



Bionano VIA™ Installation Guide

DOCUMENT NUMBER:

CG-00044

DOCUMENT REVISION:

A

Effective Date:

06/27/2023

Table of Contents

| | |
|--|-----------|
| Legal Notice | 4 |
| Patents | 4 |
| Trademarks | 4 |
| Revision History | 5 |
| VIA Installation Overview | 6 |
| VIA Server Installation | 6 |
| VIA Server Installation – Windows OS | 6 |
| Start VIA Server – Windows OS | 9 |
| VIA Server Installation – Linux OS | 11 |
| Start VIA Server – Linux OS | 13 |
| VIA License Activation | 14 |
| VIA Processing Installation | 15 |
| VIA Processing Installation – Windows OS | 15 |
| VIA Processing Installation – Linux OS | 18 |
| VIA Client Installation | 19 |
| VIA Client Installation – Windows OS | 20 |
| VIA Client Installation – Mac OS | 21 |
| VIA Shutdown | 23 |
| Shutdown VIA – Windows OS | 23 |
| Shutdown VIA – Linux OS | 24 |
| VIA Update Overview | 25 |

| | |
|---|-----------|
| VIA Update – Window OS | 25 |
| VIA Update – Linux OS | 26 |
| VIA Client Auto Update | 27 |
| VIA Sample Importer Installation | 28 |
| VIA Sample Importer Installation – Windows OS | 28 |
| VIA Sample Importer Installation – Mac OS | 28 |
| VIA Sample Importer Installation – Linux OS | 29 |
| Nirvana Installation | 29 |
| Nirvana Installation – Windows OS | 29 |
| Nirvana Installation – Linux OS | 30 |
| Additional Installation Information | 31 |
| Alternate VIA Server Port | 31 |
| Specifying Server Host | 32 |
| Alternate Storage Location | 32 |
| Adjusting RAM allocation | 33 |
| Database Contents | 33 |
| Technical Assistance | 34 |

Legal Notice

For Research Use Only. Not for use in diagnostic procedures.

This material is protected by United States Copyright Law and International Treaties. Unauthorized use of this material is prohibited. No part of the publication may be copied, reproduced, distributed, translated, reverse-engineered or transmitted in any form or by any media, or by any means, whether now known or unknown, without the express prior permission in writing from Bionano Genomics, Inc. Copying, under the law, includes translating into another language or format. The technical data contained herein is intended for ultimate destinations permitted by U.S. law. Diversion contrary to U. S. law prohibited. This publication represents the latest information available at the time of release. Due to continuous efforts to improve the product, technical changes may occur that are not reflected in this document. Bionano Genomics, Inc. reserves the right to make changes in specifications and other information contained in this publication at any time and without prior notice. Please contact Bionano Genomics, Inc. Customer Support for the latest information.

BIONANO GENOMICS, INC. DISCLAIMS ALL WARRANTIES WITH RESPECT TO THIS DOCUMENT, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THOSE OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. TO THE FULLEST EXTENT ALLOWED BY LAW, IN NO EVENT SHALL BIONANO GENOMICS, INC. BE LIABLE, WHETHER IN CONTRACT, TORT, WARRANTY, OR UNDER ANY STATUTE OR ON ANY OTHER BASIS FOR SPECIAL, INCIDENTAL, INDIRECT, PUNITIVE, MULTIPLE OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH OR ARISING FROM THIS DOCUMENT, INCLUDING BUT NOT LIMITED TO THE USE THEREOF, WHETHER OR NOT FORESEEABLE AND WHETHER OR NOT BIONANO GENOMICS, INC. IS ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Patents

Products of Bionano Genomics® may be covered by one or more U.S. or foreign patents.

Trademarks

The Bionano logo and names of Bionano products or services are registered trademarks or trademarks owned by Bionano Genomics, Inc. (“Bionano”) in the United States and certain other countries.

Bionano™, Bionano Genomics®, Saphyr®, Saphyr Chip®, Bionano Access™, and Bionano EnFocus™ are trademarks of Bionano Genomics, Inc. All other trademarks are the sole property of their respective owners.

No license to use any trademarks of Bionano is given or implied. Users are not permitted to use these trademarks without the prior written consent of Bionano. The use of these trademarks or any other materials, except as permitted herein, is expressly prohibited and may be in violation of federal or other applicable laws.

© Copyright 2023 Bionano Genomics, Inc. All rights reserved.

Revision History

| REVISION | NOTES |
|----------|------------------|
| A | Initial release. |

VIA Installation Overview

Installation of VIA includes the following overview steps:

1. Install VIA Server
2. Install VIA Processing Server
3. Install VIA Client
4. Install VIA Sample Importer (optional)
5. Install Nirvana (optional)

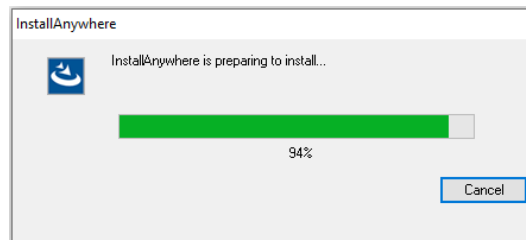
Instructions in this section will provide guidance through steps for installing VIA for the first time. For updating an installation of VIA please see the VIA Update sections in this guide.

VIA Server Installation

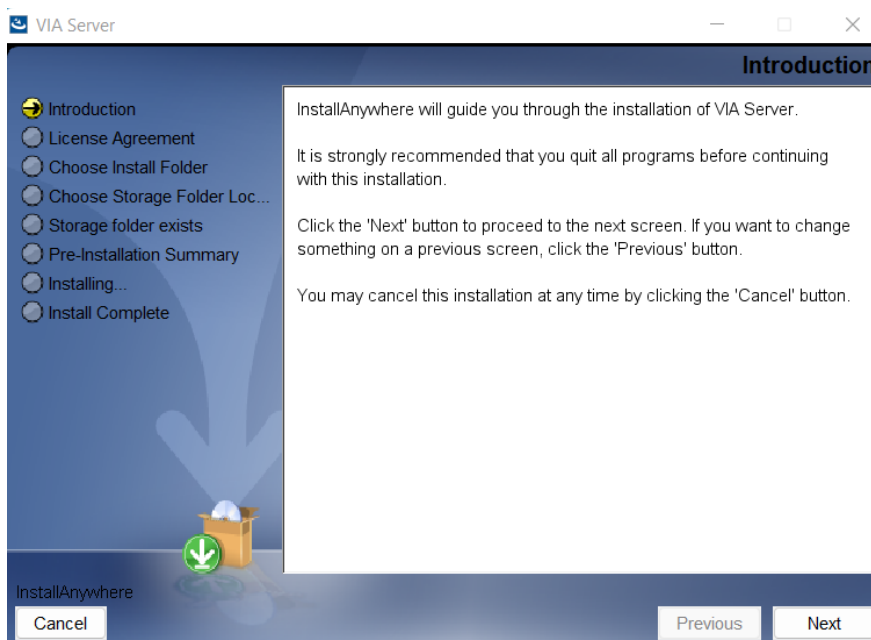
VIA Server contains database files necessary for sample analyses in VIA system. VIA Server installation must be completed prior to installing other VIA components. VIA Server may be installed on either Windows OS or Linux OS.

VIA Server Installation – Windows OS

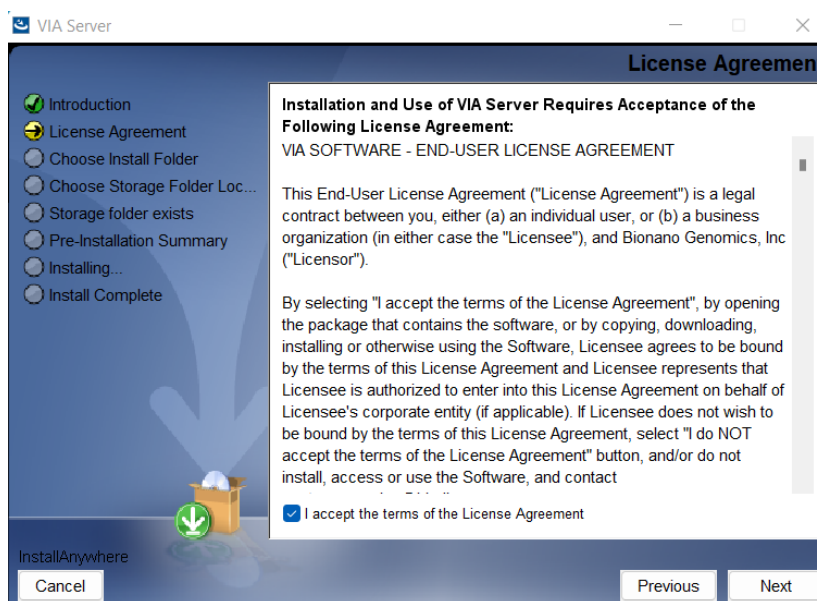
1. Run VIA Server installer with **VIA Server.exe**. This installer file is used only for new installs of VIA Server.



