bionano™

Saphyr® Site Preparation Guide

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Revision History

REVISION	NOTES
K	Compute On Demand, Custom Server, SP Tissue, and Tumor Kit information added.
L	Updated ICS Controller specification, linked Saphyr Technical Note document.
M	Added section for Data Backup, removed proxy restriction, user materials and kit descriptions updated.
N	Updated backup section.
O	Removed old/no longer valid customer required consumables and equipment part numbers and updated with validated ones. Added SP-G2 and DLS-G2 customer required consumables, equipment numbers and training kit and protocol numbers.
P	Changes to better align with current Trademark statements. Changes to Tables on pages 10 and 11.
Q	Transferred to new template.
R	Updated to include Fresh BMA protocol & Saphyr Site Prep checklist document references. Updated Technical Support European contact numbers page 24. Minor grammatical corrections throughout.
S	Updated references of CentOS and SGE to RHEL 9 and SLURM.

Introduction

This document provides guidelines and specifications to prepare the user site for installation and operation of the Bionano Saphyr® System. Please closely review the information in this guide before preparing the user site.

Authorized Bionano personnel will assist users through the installation and sample preparation process.

The site preparation process has four stages, listed in **Table 1**:

Table 1. Site Preparation Process Stages

Preparation Stage	Description
Planning	• Hardware and software requirements • Network, file storage, and electrical requirements • Coordination of requirements between the research team, IT Operations, security groups, and any other governance parties • User-supplied materials and equipment
Preparing for Instrument Arrival	• Installation guidelines • Laboratory guidelines • Environmental considerations
Preparing for Installation and Training	• Site preparation checklists • Crate contents • Accessory and Qualification kits • Installation and training schedule
Post Installation Follow-Up	• Preparing for follow-up review

The roles and responsibilities listed in **Table 2** must be followed to ensure a successful installation.

Table 2. Installation Roles and Responsibilities

Role	Responsibility
Bionano Sales representative (RBM)	• Arrange shipment of instrument and consumables • Arrange shipment of training and qualification kits
Bionano Field Service Engineer (FSE)	• Coordinate installation date with the customer • Perform full installation and qualification of Saphyr System (Instrument, Access Server, compute solution)
Bionano Field Application Scientist (FAS)	• Function as customer point of contact • Coordinate training date with the customer • Train the customer in sample preparation, running the instrument, and reviewing data output
Customer	• Ensure that all requirements listed in this document are met • Provide all user-supplied materials listed in this document • Complete 30613 Saphyr System Installation, Delivery Form • Complete 30614 Saphyr System Installation, Laboratory Checklist
IT at Customer Site	• Rack and connect Saphyr Compute and Bionano Compute Servers, if purchased • Complete 30387 checklist with help from 30251 document • Configure firewall and infrastructure to receive Saphyr System • Provide static IP addresses as described in this document • Provide a switch as described in this document. • Provide an SSL certificate for the Bionano Access Server

Planning

The planning stage provides guidelines for configuration, network security, and file storage. These guidelines explain the required infrastructure for a successful implementation of the Saphyr system within the user's organization.

Successful planning requires comprehensive coordination between all relevant parties at the site, such as the research team, IT Operations, security groups, and any other governance parties. It is essential to involve compliance teams in the process as early as possible to ensure efficient installation.

