replace values (like IP) as appropriate for your environment.

## 1 Prerequisites

If it is not on your computer, let us first connect to the workplace for vivo installation. Here, in this example, we connect to the Ubuntu VM provided by Humboldt (replace host/IP if different):

```
ssh ubuntu@vivo-test-yk
# or: ssh ubuntu@172.28.33.178
```

### OS and Packages

```
# (any dir OK)
sudo apt update

# Install Git, Maven, OpenJDK 17 (Tomcat will use JDK 17)
sudo apt install -y git maven openjdk-17-jdk

# Verify versions
java -version
mvn -version
git --version
```

## 2 Install Apache Tomcat 9.0.109 (non-packaged)

### Create user and layout

```
# (any dir OK)
sudo useradd -r -m -U -d /opt/tomcat9 -s /bin/false tomcat

# Prepare install dir
sudo mkdir -p /opt/tomcat9
```

## Download and unpack Tomcat

```
cd /tmp
curl -fLO
↪ https://dlcdn.apache.org/tomcat/tomcat-9/v9.0.109/bin/apache-tomcat-9.0.109.tar.gz
↪ || curl -fLO
↪ https://archive.apache.org/dist/tomcat/tomcat-9/v9.0.109/bin/apache-tomcat-9.0.109.t

sudo tar -xzf apache-tomcat-9.0.109.tar.gz
sudo rsync -a apache-tomcat-9.0.109/ /opt/tomcat9/

# Permissions
sudo chown -R tomcat:tomcat /opt/tomcat9
sudo find /opt/tomcat9/bin -type f -name "*.sh" -exec sudo chmod +x
```

## Systemd service (Tomcat with JDK 17 and add-opens)

```
# (any dir OK)
sudo tee /etc/systemd/system/tomcat9.service >/dev/null <<'EOF'
[Unit]
Description=Apache Tomcat 9
After=network.target

[Service]
Type=simple
User=tomcat
Group=tomcat
Environment="JAVA_HOME=/usr/lib/jvm/java-17-openjdk-amd64"
Environment="CATALINA_HOME=/opt/tomcat9"
Environment="CATALINA_BASE=/opt/tomcat9"
Environment="JDK_JAVA_OPTIONS= --add-opens=java.base/java.lang=ALL-UNNAMED
↪ --add-opens=java.base/java.lang.invoke=ALL-UNNAMED
↪ --add-opens=java.base/java.lang.reflect=ALL-UNNAMED
↪ --add-opens=java.base/java.io=ALL-UNNAMED
↪ --add-opens=java.base/java.util=ALL-UNNAMED
↪ --add-opens=java.base/java.util.concurrent=ALL-UNNAMED
↪ --add-opens=java.rmi/sun.rmi.transport=ALL-UNNAMED"
ExecStart=/opt/tomcat9/bin/catalina.sh run
ExecStop=/opt/tomcat9/bin/catalina.sh stop -force
SuccessExitStatus=143
Restart=on-failure

[Install]
WantedBy=multi-user.target
EOF

sudo systemctl daemon-reload
sudo systemctl enable --now tomcat9
sudo systemctl status --no-pager tomcat9
```

## 3 Get VIVO & Vitro sources (rel-1.15-maint)

```
sudo mkdir -p /opt/vivo
sudo chown $USER:$USER /opt/vivo
cd /opt/vivo

git clone https://github.com/vivo-project/Vitro.git Vitro -b rel-1.15-maint
```

```
git clone https://github.com/vivo-project/VIVO.git VIVO -b rel-1.15-maint
```

## 4 Prepare Maven installer settings

We use a dedicated settings file so the installer knows where to put Tomcat and the VIVO Home. We also set the default theme and provide a mirror for the VIVO dependencies location.