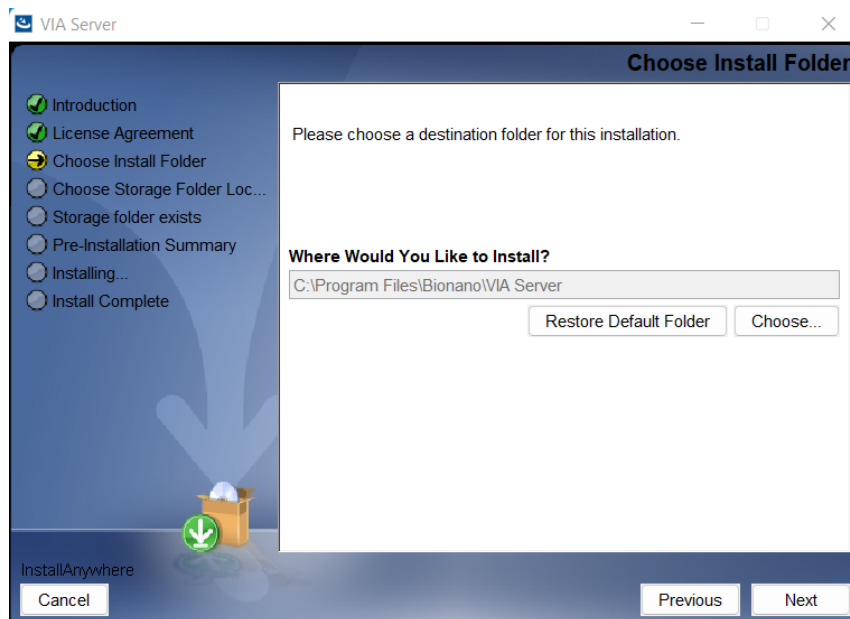
2. Follow prompts selecting the appropriate options and clicking the “Next” button. Installation can take several minutes; a progress status is displayed along the left side of the installer window.



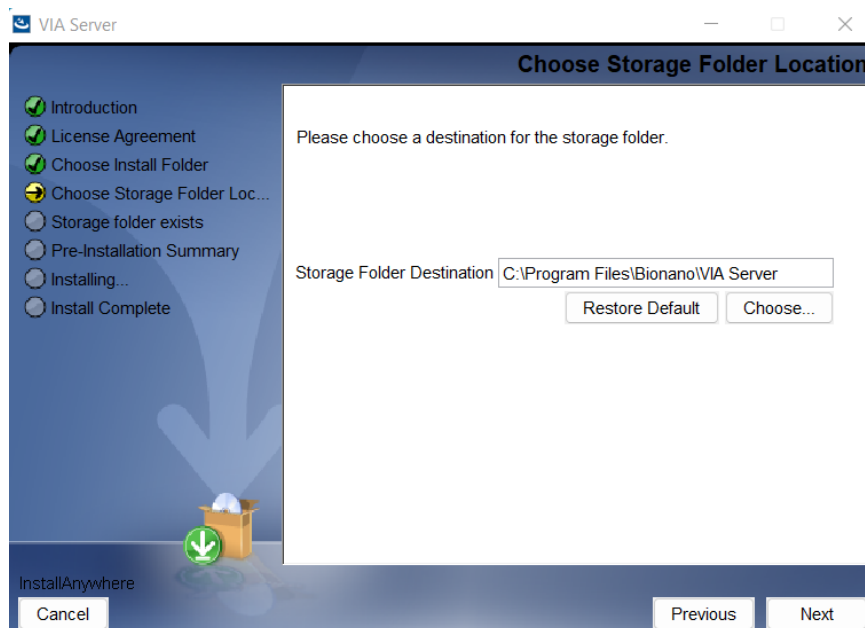
3. In the License Agreement section, click on the check box to accept the terms of the License Agreement.



4. Choose a destination folder for server installation.



5. Specify the storage folder location. The storage folder contains the database for the samples in VIA. By default, the storage folder is installed in the VIA Server directory. However, the storage folder may be specified elsewhere. For example, it can be installed on a mounted drive if there is more hard drive space.



6. Server installation progress.

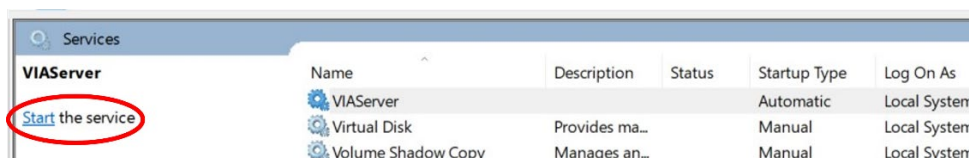


7. Install complete. Click “Done” to quit the installer.
8. Specify port (if preference is different from default port) in the **Internal.lax** file in the install directory. The default port is 8443 using secure communication (https) between VIA Server, VIA Processing Server and VIA Client. The default http port is 8081. For instructions to change VIA Server port see the Additional Installation Information section in this guide.

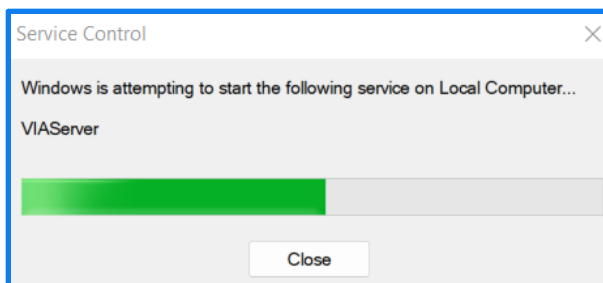
NOTE: the ports used by VIA must be open on the server machine (if they are not open, please open the ports before continuing).

Start VIA Server – Windows OS

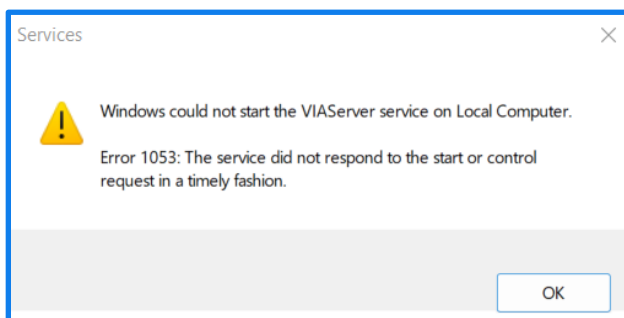
1. Start VIA Server as a service. Go to Control Panel > System and Security > Windows Tools > Services. Open the Services application and select VIAServer. To start the service, click on “Start the service”.



2. Wait for service to time out. An alert window will display a progress bar with a note that Windows is attempting to start the service.



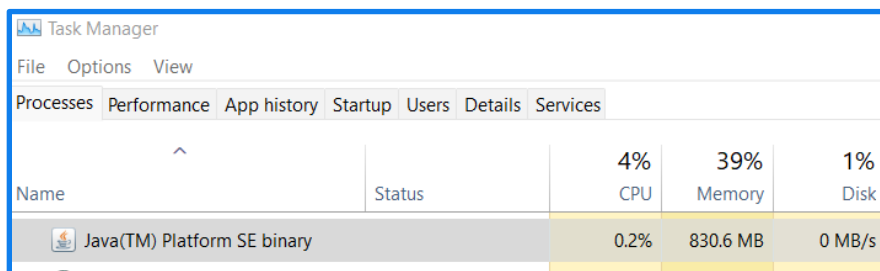
The service control window will time out before the service is started and an error message will appear.