Saphyr System Overview

Figure 1 illustrates system connectivity. The Saphyr Instrument captures images of labeled DNA molecules from the Saphyr Chip. The Instrument Controller (which controls the function of the Saphyr Instrument) converts the images into molecule data files (.bnx) and computes real-time throughput, molecule N50, and label density values. The .bnx files are transferred to the Bionano Access Server, where mapping metrics are calculated and displayed in the Instrument Control Software (ICS) and Bionano Access dashboards. Once the chip run is complete, the completed molecule data files are automatically imported into the Bionano Access web application (hosted at the Bionano Access Server). The molecule data files can then be used to perform various bioinformatics operations such as generating a *de novo* assembly, rare variant analysis, or targeted FSHD analysis. The Customer Switch isolates traffic for the Compute Servers which are designed to work together as a cluster to process bioinformatics jobs submitted from the Bionano Access web application. Bionano also offers cloud-based computing (Bionano Compute On Demand) which can be used in place of local compute servers or to augment local compute resources during computational peak periods. The Bionano Access web application monitors the progress of each computation job, captures the output, notifies the user of completion, and allows them to inspect the results in their browser on the Customer Workstation. Bionano Compute On Demand, a pay-per-use computing service, is accessible through the Bionano Access Server, for computation needs.
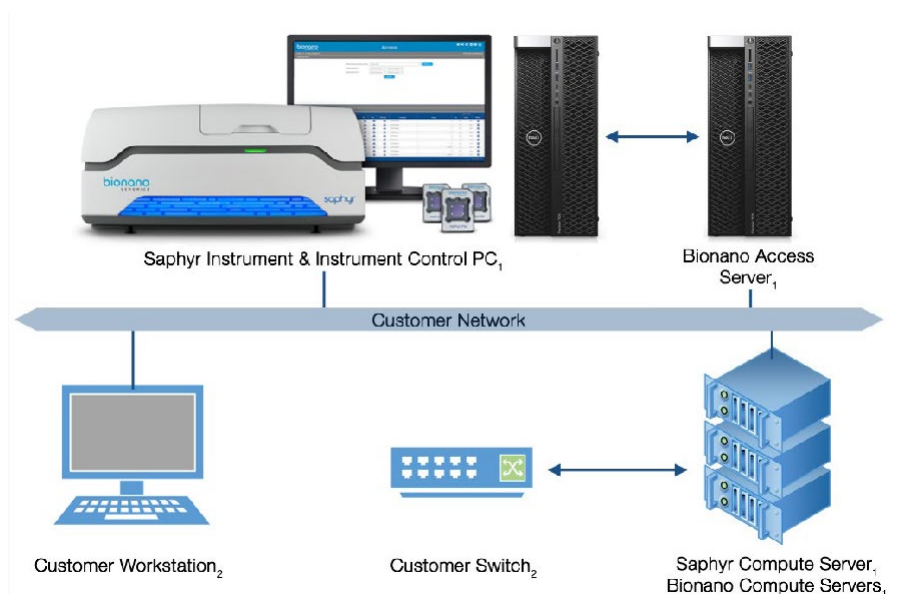

Figure 1. Saphyr System Connectivity Diagram

Bionano Purchase[1]
User Provided[2]

Hardware Requirements and Specifications

UNITERRUPTIBLE POWER SUPPLY

It is recommended that all Saphyr components (Instrument, Saphyr Instrument Controller, Monitor, Bionano Access and Compute Servers) be connected to a <u>user-supplied</u> uninterruptible power supply (UPS). This recommendation is for line conditioning and ensuring sufficient power supply. See **Table 3**.

SAPHYR INSTRUMENT

Table 3. Saphyr Requirements and Specifications

Type	Requirements/Specifications
Provided By	Bionano
Space	• Height: 38 cm (15 in) • Width: 86 cm (34 in) • Depth: 71 cm (28 in)
Power	• 100-240 VAC at 50-60 Hertz • Power Consumption ≤ 300 Watts • The Instrument is shipped with a United States power cord. Users outside of the United States are required to supply a 2m long, country specific IEC 60320-C13 power cord (in some cases, the FSE may be able to provide the suitable power cord)

SAPHYR INSTRUMENT CONTROLLER (INCLUDED WITH INSTRUMENT)

The Instrument Controller is designed to be located adjacent to the Saphyr Instrument (see **Table 4**). The two systems are directly tethered for controlling the instrument and direct data transfer of image files.

Table 4. Saphyr Instrument Controller Specification

Type	Requirements/Specifications
Provided By	Bionano
Accessories	• Monitor • Keyboard • Mouse
Operating System	• Windows 10 IoT Enterprise LTSC 2019 1809 x64
Software	• Saphyr Instrument Controller Software(ICS) • TeamViewer (remote assistance, optional) • Microsoft Edge (not user accessible, service only)
Memory	• 32 GB RAM

Type	Requirements/Specifications
Data Storage	• 8 TB in RAID 1 (D drive) • 256 GB (C drive)
Space	• Height: 46 cm (18 in) • Width: 18 cm (7 in) • Depth: 47 cm (18.5 in)
Power	• 100-240 VAC at 50-60 Hertz • Power Consumption ≤ 300 Watts
	• The Controller is shipped with a United States power cord. Users outside of the United States are required to supply a 2m long, country specific IEC 60320-C13 power cord (in some cases, the FSE may be able to provide the suitable power cord).
Network	• 2 – 1 gigabit ethernets ports • Port 1 (required): connected to the Bionano Access Server • Port 2 (recommended): connected to customer network to provide connectivity support tools as described in 30292

BIONANO ACCESS SERVER (INCLUDED WITH INSTRUMENT)

The webserver is designed to be located adjacent to the Saphyr Instrument Controller (see **Table 5**).
The two systems are directly tethered for direct data transfer.