### Create **installer/my-settings.xml**

```
cd /opt/vivo/VIVO
tee installer/my-settings.xml >/dev/null <<'EOF'
<settings xmlns="http://maven.apache.org/SETTINGS/1.1.0"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://maven.apache.org/SETTINGS/1.1.0
    ↪ http://maven.apache.org/xsd/settings-1.1.0.xsd">

  <profiles>
    <profile>
      <id>defaults</id>
      <properties>
        <app-name>vivo</app-name>
        <vivo-dir>/opt/vivo/vivo</vivo-dir>
        <tomcat-dir>/opt/tomcat9</tomcat-dir>
        <default-theme>wilma</default-theme>
      </properties>
    </profile>
  </profiles>

  <activeProfiles>
    <activeProfile>defaults</activeProfile>
  </activeProfiles>

  <!-- Optional but recommended: mirror the VIVO dependency repo to
    ↪ githubusercontent -->
  <mirrors>
    <mirror>
      <id>vivo-dependencies-mirror</id>
      <name>VIVO dependencies mirror</name>

      ↪ <url>https://raw.githubusercontent.com/vivo-project/dependencies/main</url>
      <mirrorOf>vivo-dependencies</mirrorOf>
    </mirror>
  </mirrors>
</settings>
EOF
```

## 5 Build and install VIVO to Tomcat

```
cd /opt/vivo/VIVO
mvn install -s installer/my-settings.xml
```

This will:

- build Vitro/VIVO,
- create the VIVO Home at /opt/vivo/vivo,
- deploy vivo.war into /opt/tomcat9/webapps/vivo.

## Prepare VIVO Home configuration (prevent missing-file errors)

```
# Ensure the main config exists (copy the example to the live name)
cd /opt/vivo/vivo/config
sudo cp example.applicationSetup.n3 applicationSetup.n3

# Correct ownership for Tomcat
sudo chown -R tomcat:tomcat /opt/vivo/vivo
```

## 6 Install Apache Solr 9.6.1 and create VIVO core

### Install Solr as a service

```
cd /tmp
curl -fLO https://dlcdn.apache.org/solr/solr/9.6.1/solr-9.6.1.tgz ||
↪ curl -fLO
↪ https://archive.apache.org/dist/solr/solr/9.6.1/solr-9.6.1.tgz

tar -xzf solr-9.6.1.tgz
sudo bash solr-9.6.1/bin/install_solr_service.sh solr-9.6.1.tgz

sudo systemctl enable --now solr
sudo systemctl status --no-pager solr
```

### Create a core using the official VIVO Solr config

```
cd /tmp
git clone https://github.com/vivo-project/vivo-solr.git

# Create core "vivocore" from the vivocore/conf files
sudo su -s /bin/bash solr -c "/opt/solr/bin/solr create -c vivocore -d
↪ /tmp/vivo-solr/vivocore/conf"

# Quick check
curl -sS "http://localhost:8983/solr/vivocore/admin/ping?wt=json"
```

## 7 Runtime configuration for VIVO (runtime.properties)

Create and populate `/opt/vivo/vivo/config/runtime.properties` *before* starting VIVO.

```
cd /opt/vivo/vivo/config

# Create or overwrite with minimal, correct values
sudo tee runtime.properties >/dev/null <<'EOF'
# Solr endpoints
solrURL=http://localhost:8983/solr/vivocore
vitro.local.solr.url=http://localhost:8983/solr/vivocore

# Required: base namespace for minted resources (must end with
↪ "individual/")
Vitro.defaultNamespace=http://172.28.33.178:8080/vivo/individual/

# Argon2 password hashing parameters
argon2.time=3
argon2.memory=65536
argon2.parallelism=2
```

```
# Root user (register with this email to become site admin)
rootUser.emailAddress=yagmur.kati@hu-berlin.de
```

```
# Allow self-registration (email verification off for now)
useraccounts.allowSelfRegistration=true
selfEditing.enabled=true
selfEditing.useEmailVerification=false
EOF
```

```
sudo chown tomcat:tomcat runtime.properties
```