NOTE: The message indicates that Windows could not start the service. Please ignore this error message and click “OK” to close the window.

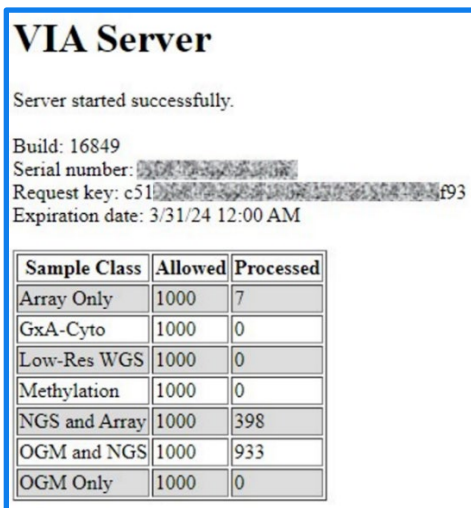
Additionally, in the Services window, VIAServer service will not indicate “Running” in the “Status” column of the “Services” window even though the server is running. However, neither the absence of the service status nor the error message is an indication that the VIA Server has been started.

3. Check to see that VIA Server Java is running. If VIA Server has started properly, then the java application for VIA Server should be running. Open Task Manager application in Windows by holding down the [ctrl] + [shift] + [esc] keys at the same time. Navigate to Processes tab and find the Java application for VIA Server. Make sure “Show processes from all users” is checked off if this option is in the Processes tab.



Check that the Java that is running is VIA Server by right clicking on “Java(TM) Platform SE binary” and selecting “Properties”. Then go to “General” tab and find “Location” which should indicate the VIA Server install directory (default = “C:\Program Files\Bionano\VIA Server dev\jre\bin”).

4. Check browser for VIA license page. Enter the server url and port (e.g. `https://localhost:8443`), in a web browser. Replace “8443” in the url with other port number if using a different port. VIA license page should appear. This is confirmation that VIA Server has started.



If VIA is started for the very first time, then a VIA license request page will appear. Instructions to request a VIA license are in the VIA License Activation section of this guide.

VIA Server Installation – Linux OS

The supported Linux distribution is CentOS 7 and 8 with the Java 8 JRE installed from Oracle's RPM (<http://www.oracle.com/technetwork/java/javase/downloads/jre8-downloads-2133155.html>)

RPM install instructions can be found at, https://www.java.com/en/download/help/linux_x64rpm_install.xml

1. Enable executable permission for **VIA Server.bin** file

```
~]# chmod +x VIA\ Server.bin
```

2. Run VIA Server installer with **VIA Server.bin**. This installer file is used only for new installs of VIA Server.

```
~]# ./VIA\ Server.bin
```

By default, the Server will be installed under the `/root/Bionano/VIA Server` directory. To install it at some other location use "`-DUSER_INSTALL_DIR=`" command line parameter. For example, the command below specifies the VIA server install directory as `/software/Bionano/VIA Server`

```
~]# ./VIA\ Server.bin -DUSER_INSTALL_DIR="/software/Bionano/VIA\ Server"
```

Note: If GUI option is enabled in the LINUX OS, it can be turned off so installer is not run in GUI interphase. The following commands can be used. You may need to stop the display manager service prior to running the below commands (systemctl stop gdm). To turn off GUI, use the following command:

```
~]# ./VIA\ Server.bin --mode text
```

3. If necessary, create a symbolic link to redirect the VIA storage directory. The storage directory contains the database for the samples in VIA. By default, the storage directory is installed in VIA Server directory under `/root/Bionano/VIA Server`. Follow the steps below to specify a different storage directory:
 - a. Mount a drive. Use the `mount` command with flag `-t` for type device directory where type can be ntfs, ext or fat. USB devices are usually vfat. Example:

```
~]# mount -t ntfs /dev/sda1 /mnt
```

- b. Create a Symbolic link to the storage directory on the mounted drive

```
~]# ln -s /root/Bionano/VIA\ Server /mnt/d
```

4. Set up VIA Server as a service. Create a unit file `via-server.service` in the VIA Server install directory (default = `/root/Bionano/VIA Server`). Make sure it has the correct file permissions. Execute as root. Example:

```
~]# touch "/root/Bionano/VIA Server/via-server.service"
```

```
~]# chmod 664 "/root/Bionano/VIA Server/via-server.service"
```

5. Add the following content to the file. **Note:** If the default install directory was not used, specify the VIA Server install directory.

```
# systemd unit configuration
#
# This can be installed as a service on new system with
#   systemctl enable "$PWD/via-server.service"
#
# Check status with
#   systemctl status via-server
```

```
[Unit]
Description=Bionano VIA Server
After=remote-fs.target
```

```
[Service]
Type=simple
WorkingDirectory=/root/Bionano/VIA Server
```

```
ExecStart="/root/Bionano/VIA Server/Internal"
LimitNOFILE=65535
```

```
[Install]
WantedBy=multi-user.target
```

Note: If the default install directory was not used, specify the VIA Server install directory

- Execute the following commands to enable the configuration

```
~]# systemctl enable "/root/Bionano/VIA Server/via-server.service"
```

Start VIA Server – Linux OS

- Start the VIA Server as a service

```
~]# systemctl start via-server
```

- Check if server is running by checking is the service is started

```
~]# systemctl status via-server
```

- Check if java for VIA server is launched

```
~]# ps aux | grep java
```

- Check browser for VIA license page. Enter the server url and port (e.g. <https://localhost:8443>), in a web browser. Replace “8443” in the url with other port number if using a different port. VIA license page should appear. This is confirmation that VIA Server has started.

VIA Server

Server started successfully.

Build: 16849
 Serial number: [REDACTED]
 Request key: c51[REDACTED]f93
 Expiration date: 3/31/24 12:00 AM

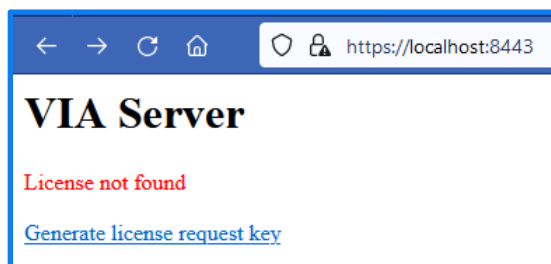
| Sample Class | Allowed | Processed |
|---------------|---------|-----------|
| Array Only | 1000 | 7 |
| GxA-Cyto | 1000 | 0 |
| Low-Res WGS | 1000 | 0 |
| Methylation | 1000 | 0 |
| NGS and Array | 1000 | 398 |
| OGM and NGS | 1000 | 933 |
| OGM Only | 1000 | 0 |

If VIA is started for the very first time, then a VIA license request page will appear. Instructions to request a VIA license are in the VIA License Activation section of this guide.

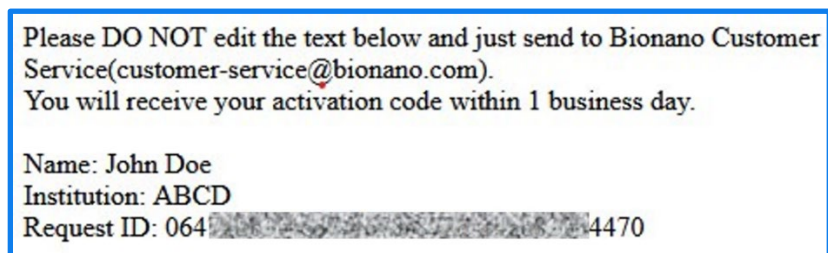
VIA License Activation

Once VIA server is running, a license needs to be created and installed on the VIA Server install directory.

1. Open a web browser and enter the server url and port (e.g. `https://localhost:8443`). Replace "8443" in the url with other port number if using a different port.
2. A message stating there is no VIA license appears. If a message stating the server has started does not appear, wait up to 10 minutes and check again. The following message should appear:



3. Click on the "Generate license request key" link, fill in the fields, and click "Submit". A license request ID will be generated as shown in the example below:



Select the entire text displayed and email to support@bionano.com with subject "VIA License Request". Bionano support will send an email with the license file.