Table 5. Bionano Access Server Specifications

Type	Requirements/Specifications
Provided By	Bionano
Software	• RHEL 9 • Bionano Access • Bionano Solve • VIA • PostgresSQL • Java • Nodejs • Perl • Python • R • Singularity
Memory	• 128 GB RAM
Data Storage	• 40 TB with RAID Controller (4x 16TB RAID 5)

Type	Requirements/Specifications
Space	• Height: 46 cm (18 in) • Width: 18 cm (7 in) • Depth: 47 cm (18.5 in)
Power	• 100-240 VAC at 50-60 Hertz • Power Consumption ≤ 300 Watts • The server is shipped with a United States power cord. Users outside of the United States are required to supply a 2m long, country specific IEC 60320-C13 power cord (in some cases, the FSE may be able to provide the suitable power cord).
Network	• One port is connected to the Saphyr Instrument controller at 1Gbps • LAN connection can be done at 1 or 10Gbps

OVERVIEW OF COMPUTE OPTIONS

Bionano offers multiple solutions for processing Bioinformatics jobs including Compute Servers and Bionano Compute On Demand. Choose either option or a combination for user computing needs.

Compute Servers

SAPHYR COMPUTE SERVER (OPTIONAL PURCHASE)

The number of compute servers required for installation will be determined based on user compute requirements and environmental conditions (see **Table 6**). The compute servers work together as a cluster to perform various bioinformatic operations including *de novo* assembly, variant annotation, and scaffolding. Each compute cluster must have at least one Saphyr Compute which serves as the head node with storage and the SLURM master installed. Additional Bionano Computes are added to scale the cluster to fit specific user demands. A single Bionano Access Server can be configured to interact with multiple compute clusters if required.

Table 6. Compute Server

Type	Requirements/Specifications
Provided By	Bionano (additional purchase)
Software	• RHEL 9 • Bionano Solve • Python • Perl • R • SLURM • Singularity
Space	• 2U rackmount server (to be provided by customer) • Rails provided with the servers

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Type	Requirements/Specifications
Power	• Dual 2600 W Hot-plug Redundant Power Supplies (Customer supplied UPS is recommended) • Standard PDU 2 6' IEC320-C19/C20 250V power cables are provided
Network	4x to 5x 1 or 10Gbps Ethernet connection (Review 30251 for cabling options)

BIONANO COMPUTE SERVERS (OPTIONAL PURCHASE)

Table 7 lists recommended configurations including, at least, one Bionano Compute Server. At least one Saphyr Compute Server must be added before adding any Bionano Compute systems. **Table 8** describes switch requirements.

Table 7. Compute Servers

Type	Requirements/Specifications
Provided By	Bionano (additional purchase)
Software	• RHEL 9 • Bionano Solve • Python • Perl • R • SLURM • Singularity
Space	• 2U rackmount server (to be provided by customer) • Rails provided with the servers
Power	• Dual 2600 W Hot-plug Redundant Power Supplies (Customer supplied UPS is recommended) • Standard PDU 2 6' IEC320-C19/C20 250V power cables are provided
Network	4x 1 or 10Gbps Ethernet connection (Review 30251 for cabling options)

SWITCH (CUSTOMER PROVIDED)

Table 8. Switch

Type	Requirements/Specifications
Provided By	Customer
Hardware	• 24-port GB, Layer 2+ Switch • Rack-mountable • NETGEAR switch is recommended

BIONANO COMPUTE ON DEMAND (ADDITIONAL PURCHASE)

A pay-per-use solution (tokens) is accessible through Bionano Access. It can be used to perform *de novo* assembly, variant annotation, hybrid scaffolding, and other bioinformatics pipeline functions independent of the Compute Servers.

Refer to the *Bionano Access Software User Guide* (CG-30142) for additional information about configuring Compute On Demand, *Data Security Guidelines* (CG-30292) for data security consideration and Terms and Conditions, and *Bionano Compute On Demand Release Notes* (RNOTE-00006).

Network Requirements

The components in the Saphyr system require network connectivity to communicate with each other. Poor network reliability or throughput can affect the performance of the Saphyr system.

Bionano Access and VIA are installed on the Bionano Access Server and are accessible from workstations connected to the same network. Users can perform various activities, such as generating experiments, monitoring instruments, run status, and performing and sharing analyses (when properly configured with Bionano computation servers). This can be done by logging in to Bionano Access via a web browser (recommended web browser is Chrome). VIA can be logged into through the installed desktop application. **NOTE:** VIA Client should be installed on a user's workstation prior to analysis training (refer to the "VIA Client Installation" section of the *Bionano VIA Installation Guide* (CG-00044).

The Bionano Access Server has a tethered connection to the Saphyr Instrument Controller. Please refer to the *Saphyr Networking and Setup Guide* (CG-30251) and *Data Security Guidelines* (CG-30292) for more details.