## 8 Start / Restart and Verify

```
# Restart Tomcat so VIVO reads its configs
sudo systemctl restart tomcat9
```

```
# Give it a few seconds, then check from the server:
curl -I http://localhost:8080/vivo/      # first hit may 302 to /vivo/
curl -I http://localhost:8080/vivo/      # should return HTTP/1.1 200 OK
```

```
# Optional: human-readable startup report
curl -sS "http://localhost:8080/vivo/startupStatus?render=plaintext" | sed
↪ -n '1,200p'
```

From your workstation (same network/VPN), open:

```
http://172.28.104.96:40881/vivo/
%http://172.28.33.178:8080/vivo/
```

**Note:** This setup uses HTTP on port 8080. TLS was not configured on Tomcat for this install.

## 9 Java Version Requirements

**Supported Versions** VIVO requires a full Java *Development Kit* (JDK), not just the runtime (JRE). The minimum supported version is **Java 11**. VIVO 1.15 and later have been tested successfully on **OpenJDK 17** with Apache Tomcat 9.

**Switch the System Java to 17** Use `update-alternatives` to select the Java 17 binary:

```
sudo update-alternatives --config java
# When prompted, choose the entry for:
#   /usr/lib/jvm/java-17-openjdk-amd64/bin/java
```

Verify the selection:

```
java -version
# Expect: openjdk version "17.x"
```

**Ensure Tomcat Uses Java 17** For manual Tomcat installs under `/opt/tomcat9`, set `JAVA_HOME` (and `VIVO_HOME`) via `setenv.sh`. Create or edit the file:

```
vi /opt/tomcat9/bin/setenv.sh
```

Add (or confirm) the following lines:

```
#!/bin/bash
export JAVA_HOME=/usr/lib/jvm/java-17-openjdk-amd64
```

```
export VIVO_HOME=/opt/vivo/vivo
```

**Restart Tomcat to Apply the Change** Stop and start Tomcat so it picks up the new JVM:

```
sudo /opt/tomcat9/bin/shutdown.sh
sudo /opt/tomcat9/bin/startup.sh
```

You should see output similar to:

```
Using JRE_HOME:          /usr/lib/jvm/java-17-openjdk-amd64
Tomcat started.
```

**Verification** Confirm Tomcat is now running with Java 17:

```
ps -ef | grep tomcat | grep java
# The command path should include:
#   /usr/lib/jvm/java-17-openjdk-amd64/bin/java
```

**Unsupported Versions** Java 20 and higher may prevent VIVO and Vitro from starting correctly (e.g., “FATAL: Could not set up the Solr search engine”). If a higher JDK is installed, ensure Tomcat is pinned to Java 11 or 17 as shown above.

## 10 Logging In to VIVO

**Access the Web Interface** After Tomcat and Solr have both started successfully, open a web browser and navigate to your VIVO base URL. Replace the host and port with those used in your deployment:

```
http://172.28.104.96:40881/vivo/
```

The VIVO home page should appear with navigation tabs (Home, People, Organizations, etc.) and a Log in panel on the right-hand side.

**Administrator Login** For the initial login, use your own institutional or preferred e-mail address and the default administrator password `rootPassword`. You can change this password after logging in.

```
Email:    yagmur.kati@hu-berlin.de
Password: rootPassword
```

After logging in successfully, VIVO will prompt you to enter and confirm a new password. Once this is completed, the top navigation bar will display a Site Admin link, giving you access to data management, ontology configuration, and site settings.

## 11 Appendix: Useful Checks and Paths

### Service status

```
sudo systemctl status tomcat9 --no-pager
sudo systemctl status solr --no-pager
```

## Logs

```
# Tomcat  
tail -n 150 /opt/tomcat9/logs/catalina.out
```

```
# Solr  
tail -n 150 /var/solr/logs/solr.log
```

## Key directories

- Tomcat: /opt/tomcat9
- VIVO Home: /opt/vivo/vivo
- VIVO runtime config: /opt/vivo/vivo/config/runtime.properties
- Deployed VIVO webapp: /opt/tomcat9/webapps/vivo
- Solr install: /opt/solr, Solr data: /var/solr