NOTE: After sending the details to Bionano for a license, **do not** click on Generate license request key again and **do not** refresh the link to the Request ID page. Each license generated is based on the latest license key created on the machine. Clicking this button again or refreshing the page will cause the Request ID to reset and the license Bionano support sends will not work. Once the Request ID has been sent to Bionano support, the browser page may be closed.

4. Once the license file is obtained, copy the file into the server install directory (e.g., default Windows OS = `C:\Program Files\Bionano\VIA Server`; default Linux OS = `root/Bionano/VIA Server`).
5. Confirm that the server has started successfully. Open the server url (e.g., `https://localhost:8443`) in a new web browser tab or window. The VIA Server license should appear displaying a message that "Server started successfully" along with the server build number, serial number, license request key, expiration date, and allowed Sample Classes.

VIA Server

Server started successfully.

Build: 16849
 Serial number: [REDACTED]
 Request key: c51[REDACTED]f93
 Expiration date: 3/31/24 12:00 AM

| Sample Class | Allowed | Processed |
|---------------|---------|-----------|
| Array Only | 1000 | 7 |
| GxA-Cyto | 1000 | 0 |
| Low-Res WGS | 1000 | 0 |
| Methylation | 1000 | 0 |
| NGS and Array | 1000 | 398 |
| OGM and NGS | 1000 | 933 |
| OGM Only | 1000 | 0 |

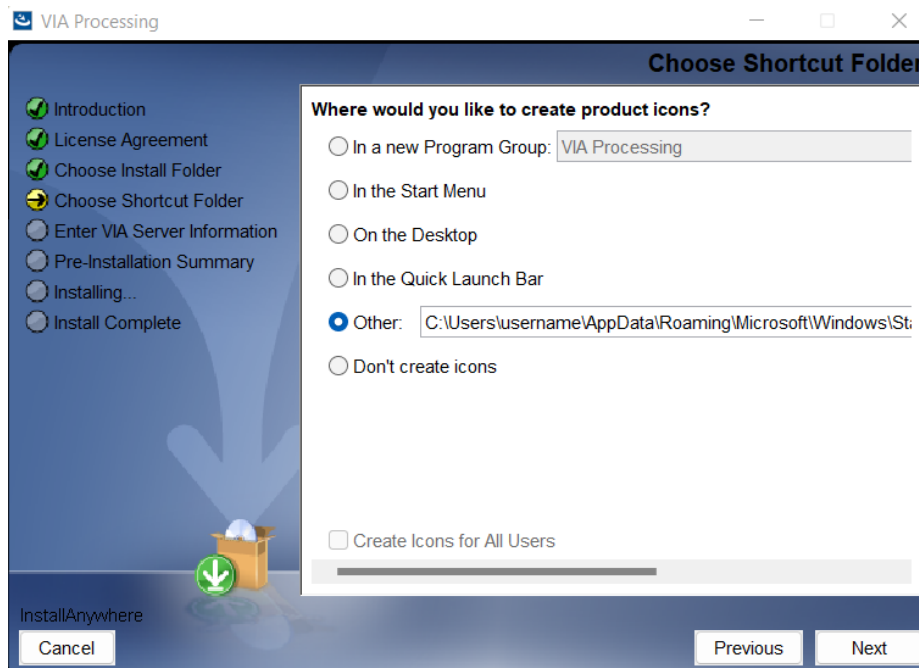
NOTE: If there is a need to restart the machine on which the VIA Server is running, make sure to follow proper shut down procedure as instructed in the VIA Shutdown section. If the server is not stopped correctly prior to computer restart, a sample in the server database may become corrupted or the server may take several hours to start up if there are many samples (hundreds to thousands) in the database.

VIA Processing Installation

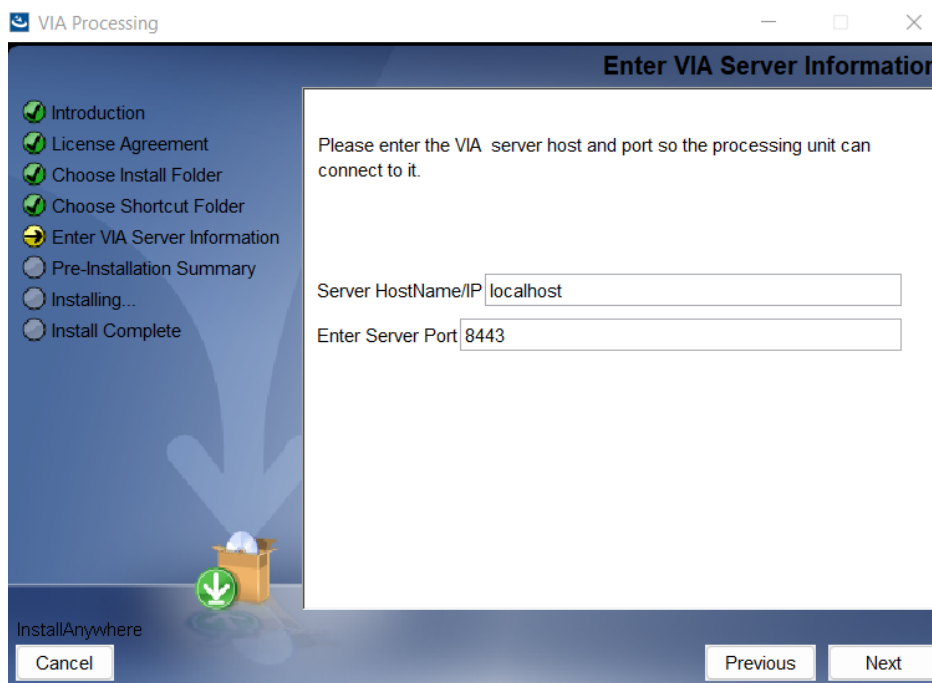
VIA Processing is the component that processes samples. VIA Processing installation must be done after VIA Server and license file installation. VIA Processing may be installed on the same machine (preferred) as the VIA Server or on a different machine. In a high throughput environment, VIA Processing can be installed on multiple different machines – please contact Bionano Support for further assistance.

VIA Processing Installation – Windows OS

1. Run VIA Processing installer (**VIA Processing.exe**).
2. Follow prompts selecting the appropriate options and clicking the “Next” button. Installation can take several minutes; a progress status is displayed along the left side of the installer window.
3. Make sure to check the box for the License Agreement and specify the VIA Processing install directory if default is not preferred.
4. Choose a shortcut folder. Several options are available to create a shortcut icon for VIA Processing. The default is to create a shortcut by choosing “Other” and specifying the folder:
C:\Users\username\AppData\Roaming\Microsoft\Windows\Start Menu\Programs\Bionano\VIA Processing

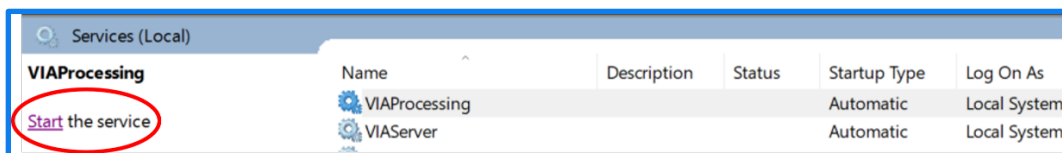


5. Specify VIA Server hostname/IP and port. If VIA Processing is installed on the same machine as VIA Server, then “localhost” can be entered as the server hostname. Otherwise, the servername or IP must be specified. If the default port 8443 (https) was changed on the VIA Server, the updated port number must also be specified in the VIA Processing.



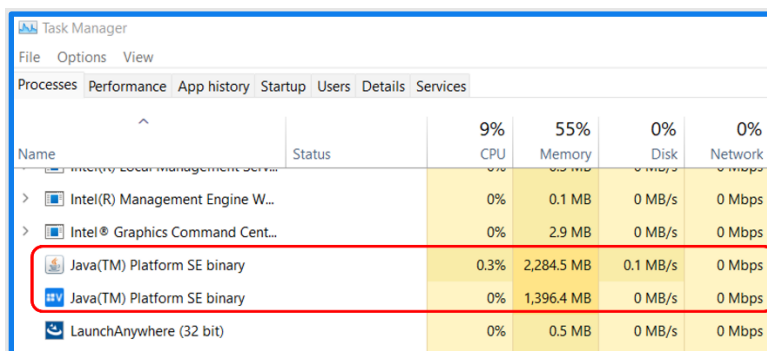
NOTE: VIA Processing connection settings can be altered in the `Internal.lax` in the VIA Processing install directory if the settings are not properly set during VIA Processing installation or if the settings need to be changed after installation.