BACKUP REQUIREMENTS

The Saphyr solution does not come with backup capabilities. Typically, customers already have enterprise level backup solutions so it would be redundant. Customers should determine their backup needs and arrange to back up the Bionano Access Server on a regular basis. The Bionano Access Server is the only system that has long term storage for data generated from Saphyr system. The Bionano Access Server has approximately 40TB of storage total and could see daily file growth up to 60GB per day depending on chip runs and analysis performed.

FILE STORAGE RECOMMENDATIONS

The Bionano Access Server will store result files such as molecule data files (BNX) and *de novo* assemblies. This data will continue to grow over time. The Bionano Access Server has been configured to have sufficient file storage for several years. We highly recommend that all content in the Access Installation folder is backed up on a regular basis. Depending on system utilization users may need to transition to an enterprise storage solution if the capacity of the Bionano Access Server is exceeded. Alternatively, users can export and archive unused projects periodically. See the *Bionano Access User Guide* (CG-30142) for details.

User-Supplied Materials

Table 9 and **Table 10** list user-supplied materials required for all types of sample preparation training. Additional, protocol-specific materials are referred to on subsequent pages. Confirm with the FAS when all the corresponding consumables and equipment is available before scheduling training.

USER-SUPPLIED EQUIPMENT

Table 9. User-Supplied Equipment

Equipment	Supplier	Catalog #
HulaMixer Sample Mixer	Thermo Fisher	15920D
Qubit Fluorometer	Thermo Fisher	Q33216 or similar
Microcentrifuge, refrigerated	General lab supplier	
Pipettes (2, 10, 20, 200, and 1000 µl) Note: light touch pipettes are not compatible	General lab supplier	
Ice bucket and ice	General lab supplier	
Mini Benchtop Microcentrifuge (2,200 x g spin)	Cole-Parmer or equivalent	EW-17701-11
Vortexer	VWR or equivalent	10153-838
Thermal Cycler with Heated Lid (10 °C above block temp.)	General lab supplier	
4 °C refrigerator and -20 °C freezer	General lab supplier	
-20 °C Enzyme Block	General lab Supplier	
4 °C Aluminum Cooling Block for tubes (optional)	Sigma Aldrich	Z740270 or similar
Forceps, pointed and curved	Electronic Microscopy Sciences or equivalent	78141-01
Positive-displacement pipette MR-10 (recommended) **	Rainin	17008575 or similar
Pipet tips, 10 µl, C-10 for pos. displacement (recommended)**	Rainin or equivalent	17008604 or similar
Bath Sonicator (optional)	General lab supplier	
Vari-Mix Test Tube Rocker (Blood & BMA workflows only)	VWR or equivalent	10159-754
Dynamag-2 Magnetic Tube Rack*	Thermo Fisher	12321D
HemoCue WBC Analyzer* (Blood & BMA workflows only)	Fisher Scientific (for US) Distributor (outside US)	22-601-017
HemoCue Microcuvettes* (Blood & BMA workflows only)	Fisher Scientific	22-601-018
-80 °C freezer	General lab supplier	
Water Bath, 37°C (Frozen blood & BMA workflows only)	General lab supplier	
Eppendorf ThermoMixer® C & Eppendorf SmartBlock™ 1.5 mL, Thermoblock set to 55°C (Or 55°C heat block for 1.5ml tubes or water bath as alternatives)	Eppendorf or Equivalent	5382000023, 5360000038
Cryopreservation Box (for 1.5 ml microcentrifuge tubes)	General Lab Supplier	

*(Items in blue) Bionano strongly encourages not substituting this equipment and getting the exact item recommended, as using these will give the most successful outcome from the workflow.

**A positive displacement pipet is a special pipet with a plunger that operates a built-in piston in special tips that go with the pipet. Such a pipet and tips are highly effective in accurately pipetting and dispensing small volumes of viscous liquids, and therefore are highly recommended to be used while aliquoting Ultra High Molecular Weight gDNA isolated using Bionano's protocols.