6. In the Pre-Installation Summary review the installation specifications and when ready to proceed click “Install”. A progress bar will be displayed showing the installation status.
7. Once installation is complete, click “Done” to quit the installer.
8. Start VIA Processing as a service. Go to Control Panel > System and Security > Windows Tools > Services. Open the Services application.
9. Select VIAProcessing and click “Start the service”.



NOTE: The service control window will time out before the VIAProcessing service is started and an error message will appear. Please ignore this error message and click “OK” to close the window. The message does not necessarily mean that VIAProcessing service has not started.

10. Confirm that VIA Processing is running. Open Task Manager and navigate to Processes tab. Make sure “Show processes from all users” is checked off if this option is in the Processes tab. If VIA Processing is installed on the same machine as VIA Server, 2 copies of Java should be running – one for VIA Server and the other for VIA Processing.



Verify that one of the Java applications is VIA Processing by right clicking “Java(TM) Platform SE binary”, select “Properties”, and go to “General” tab. The specified directory under “Location” should indicate the VIA Processing install directory.

NOTE: The processing server can be installed on multiple different machines in a high throughput environment – please contact Bionano Support.

VIA Processing Installation – Linux OS

1. Enable executable permission for `VIA Processing.bin` file

```
~]# chmod +x VIA\ Processing.bin
```

2. Run `VIA Processing.bin` installer to install VIA Processing.

```
~]# ./VIA\ Processing.bin
```

If the installer is executed as root then the application will be installed as default in `/root/Bionano/VIA Processing`. If the installer is executed as the user then `/Bionano/VIA Processing` will be under user home.

To install it at a non-default location use "`-DUSER_INSTALL_DIR=`" command line parameter. For example:

```
~]# ./VIA\ Processing.bin -DUSER_INSTALL_DIR="/home/VIA\ Processing"
```

3. Once VIA Processing installation is complete, the VIA Server hostname and port needs to be specified. To do this navigate to the VIA Processing install directory and open the `Internal.lax` file with a text editor.
4. Find the arguments line that begins with `lax.command.line.args`. After the "=" specify the VIA Server host and port. For example, if https port 8443 is used for VIA Server and VIA Server is installed on the same machine as VIA Processing then the line should be:

```
lax.command.line.args=localhost 8443 proclog
```

Default https port = 8443 and http port = 8081. If a different port number is preferred, this must be altered in the `Internal.lax` file for both VIA Server and VIA Processing.

The default connection between VIA Server and Processing is https. To use http instead, add "`--http`" immediately before the server hostname in the command line arguments line (e.g.

```
lax.command.line.args=--http localhost 8081 proclog)
```

in the `Internal.lax` file for VIA Processing.

5. Set up VIA Processing as a service. Create a unit file `via-proc.service` in the VIA Processing install directory (default = `/root/Bionano/VIA Processing`). Make sure it has the correct file permissions. Execute as root. Example:

```
~]# touch "/root/Bionano/VIA Processing/via-proc.service"
```

```
~]# chmod 664 "/root/Bionano/VIA Processing/via-proc.service"
```

Add the following content to the file. **NOTE:** If install directory is different from default, specify the correct VIA Processing install directory.

```
# systemd unit configuration
#
# This can be installed as a service on new system with
#   systemctl enable "$PWD/via-proc.service"
#
# Check status with
#   systemctl status via-proc
```

```
[Unit]
Description=Bionano VIA Processing
After=remote-fs.target
```

```
[Service]
Type=simple
WorkingDirectory=/root/Bionano/VIA Processing
ExecStart="/root/Bionano/VIA Processing/Internal"
LimitNOFILE=65535
```

```
[Install]
WantedBy=multi-user.target
```

6. Execute the following commands to enable the configuration

```
~]# systemctl enable "/root/Bionano/VIA Processing/via-proc.service"
```

7. Start the service

```
~]# systemctl start via-proc
```

8. Check if server is running by checking is the service is started

```
~]# systemctl status via-proc
```

9. Check if java for VIA server has launched

```
~]# ps aux | grep java
```

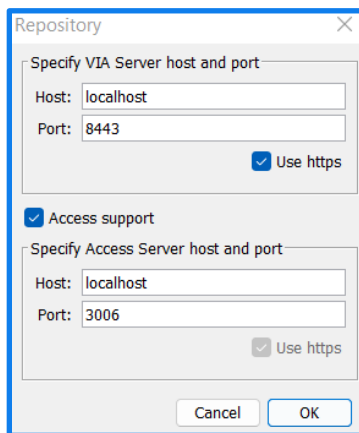
10. Install VIA license. Instructions are outlined in the VIA License Activation section of this guide.

VIA Client Installation

VIA Client is the interface between the user and VIA Server. VIA Client is installed on each user machine. VIA Client may be installed on either Windows OS or Mac OS

VIA Client Installation – Windows OS

1. Run VIA Client installer (`VIA Client.exe`) on the user machine.
2. Follow prompts selecting the appropriate options and clicking the “Next” button. Installation can take several minutes; a progress status is displayed along the left side of the installer window.
3. Make sure to check the box for the License Agreement and specify the VIA Client installation directory if default is not preferred.
4. Choose a shortcut folder. Several options are available to create a shortcut icon for VIA Client. Select “On the Desktop”. This will create a VIA Client shortcut on the user’s Windows desktop.
5. In the Pre-Installation Summary review the installation specification and when ready to proceed click “Install”. A progress bar will be displayed showing the installation status.
6. Once installation is complete, click “Done” to quit the installer.
7. Launch VIA Client from the desktop shortcut
8. Specify VIA Server host and port. Upon initially launching VIA Client at the VIA login window, go to Repository à Settings. The box below shows typical settings for a local installation where the VIA Client software is installed on the same machine as VIA Server.



“Host” can be either server name or IP. The default VIA Server https port = 8443 and http port = 8081. If using https port, make sure to check the box for “Use https”. Once the host and port information has been entered, click “OK”.

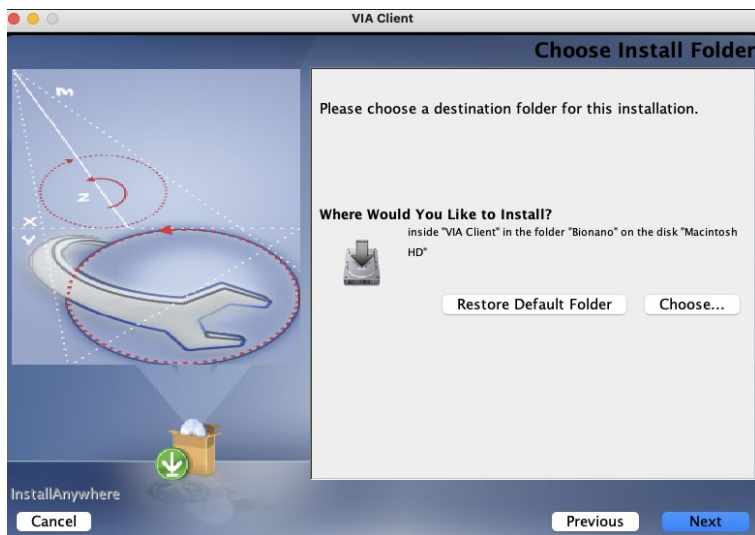
Select Access support. In the repository settings, Access Server host and port can be specified. If Access is on the BAS, the IP address for the BAS should be used for the host. The default port for Access is 3005.

NOTE: The repository settings will be saved after clicking “OK”. If these specifications are not altered on VIA Server, users do not need to re-enter the host and port settings.