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USER-SUPPLIED CONSUMABLES

Table 10. User-Supplied Consumables

Consumable	Supplier	Catalog #
PCR tubes, thin-walled, flat cap, DNase-free, 0.2 ml	Thermo Fisher	AM12225 or similar
Qubit Broad Range (BR) dsDNA Assay Kit	Thermo Fisher	Q32853
Qubit High Sensitivity (HS) dsDNA Kit (recommended)	Thermo Fisher	Q32851
Qubit Assay Tubes	Thermo Fisher or Axygen	Q32856 or 10011-830
UltraPure nuclease-free water	Thermo Fisher	10977015
Microcentrifugetubes, 0.5ml, amber, nuclease-free	USA Scientific	1605-0007
Microcentrifuge tubes, 1.5 ml	VWR	87003-294
Microcentrifuge Tubes, 2.0 ml, Nuclease Free	Fisher Scientific or Equivalent	05-408-138
Microcentrifuge Tube, 5.0 ml, Nuclease Free	Thomas Scientific or Equivalent	1201T80
Pipette tips, aerosol-resistant 2, 10, 20, 200, and 1000 µl	General lab supplier	
Pipette tips, wide bore, filtered, 200 ul	USA Scientific equivalent	1011-8810
Pipette tips, unfiltered, 200 ul	USA Scientific or equivalent	1111-1810
Pipette tips, 10 µl, C-10 for pos. displacement (recommended)	Rainin	17008604
Extra Long 1000 ul Tips, Sterile	VWR or equivalent	76322-154
Conical Centrifuge Tubes, 50 mL, PP	Fisher Scientific	14-432-22
Conical Centrifuge Tubes, 15 ml, PP	Fisher Scientific	05-539-12
Ethanol, 200 Proof, Molecular Biology Grade	Sigma-Aldrich	E7023
Disinfectant Concentrate, TexQ TX651**	Texwipe	TX651
Bleach for Disposal of Blood/Cell Media	General Lab Supplier	
Isopropanol (IPA), ≥ 99.5%, Molecular Biology Grade	Fisher Scientific	A461-212 (new P/N 327270010)
Parafilm	General Lab Supplier	
Sterile 5- and 10-ml Disposable Pipettes (TD+)	General Lab Supplier	
Phenylmethylsulphonyl Fluoride Solution (PMSF), 100 mM (Non-SP-G2 workflows only)	Sigma-Aldrich	93482
Proteinase K Enzyme, Puregene (Non DLS-G2 workflows only)	Qiagen	158918

*Bionano strongly encourages not substituting this equipment and getting the exact item recommended, as using these will give the most successful outcome from the workflow.

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ADDITIONAL USER-SUPPLIED MATERIALS FOR DNA ISOLATION

Table 11 provides reference protocols that list materials required for extracting DNA from varying sources. The FAS will highlight the required materials depending on sample type and protocol choice. Ensure that the appropriate materials are available on training day. In the User Training Kit (see details in Preparing for Installation and Training), Bionano provides 1 DNA Isolation Kit, per customers' request.

Table 11. User-Supplied Materials for DNA Isolation

Sample Type	Protocol
Human Cell Culture	Generation 2 *Bionano Prep SP-G2 Fresh Cell DNA Isolation Protocol* (P/N CG-00003) *Bionano Prep SP-G2 Frozen Cell DNA Isolation Protocol* (P/N CG-00004) *Saphyr Site Preparation: User Supplied Material Checklist for SP-G2 DNA Isolation Protocols and DLS-G2 Labeling Protocol* (CG-00050) Generation 1 *Bionano Prep SP Fresh Cell DNA Isolation Protocol v2* (P/N 30396) *Bionano Prep SP Frozen Cell Pellet DNA Isolation Protocol v2* (P/N 30398)
Human Blood	Generation 2 *Bionano Prep SP-G2 Fresh Human Blood DNA Isolation Protocol* (P/N CG-00005) *Bionano Prep SP-G2 Frozen Human Blood DNA Isolation Protocol* (P/N CG-00006) *Saphyr Site Preparation: User Supplied Material Checklist for SP-G2 DNA Isolation Protocols and DLS-G2 Labeling Protocols* (CG-00050) Generation 1 *Bionano Prep SP Fresh Human Blood DNA Isolation Protocol v2* (P/N 30258) *Bionano Prep SP Frozen Human Blood DNA Isolation Protocol v2* (P/N 30246)
Bone Marrow Aspirates	Generation 2 *Bionano Prep SP-G2 Frozen BMA DNA Isolation Protocol* (CG-00007) *Bionano Prep SP-G2 Fresh BMA DNA Isolation Protocol* (CG-00062) *Saphyr Site Preparation: User Supplied Material Checklist for SP-G2 DNA Isolation Protocols and DLS-G2 Labeling Protocols* (CG-00050) Generation 1 *Bionano Prep SP BMA DNA Isolation Protocol v2* (P/N 30399)
Animal Tissue	Generation 1 *Bionano Prep SP Tissue and Tumor DNA Isolation Protocol* (P/N 30339) *Saphyr Site Preparation: User Supplied Material Checklist for SP Tissue and Tumor DNA Isolation Protocols* (CG-00051)
Plant Tissue	Generation 1 *Bionano Prep Plant Tissue DNA Isolation Base Protocol* (P/N 30068) *Bionano Prep Plant Tissue DNA Isolation High Polysaccharide Protocol* (P/N 30128) *Bionano Prep Plant Tissue DNA Isolation High Polyphenol Protocol* (P/N 30133) *Bionano Prep Plant Tissue DNA Isolation Liquid Nitrogen Grinding Protocol* (P/N 30177) *Saphyr Site Preparation: User Supplied Material Checklist for Plant DNA Isolation Protocols* (CG-00052)

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ADDITIONAL USER-SUPPLIED MATERIALS FOR DNA LABELING

Table 12 provides protocols that list materials required for labeling genomic DNA. The FAS will highlight the required materials depending on labeling type. Ensure that the appropriate materials are available on training day. In the User Training Kit (see details in Preparing for Installation and Training), Bionano provides 1 DNA Labeling Kit, per customers' request.

Table 12. Additional User-Supplied Materials for DNA Labeling

Labeling Method	Protocol
Direct Label and Stain (DLS)	Generation 2 *Bionano Prep Direct Label and Stain G2 (DLS-G2)* (CG 30553-1) *Saphyr Site Preparation: User Supplied Material Checklist for SP-G2 DNA Isolation Protocols and DLS-G2 Labeling Protocols* (CG-00050) Generation 1 *Bionano Prep Direct Label and Stain (DLS)* (P/N 30206)

Preparing for Arrival

Installation Guidelines

An authorized service provider delivers the system. Make sure that the crate is stored securely near the installation lab bench. The instrument has two tip-tilt indicators mounted to the outside of the crate as well as one impact-shock indicator (see **Figure 2**). Please inspect the exterior of the crate for damage and inform the Field Service Engineer (FSE) if either one of the two tip-tilt sensors, or the shock-impact sensors have been triggered.

Figure 2. (from left to right) shock-impact sensors (un-triggered and triggered) and tip-tilt sensors (un-triggered and triggered)

⚠️ **CAUTION:** Only a Bionano FSE (or personnel approved by Bionano) can uncrate and install the instrument.

- At least three weeks before installation, confirm with the FAS that the required consumables and equipment are on hand.
- Ensure that the lab space and bench are ready for installation.
- Ensure that a pallet jack to support the crate and instrument is available.
- Ensure there are at least three people to assist the FSE with lifting the Saphyr instrument.

- Install the Saphyr Compute Server and Bionano Compute Server(s) in the data center. Ensure that IP addresses and all network requirements have been met as described in the "Network Requirements" section above.

Dimensions

Table 13 lists dimensions for the instrument and the crates.

Table 13. Dimensions

Measurement	Instrument	Crates
Height	38 cm (15 in)	152 cm (60 in) Total [~81 cm (32 in) for Top accessory crate + ~74 cm (29 in) for Instrument crate]
Width	86 cm (34 in)	109 cm (43 in) for Top accessory crate and Instrument crate
Depth	71 cm (28 in)	81 cm (32 in) [~74 cm (29 in) for Top accessory crate, ~81 cm (32 in) for Instrument crate]
Weight	103 kg (227 lb.)	254 kg (560 lbs.) [Top accessory crate including controller, monitor, server, and accessory kit + Instrument crate including instrument]

Laboratory Guidelines

- Prepare a clean, level surface such as a sturdy lab bench for the instrument.
- Keep the instrument away from direct sunlight or heat source.
- Do not place the instrument on a lab bench that has liquids or chemicals.
- Do not place any other equipment on the bench that could produce vibrations, including centrifuges, compressors, and shakers.
- Do not place the instrument on or near objects that can produce vibrations, such as heavy doors.
- Do not place objects on top of the instrument.

Lab Bench Layout

Table 14 is helpful for determining the correct position of the instrument to allow proper ventilation and access to the power switch and power outlet.

Table 14. Lab Bench Layout

Access	Minimum Clearance
Lab Bench Space	Allow at least 160cm (63in) width by 77cm (30in) depth.
Top	Allow at least 93cm (37in) above the instrument.
Back	Allow at least 5cm (2in) behind the instrument.
Sides	Allow at least 15cm (6in) on each side of the instrument.
Connections	• 4 standard electrical outlets (100~240VAC) • 2 – 1 gigabit ethernets ports

CAUTION: Moving the instrument can compromise data integrity.

- Insufficient overhead clearance can damage the stage access door and affect run performance.
- The Saphyr Instrument Controller must be placed within 1m (3ft) of the instrument.

Environmental Considerations

Table 15 lists recommendations for optimum environmental situations. This instrument is designed for indoor use only.