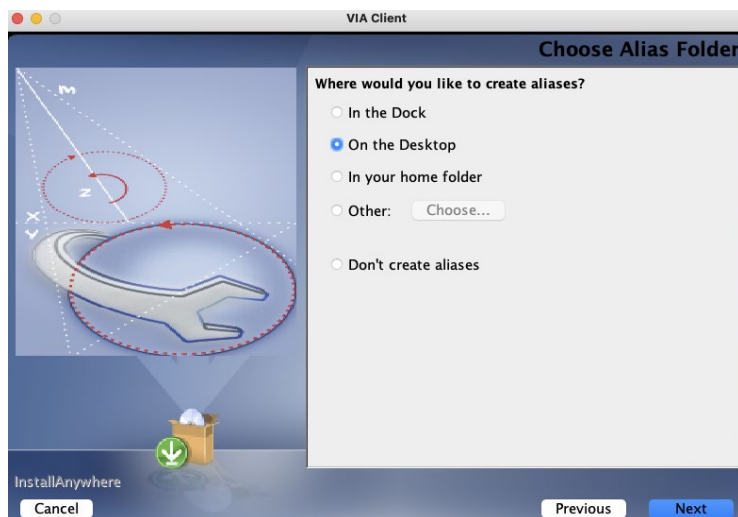
9. Select Access support. In the Repository settings, Access Server host and port can be specified. If Access is on the BAS, the IP address for the BAS should be used for the host. The default port for Access is 3006.
10. Proceed to log into the VIA Client. The admin user may create username and password for all other users. Default admin username = admin and password = admin7. To log in as an admin user, check the box for “Login as Admin”.

VIA Client Installation – Mac OS

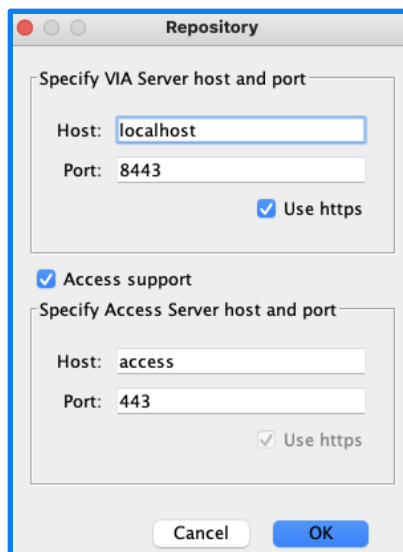
1. Run VIA Client installer (**VIA Client.app**) on the user machine.
2. Follow prompts selecting the appropriate options and clicking the “Next” button. Installation can take several minutes; a progress status is displayed along the left side of the installer window.
3. Make sure to check the box for the License Agreement and specify the VIA Client installation directory if default is not preferred.
4. Choose an installation folder. The default folder is **/Applications/Bionano/VIA Client**



5. Choose alias (shortcut) folder. Several options are available to create a shortcut icon for VIA Client. If “On the Desktop” is selected a VIA Client shortcut will be created on the user’s Mac desktop.



6. In the Pre-Installation Summary review the installation specification and when ready to proceed click “Install”. A progress bar will be displayed showing the installation status.
7. Once installation is complete, click “Done” to quit the installer.
8. Launch VIA Client from desktop shortcut.
9. Specify host and port in VIA Client. Upon initially launching VIA Client at the VIA login window, go to Repository à Settings. The box below shows typical settings for a local installation where the VIA Client software is installed on the same machine as VIA Server.



“Host” can be either server name or IP. The default VIA Server https port = 8443 and http port = 8081. If using https port, make sure to check the box for “Use https”.

Select Access support. In the repository settings, Access Server host and port can be specified. If Access is on the BAS, the IP address for the BAS should be used for the host. The default port for Access is 3005.

NOTE: The repository settings will be saved after clicking “OK”. If these specifications are not altered on VIA Server, users do not need to re-enter the host and port settings.

10. Proceed to log into the VIA Client. The admin user may create username and password for all other users. Default admin username = admin, and password = admin7. To log in as an admin user, check the box for “Login as Admin”. It is recommended that each site change the admin user password upon initial login to ensure security.

VIA Shutdown

To ensure that sample data and processing are not adversely affected, proper shut down of VIA is necessary. Prior to shutting down VIA, all users should be logged out of their VIA Client. The order of operation for properly shutting down VIA includes:

1. Shutdown VIA Processing
2. Shutdown VIA Server

When proper instructions are followed, VIA Processing will shut down without abruptly terminating a sample in the middle of processing. If a sample is in the middle of processing when the command to shutdown VIA Processing is executed, then VIA Processing will finish processing the sample prior to shutting down. If there are other samples in queue pending to be processed, then VIA Processing will continue processing after it is restarted. Abruptly shutting down VIA Processing through methods not outlined in this guide, such as end tasking the java application or killing the service, may result in loss of data for samples in processing.

Before VIA Server can be shut down, make certain that all users are not logged into their VIA Client. Failure to check that all users are logged off may result in samples not being saved if in the middle of editing or may result in a corrupted sample.

Also prior to shutting down VIA Server, confirm that VIA Processing is properly shut down. Shutting down VIA Server will immediately shutdown VIA Processing which can result in loss of sample if in the middle of processing. Abruptly shutting down VIA Server through methods not outlined in this guide, such as end tasking the java application or killing the service, may result in loss of data. When VIA Server is properly shut down, a check point will be created in the VIA Server database for faster indexing during VIA Server restart.

Shutdown VIA – Windows OS

1. Shutdown VIA Processing
 - i. Navigate to VIA Processing install directory (default = `C:\Program Files\Bionano\VIA Processing`)

- ii. Run the **StopProcessing.exe** file. To execute file, right click on the file and select “Run as administrator”.
- iii. Confirm VIA Processing has stopped. If VIA Processing is in the middle of processing a sample, it will finish processing the sample before it shuts down. Hence, please be patient if VIA Processing does not shut down immediately. To check if VIA Processing has stopped:
 - a. Open Task Manager and click on the Processes tab. Make sure “Show processes from all users” is checked off if this option is in the Processes tab.
 - b. Search for Java applications. Both VIA Server and Processing run on Java. If Java application is running, right click on “Java(TM) Platform SE binary”, select “Properties”, and go to “General” tab. The specified directory under “Location” will indicate the install directory.
 - c. When VIA Processing is shut down, the Java application from the VIA Processing install directory will not be displayed in the Processes tab.

2. Shutdown VIA Server

- i. Navigate to VIA Server install directory (default = `/Program Files/Bionano/VIA Server`)
- ii. Run the **StopServer** file.
- iii. Confirm VIA Server has stopped. There are 2 options to check if VIA Server has stopped:
 - a. Check that the java for VIA Server has stopped. Open Task Manager and click on the Processes tab. Search for Java applications. When VIA Server is shut down, the Java application from the VIA Server will not be displayed in the Processes tab.
 - b. Open web browser and enter address to VIA license page (e.g. `https://localhost:8081`). If VIA Server is shut down, the VIA license page will not display on the browser.
 - c.

Shutdown VIA – Linux OS

1. Shutdown VIA Processing

- i. Navigate to VIA Processing install directory (default = `root/Bionano/VIA Processing`)
- ii. Run the **StopProcessing** file.

```
~]# ./StopProcessing
```
- iii. Confirm VIA Processing has stopped. If VIA Processing is in the middle of processing a sample, it will finish processing the sample before it shuts down. Hence, please be patient if VIA Processing does not shut down immediately. To check if VIA Processing has stopped, check that java for VIA Processing has stopped.


```
~]# ps aux | grep java
```

2. Shutdown VIA Server

- i. Navigate to VIA Server install directory (default = `root/Bionano/VIA Server`)
- ii. Run the `StopServer` file.

```
~]# ./StopServer
```

- iii. Confirm VIA Server has stopped. There are 2 options to check if VIA Server has stopped:
 - a. Check that Java for VIA Server is shut down.

```
~]# ps aux | grep java
```
 - b. Open web browser and enter address to VIA license page (e.g. `https://localhost:8081`). If VIA Server is shut down, the VIA license page will not display on the browser.

VIA Update Overview

This section is for updating the VIA system. The installation instructions are provided in the Initial VIA Installation section. Before updating the VIA Server, please note the following:

Make sure there is a backup of VIA before attempting an update to ensure that no data is lost in case something goes wrong during the installation process. Customers are responsible for having a backup system in place for VIA and we recommend an additional backup be created just prior to an update. At minimum, a copy of the “Storage” directory in the VIA Server install directory should be made prior to any update as well as the `license.nxc` and `lic.req` files (also in the VIA Server install directory).

VIA Update – Window OS

1. Properly shut down VIA as instructed in the VIA System Shutdown section.
2. Run `VIA Server Update.exe`. Follow prompts selecting the appropriate options. Be mindful of the VIA Server installation directory and storage folder location. When VIA Server update is complete, click “Done” to quit the installer.
3. Unzip the `VIAClientUpdate.zip` file if performing VIA Client auto update.
4. Copy the contents in the zip file to the “candidate” folder in the VIA Server installation directory (default = `C:\Program Files\Bionano\VIA Server\storage\resources\client_updates\candidate`). The contents in the `VIAClientUpdate.zip` include a `props` file, `readme.html`, and another zip file with version and build in the name (eg. `v7.0_16849.zip`)

5. Run **VIA Processing Update.exe**. Follow prompts selecting the appropriate options. Be mindful of the VIA Processing install directory. When VIA Processing update is complete, click “Done” to quit the installer.
6. Restart VIA Server and Processing
7. Log into VIA Client as “admin” username and follow instructions for VIA Client auto update.
8. After admin has updated the client, VIA will prompt all VIA Clients from other machines to update next time a user logs into the client.

VIA Update – Linux OS

1. Properly shut down VIA as instructed in the VIA System Shutdown section.
2. Run **VIA Server Update.bin**. Provide executable file permissions if necessary.

```
~]# ./VIA\ Server\ Update.bin
```

Be mindful of the VIA Server installation directory. If the VIA Server installation directory is different from default use “-DUSER_INSTALL_DIR=” command line parameter. For example,

```
~]# ./VIA\ Server\ Update.bin -DUSER_INSTALL_DIR="/home/Bionano/VIA\ Server"
```

3. Unzip the **VIAClientUpdate.zip** file if performing VIA Client auto update.
4. Copy the contents in the zip file to the “candidate” folder in the VIA Server installation directory (default = **root/Bionano/VIA Server/storage/resources/client_updates/candidate**). The contents in the **VIAClientUpdate.zip** include a **props** file, **readme.html**, and another zip file with version and build in the name (eg. **v7.0_16849.zip**)
5. Run **VIA Processing Update.bin**. Provide executable file permissions if necessary.

```
~]# ./VIA\ Processing\ Update.bin
```

Be mindful of the VIA Processing installation directory. If the VIA Processing installation directory is different from default use “-DUSER_INSTALL_DIR=” command line parameter. For example,

```
~]# ./VIA\ Processing\ Update.bin -DUSER_INSTALL_DIR="/home/VIA\ Processing"
```

6. Restart VIA Server and Processing
9. Log into VIA Client as “admin” username and follow instructions to update VIA Client.
10. After admin has updated the client, VIA will prompt all VIA Clients from other machines to update next time a user logs into the client.

VIA Client Auto Update

VIA has a built-in system that checks for and alerts the VIA administrator of available VIA Client updates. Upon logging into VIA Client, an alert is displayed when software updates are available. During VIA Server update, contents in the `VIAClientUpdate.zip` may be placed in the VIA Server which will prompt VIA administrator to initiate the update to VIA Client for all users. The VIA administrator must choose if and when to perform the update. The VIA Client does not automatically update – it requires the administrator to initiate the update.

If VIA Client auto update is not preferred, then installation for a new version of VIA Client can be done for each VIA Client. The new version of VIA Client may be installed over the previously installed VIA Client directory. Instructions for manual installation of VIA Client are outlined in VIA Client Installation section of this guide.

For VIA Client auto update, instructions are provided below for admin and all users to follow when prompted by logging into VIA Client. VIA administrator must initiate the update to VIA Client for all users.

1. When VIA admin or user logs into VIA Client, a notification to update for the new VIA Client version or build will appear. VIA administrator (using “admin” username) must first update VIA Client before all other users. Admin update will prompt auto update notifications to all other clients. Failure to initiate the VIA Client update by admin will result in other VIA Clients not receiving the notification to update.
2. On the update notification window, a list of updated features is displayed along with options for the user to select. If VIA Server has been updated to a newer version or build, selecting to not proceed with an update to VIA Client may result in error messages or the inability to log into VIA Client.
 - a. “Not now” – VIA Client will not update and will attempt to proceed with the user login with the current version of VIA Client. The update notification will appear again next time the user logs into VIA Client.
 - b. “Don’t remind me again” – VIA Client will not update and will attempt to proceed with the user login with the current version of VIA Client. The update notification will not appear again.
 - c. “Proceed” – VIA Client will proceed with the update.
3. After clicking “Proceed”, VIA Client update will be downloaded to the user’s computer. After download is complete, a prompt will show requesting the user restart the application to apply the updates. Close the window and restart VIA Client.
4. Once VIA Client is restarted, the updates are applied. Once the update is completed, click “OK” and restart VIA Client.
5. Finally, the VIA Client log in window should now appear. To check if the VIA Client was successful go to upper left corner of the window and click “Help” → “About”. The version and build for VIA Client will appear. If the update is confirmed, then log into VIA Client.

VIA Sample Importer Installation

The VIA Sample Importer is a command line utility that streamlines and automates sample loading and processing for VIA. It is required for uploading OGM samples from Access to VIA. For VIA software only installation, VIA Sample Importer is an optional component of VIA. The VIA Sample Importer can be installed on Windows, Mac, or Linux OS.

VIA Sample Importer Installation – Windows OS

1. Run VIA Sample Importer installer (**VIA Sample Importer.exe**) on the user machine.
2. Follow prompts selecting the appropriate options and clicking the “Next” button. Installation can take several minutes; a progress status is displayed along the left side of the installer window. Make sure to check the box for the License Agreement.
3. Specify the VIA Sample Importer installation directory if default is not preferred. Default install directory is **C:\Program Files\Bionano\VIASampleImporter**
4. Choose a shortcut folder. Several options are available to create a shortcut icon for VIA Client. If “On the Desktop” is selected, a VIA Sample Importer shortcut will be created on the user’s Windows desktop.
5. In the Pre-Installation Summary review the installation specification and when ready to proceed click “Install”. A progress bar will be displayed showing the installation status.
6. Once installation is complete, click “Done” to quit the installer.

VIA Sample Importer Installation – Mac OS

1. Run VIA Client installer (**VIA Sample Importer.app**) on the user machine.
2. Follow prompts selecting the appropriate options and clicking the “Next” button. Installation can take several minutes; a progress status is displayed along the left side of the installer window. Make sure to check the box for the License Agreement.
3. Choose an installation folder. The default folder is **/Applications/Bionano/VIASampleImporter Client**
4. Choose alias (shortcut) folder. Several options are available to create a shortcut icon for VIA Sample Importer. If “On the Desktop” is selected VIA Sample Importer shortcut will be created on the user’s Mac desktop.
5. In the Pre-Installation Summary review the installation specification and when ready to proceed click “Install”. A progress bar will be displayed showing the installation status.

6. Once installation is complete, click “Done” to quit the installer.

VIA Sample Importer Installation – Linux OS

1. Run VIA Client installer (**VIA Sample Importer.bin**) on the user machine. Provide executable file permissions if necessary.

```
~]# ./VIA\ Sample\ Importer.bin
```

If the installer is executed as root then the application will be installed as default in `/root/Bionano/VIA Sample Importer`. If the installer is executed as the user then `/Bionano/VIA Sample Importer` will be under user home.

To install it at a non-default location use "`-DUSER_INSTALL_DIR=`" command line parameter. For example:

```
~]# ./VIA\ Sample\ Importer.bin -DUSER_INSTALL_DIR="/home/VIA Sample Importer"
```

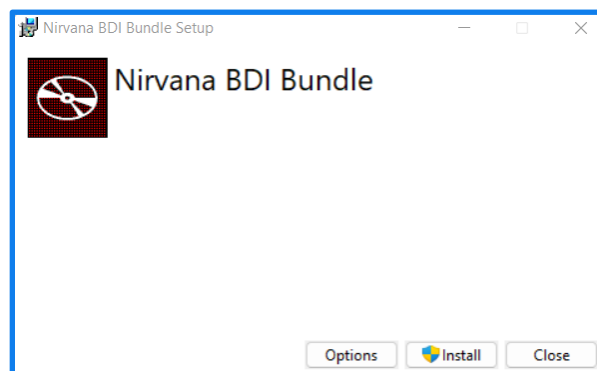
1. Once the installer completes the installation, VIA Sample Importer is ready for use.