Table 15. Environmental Considerations

Element	Specification
Temperature	Maintain a lab temperature stable and between 19°C (66°F) to 25°C (77°F).
Humidity	Maintain a noncondensing relative humidity between 20–80%.
Elevation	Place the instrument at an altitude below 2,000 m (6,500 ft) above sea level.
Ventilation	At least 5 cm (2 in) of clearance behind the instrument to allow proper ventilation and access to power outlet. Overhead clearance required for installation and service is 93 cm (37 inch).
Air Quality	Operate the instrument in a Pollution Degree II environment or better as defined by the International Electrotechnical Commission (IEC).

Preparing for Installation and Training

Site Preparation Checklists

- Ensure that the facility is ready for delivery of the crate. See crate contents listed in **Table 16, Table 17**, and **Table 18.**
- Ensure that all appropriate equipment to support the crate and instrument (e.g., pallet jack) is available.
- Ensure that all required personnel are present on the scheduled installation day (at least three people).
- Ensure that the contents in the Qualification Kit and Accessory Kit have been received and properly stored.

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NOTE: The Accessory Kit is included in the crate.

- Verify that the site has proper computing, network, file storage, and electrical requirements.

Crate Contents

Table 16. Crate Contents

Item	Content	Storage Temperature
Instrument	1 each	15–25 °C (59–77 °F)
Monitor	1 each	15–25 °C (59–77 °F)
Keyboard	1 each	15–25 °C (59–77 °F)
Mouse	1 each	15–25 °C (59–77 °F)
Instrument Controller	1 each	15–25 °C (59–77 °F)
Bionano Access Server	1 each	15–25 °C (59–77 °F)
Accessory Kit	1 each	15–25 °C (59–77 °F)

The FSE will unpack the crate during the installation visit. Compute Servers will ship in additional palletized crate(s) (Storage Temperature: 15–25 °C (59–77 °F)).

Accessory Kit Generation 1 (P/N 80035)

Table 17. Accessory Kit Generation 1 (P/N 80035)

Item	Content	Storage Temperature
US-Specific Power Cord	4 each	15–25 °C (59–77 °F)
Saphyr Chip Clip G2.3	2 clips	15–25 °C (59–77 °F)
Display Port Cable	2 each	15–25 °C (59–77 °F)
Network Cable (Cat7)	4 each	15–25 °C (59–77 °F)
USB 2.0 A to B Connector	1 each	15–25 °C (59–77 °F)
Air Filter	3 each	15–25 °C (59–77 °F)
Lens Cleaning Paper	2 each	15–25 °C (59–77 °F)
Mousepad	1 each	15–25 °C (59–77 °F)

Accessory Kit, Generation 2 (P/N 80065)

Table 18. Accessory Kit, Generation 2 (P/N 80065)

Item	Content	Storage Temperature
US-Specific Power Cord	4 each	15–25 °C (59–77 °F)
Saphyr Chip Clip G3.3	2 clips	15–25 °C (59–77 °F)
Display Port Cable	2 each	15–25 °C (59–77 °F)
Network Cable (Cat7)	4 each	15–25 °C (59–77 °F)
USB 2.0 A to B Connector	1 each	15–25 °C (59–77 °F)
Air Filter	3 each	15–25 °C (59–77 °F)
Lens Cleaning Paper	2 each	15–25 °C (59–77 °F)
Mousepad	1 each	15–25 °C (59–77 °F)

Qualification Kit Generation 1 (P/N 90034)

The Saphyr System Qualification Kit (see **Table 19** and **Table 20**) will be shipped around the same time as the Saphyr system unless its shipment is otherwise specified and coordinated by the FSE.

Table 19. Qualification Kit Generation 1 (P/N 90034)

Item	P/N	Content	Storage
Saphyr Chip® G2.3	20366	3 each	4 °C
DLS Biological Control A, 100 µl	20400	2 each	4 °C
SP Large Genome Labeling Control. 5000 ng[+]	20399	1 each	4 °C

[+] This control will be used for training.

Qualification Kit Generation 2 (P/N #90144)

The Saphyr System Qualification Kit will be shipped around the same time as the Saphyr system unless its shipment is otherwise specified and coordinated by the FSE.

Table 20. Qualification Kit Generation 2 (P/N 90144)

Item	P/N	Content	Storage
Saphyr Chip® G3.3	20440	3 each	4 °C
DLS Biological Control A, 100µl	20400	2 each	4 °C

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SP Large Genome Labeling Control. 5000 ng[+]	20399	1 each	4 °C

[+] This control will be used for training.

User Training Kits (P/N 90102, 90149, 90111, 90150, 90127, or 90017)

The FAS will coordinate the Saphyr System User Training Kit to arrive approximately one to three weeks before training begins. It will contain a combination of 1) a DNA Labeling Kit, 2) a DNA Isolation Kit (Saphyr Chips and Control will be provided with the Qualification Kit, and 3) 25 tokens (to demo Compute On Demand usage). Coordinate with the FAS to send the proper Labeling Kit and Isolation Kit combination as listed by referencing <u>one</u> of the part numbers below for delivery:

- P/N 90102: DLS Labeling + SP Blood and Cell DNA Isolation v2 + Bionano Prep SP Magnetic Retriever
- P/N 90149: DLS-G2 Labeling + SP-G2 Blood and Cell DNA Isolation + Bionano Prep SP Magnetic Retriever
- P/N 90111: DLS Labeling + SP Bone Marrow Aspirate DNA Isolation v2 + Bionano Prep SP Magnetic Retriever
- P/N 90150: DLS-G2 Labeling + SP-G2 Bone Marrow Aspirate DNA Isolation + Bionano Prep SP Magnetic Retriever
- P/N 90127: DLS Labeling + SP Tumor and Tissue DNA Isolation + Bionano Prep SP Magnetic Retriever
- P/N 90017: DLS Labeling + Plant Tissue DNA Isolation

Labeling Kits Training

Table 21 indicates the contents to be expected in the available labeling kits.

Table 21. Labeling Kits

Labeling Training Kit	P/N	Content	# of Boxes	Storage
Bionano Prep DLS Labeling Kit	80005	1 each (10 rxn)	3	-20°C, 4°C, 15-30°C
Bionano Prep DLS-G2 Labeling Kit	80046	1 each (12 rxn)	3	-20°C, 4°C, 15-30°C

DNA ISOLATION TRAINING KIT: SP BLOOD AND CELL, SP BMA, SP TISSUE AND TUMOR <u>OR</u> PLANT TISSUE

NOTE: Choose <u>one</u> of the DNA isolation kits in **Table 22** to be used during training.

Table 22. Isolation Kits

DNA Isolation Training Kits	P/N	Content	# of Boxes	Storage
SP Blood & Cell Culture DNA Isolation Kit v2	80042	1 each (10 rxn)	2	4°C, 15-30°C
SP-G2 Blood & Cell Culture DNA Isolation Kit	80060	1 each (12 rxn)	2	4°C, 15-30°C
SP Tissue and Tumor DNA Isolation Kit	80038	1 each (10 rxn)	1	15-30°C
SP Bone Marrow Aspirate (BMA) DNA Isolation Kit v2	90103	1 each (10 rxn)	3	4°C, 15-30°C
SP-G2 Bone Marrow Aspirate (BMA) DNA Isolation Kit	90151	1 each (12 rxn)	3	4°C, 15-30°C
Plant Tissue DNA Isolation Kit	80003	1 each (5 rxn)	2	4°C, 15-30°C

25 Tokens for Bionano Compute On Demand Customers

25 tokens are provided for Bionano Compute On Demand solutions customers, to allow system qualification and customer training.

Post-Installation Follow Up and Resources

After training has been completed, a follow-up review meeting with the FAS will be scheduled. The review meeting is usually in the format of a conference call. For the review, prepare to provide the following:

- Data produced from the first run without the FAS on site.
- List of customization requests for the instrument and software.
- List of questions, concerns, and issues, such as level of comfort, comprehension, and confidence in using the Saphyr system.

Additional Resources

Documentation listed in **Table 23** is available for download from the Bionano Support page and **Table 24** provides a glossary of terms.

Table 23. Additional Resources

Resource	Description
Saphyr System Safety Guide (CG-30253)	Provides information about the instrument safety considerations.
Saphyr System User Guide (CG-30247)	Provides an overview of instrument components and software, proper maintenance, and troubleshooting.
Bionano Access Software Guide (CG-30142)	Provides an overview of data analysis.

Resource	Description
Data Security Guidelines (CG-30292)	Provides security guidelines for Compute On Demand usage.
Saphyr Networking and Setup Guide (CG-30251)	Provides detailed IT guide for installing the Saphyr System.

Glossary

Table 24. Glossary

Term	Definition
CIFS	Common Internet File System
FAS	Field Application Scientist
FSE	Field Service Engineer
GB	Gigabyte
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
IEC	International Electrotechnical Commission
OS	Operating system
RBM	Regional Business Manager
SLURM	Simple Linux Utility for Resource Management
SSD	Solid-state drive
SFTP	Secure File Transfer Protocol
SMTP	Simple Mail Transfer Protocol
SSH	Secure Shell
TB	Terabyte

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Technical Assistance

For technical assistance, contact Bionano 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 Monday through Friday, 9:00 a.m. to 5:00 p.m., CET UK: +44 115 654 8660 France: +33 5 37 10 00 77 Belgium: +32 10 39 71 00
Website	www.bionano.com/support
Address	Bionano, Inc. 9540 Towne Centre Drive, Suite 100 San Diego, CA 92121

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