Nirvana Installation

Nirvana is a sequence variant annotator installed on the same machine as VIA Processing. Installation of Nirvana application and annotation data provided by Bionano support is necessary for VIA to properly function with Nirvana. Other versions of Nirvana application not provided by Bionano is not supported in VIA.

Nirvana Installation – Windows OS

1. Run **NirvanaBundle.exe** installer file. The default installation folder is `C:\Program Files\NirvanaBDI`. To select a different install folder, click “Options”.



2. After the installer has finished installing Nirvana, click “Close”

3. Unzip data zip files for each genome build (e.g. GRCh37) into the “Data” folder in the Nirvana install directory (default = `C:\Program Files\NirvanaBDI\Data`).
4. Configure VIA Processing to route Sequence Variants to Nirvana.
 - a. Open `Windows-processing.config` file in VIA Processing installation folder
 - b. If different from default, edit the Nirvana install directory specified in the file.
 - c. Save the file as `processing.config`.
5. Restart VIA Processing. Only VIA Processing needs to be restarted, not VIA Server. Restarting VIA Processing will apply changes to the files in the installation directory.

Nirvana Installation – Linux OS

1. Install EPEL. Nirvana installer is an *.rpm file that depends on the following system dependencies: `ltnst`, `userspace-rcu`, and `libc`. Installing EPEL will install these system dependencies.

```
~]# yum install epel-release
```
2. Run `NirvanaBDI-*.rpm` installer file. The default installation folder is `opt/NirvanaBDI`. To install in a different directory, first symlink the default directory to the desired install directory and then run the installer.

```
~]# yum install NirvanaBDI-*.rpm
```
3. Unzip data zip files for each genome build (e.g. GRCh37) into the “Data” directory in the Nirvana install directory (default = `opt/NirvanaBDI/Data`).
4. Configure VIA Processing to route Sequence Variants to Nirvana.
 - a. Open `Linux-processing.config` file in VIA Processing installation directory
 - b. If different from default, edit the Nirvana install directory specified in the file.
 - c. Save the file as `processing.config`.
5. Restart VIA Processing. Only VIA Processing needs to be restarted, not VIA Server. Restarting VIA Processing will apply changes to the files in the installation directory.

Additional Installation Information

Alternate VIA Server Port

The default port is 8443 using secure communication (https) between VIA Server, VIA Processing Server and VIA Client. The default http port is 8081. If the preference is to use a port number different from the default, changes must be made to the `Internal.lax` file in the VIA Server and VIA Processing install directory.

Changes to the default port can be made after installation is complete, but before starting the VIA. If changes are made after VIA is started, then VIA will need to be restarted for changes to become effective.

Change port on VIA Server:

1. Go to VIA Server install directory
2. Open the `Internal.lax` file with a text editor.
3. Search for `lax.nl.java.option.additional` and add `-Djetty.port=8081` (replace 8081 with the port of choice). To change secure HTTP (https) add `-Dhttps.port=8443` (replace 8443 with the port of choice).
4. Save the `Internal.lax` file
5. Restart VIA Server

Change port on VIA Processing:

1. Go to VIA Processing installation directory
2. Open the `Internal.lax` file with a text editor.
3. Find the arguments line that begins with `lax.command.line.args`. After the VIA Server host name is the port number. For example, in the line below, the VIA hostname is "localhost" and port "8443" (https).

```
lax.command.line.args=localhost 8443 proclog
```

4. Change the port number in this line. The default connection between VIA Server and Processing is https. To use http instead of https, add "--http" immediately before the server hostname in the command line arguments line. The line below shows an example of VIA Server localhost with http port 8081.

```
lax.command.line.args=--http localhost 8443 proclog
```

5. Save the `Internal.lax` file
6. Restart VIA Processing

Change port in VIA Client

1. Launch VIA Client application.
2. Go to Repository (upper left corner) and select click on "Settings".
3. Change port to VIA Server and click "OK" to save.

Specifying Server Host

In some situations, the server host or IP address may need to be changed after initial installation. If the VIA Server host changes, then the new host name needs to be specified in VIA Processing and Client.

Change server host name in VIA Processing

1. Go to VIA Processing installation directory.
2. Open the `Internal.lax` file with a text editor.
3. Find the arguments line that begins with `lax.command.line.args`. After the VIA Server host name is the port number. For example, in the line below, the VIA hostname is "localhost" and port "8443" (https).

```
lax.command.line.args=localhost 8443 proclog
```

4. Change the server host name or IP address
5. Save the `Internal.lax` file
6. Start VIA Processing (or restart if VIA Processing is running)

Change server host name in VIA Client

1. Launch VIA Client application.
2. Go to Repository (upper left corner) and select click on "Settings".
3. Change VIA Server name or IP address in the "Host" field and click "OK" to save.

Alternate Storage Location

The storage folder is the directory where VIA database (samples, regions, and annotations, etc.) is saved. For optimal performance, the storage folder should be on the same machine as VIA Server. However, in some situations, the storage folder may need to be moved to an alternate location than the main server installation folder. For Windows OS, changing storage folder location can be done by editing the `Internal.lax` file in VIA Server installation directory. For Linux OS, it is better to create a symbolic link from the storage directory in the installation directory to the alternate location.

Change storage location in Windows OS

1. Go to VIA Server installation directory.
2. Open the `internal.lax` file with a text editor.
3. Find the line starting with `lax.nl.java.option.additional=` and add the option - `Dbd.nexus.storage.basePath` to the end of the line and add the folder path. See example below for an alternate storage folder called `altstorage` in D Drive:
Windows OS = `-Dbd.nexus.storage.basePath="D:\\mount\\VIA\\altstorage"`
4. Save the file and restart VIA Server.

Change storage location in Linux OS

1. Mount a drive. Use the `mount` command with flag `-t` for type device directory where type can be `ntfs`, `ext` or `fat`. USB devices are usually `vfat`. Example command to mount `ntfs`:
`mount -t ntfs /dev/sda1 /mnt/d`
2. Create a symbolic link to the storage directory on the mounted drive by running this command:
`ln -s /root/Bionano/VIA\ Server /mnt/d`

Adjusting RAM allocation

By default, during installation, VIA Server and VIA Processing are allocated 4g of RAM. VIA Client allocates half the available system RAM to the application. Depending on the types of samples processed by VIA, the amount of RAM allocated to each application may be adjusted. Below are instructions to change the RAM allocation.

1. Go to VIA Server or VIA Processing installation directory and open the `internal.lax` file with a text editor. For changes to VIA Client, go to the installation directory open the `VIA Client.lax` file.
2. Go to the line starting with `lax.nl.java.option.additional=` and find `-Xmx`.
3. Change the value to specify the RAM allocated followed by `g` to indicate gigabytes. Below is an example for 12 gigabytes of RAM:
`lax.nl.java.option.additional=-Xms512m -Xmx12g`
4. Save the file and restart the application.

Database Contents

The VIA system will be set up and maintained by the VIA admin to allow specific functions, user accounts, and access to specific features, etc. The admin also creates the Sample Types and regions files as well as the decision tree scripts for the logic used within the lab's review process. The installer comes with some "seed data" to be used by the admin to customize further to the individual lab's needs. Seed data includes data types and sample processing settings for the data types. It also includes several up-to-date tracks from ClinGen (prenatal, postnatal, and dosage sensitive map), OMIM, DECIPHER Syndromes, RefSeq, and more. Additional Sample Types and regions can be added; please refer to the VIA User Guide and/or contact Bionano Support.

Technical Assistance

For technical assistance, contact Bionano Genomics Technical Support.

You can retrieve documentation on Bionano products, SDS's, certificates of analysis, frequently asked questions, and other related documents from the Support website or by request through e-mail and telephone.

| TYPE | CONTACT |
|---------|--|
| Email | support@bionano.com |
| Phone | Hours of Operation: Monday through Friday, 9:00 a.m. to 5:00 p.m., PST US: +1 (858) 888-7663 |
| Website | www.bionano.com/support |
| Address | Bionano Genomics, Inc. 9540 Towne Centre Drive, Suite 100 San Diego, CA 92121 |