

Facilities/Infrastructure

The system must meet CBEMA and ITIC power quality standards. Three phase 480V 4-wire connections are preferred for all compute racks. Three phase 208V 4-wire connections are also allowable and is preferred for racks requiring dual sourced power (storage/administrative racks).

Description of the proposed wiring connections for all racks must identified. The system's power configuration must allow the login, administration, networking, and storage infrastructure to be supported by dual, redundant facility power feeds (*in order for this infrastructure to remain available when one source of power is offline*).

The architectural design must allow the system to remain in production even if one or more of the compute racks are powered down; in the event that all compute racks are powered down, the file systems and login nodes must remain available to users.

The system's design must allow individual compute racks to be powered down without impacting the availability of system components in other racks.

At least 95% of the heat generated by the system must be removed by liquid-cooling. The percentage of heat removal must be determined by dividing the LINPACK liquid cooling tons by the LINPACK total cooling tons. A chilled water cooling plant will provide 500 Tons of 60 degree F water to provider CDU and/or rear door assemblies.

All trays necessary to neatly organize the system's cables must be provided.

The system must be configured to properly integrate with the site facilities described in this document.

The system must be delivered to and installed in:

Bldg 3511, 6391 Rodman Road

Aberdeen Proving Ground, MD 21005

Summary for Building B3511 Computer Room 2(A2I2:CR2) TI-26 Base 1

- Available Space for TI-26 2730 sq. ft.
- Subfloor Clearance 30"
- Design load per floor tile 2500 psi
- Uniform Load 675 lbs/sq. ft.
- Ceiling Height 10'
- Door Height 9'
- Available Power 2.0 MW

- UPS/Generator Backup Available? Yes (Generator and UPS)
- Available Cooling Capacity for TI-26 500 tons (60 degree F water)
- Generator Backup for Cooling Available Yes (Generator and UPS)
- Under floor cooling and humidity control provided by in room CRAC units

Floor Space

2,730 sq. ft. of computer room floor space in A2I2 Computer Room2 will be set aside for TI-26 base 1. The reserved space for Base 1 is on the first floor of A2I2 and accessed via a loading dock. The floor structure is designed to 2,500 psi/per tile with an assumed footprint of 2' x 4' up to 5' x 8' racks (larger racks could be accommodated if needed). Racks should spread weight evenly across multiple load points on the floor grid. Floor tiles are 2' x 2' in size. Subfloor plenum is used for supplying conditioned air, chilled water, and power. All networking and system interconnect cabling shall be installed above the raised floor. Any floor alterations/bracing needed to support heavier racks must be included in vendor proposal. Access to the raised floor from the loading dock is achieved via building entrance and room entrance which both have 9' double doors.

Cooling

Approximately 500 tons of chilled water cooling capacity is available for TI-26 base 1 at a supply temperature of approximately 60 degrees F (+/- 3 Degree Difference). The ambient air temperature for the computer room is designed to be 72 +/- 5 DEG F with 45-55% Relative Humidity (47-58 DEG F DEW POINT) which is controlled by a building air handler. ARL will provide an additional 40 tons of cooling through the floor plenum using two 20-TON CRAC's if required.

Power/Electrical

A total of 2.0 MW of conditioned power with UPS and generator backup will be available for TI-26 Base System 1. Four (4) 1200-Amp 480VAC Panelboards for single source compute cabinets are available. Additionally, four (4) 250-Amp Power Distribution Units (PDU) provide dual-sourced power to 208 VAC 3-phase loads (Two PDU's per Power Source).

- 208 VAC PDUs are 3PH, 4-wire + ground secondary (5 Wire)
- 480 VAC Panelboards are 277/480V with a neutral and ground (5 Wire)

The Compute nodes will also be supported by UPS and generator but should be housed in racks supporting 480v 3-phase power. There is a single source of power for these racks. There are Four (4) 1200-Amp 480v 3-phase power panel units (PPU) available for the computing capacity for the proposed machine. Breakers for these racks will be in the PPUs attached to the wall in the designated space.

The vendor 208 VAC PDU loads should be designed with dual source power to maintain storage, networks, management nodes, and other critical loads for the proposed machine.

Networking Infrastructure

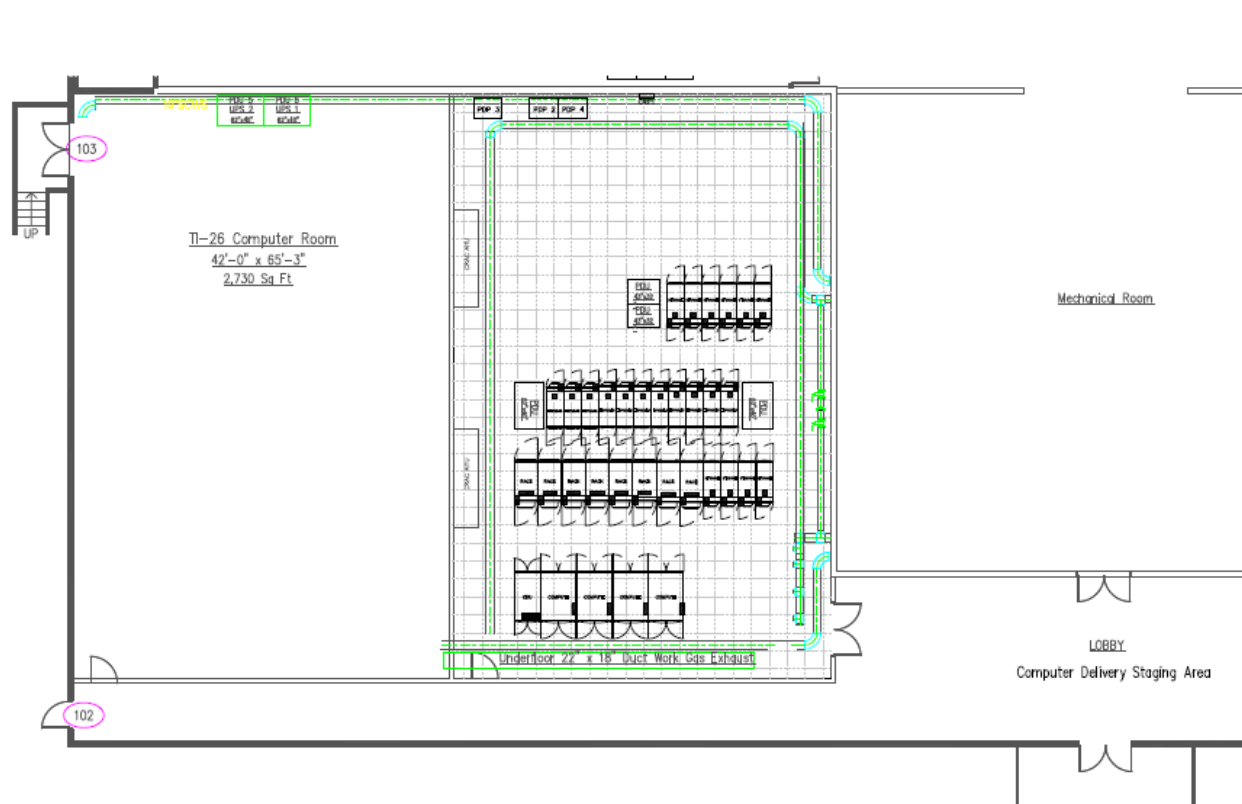
The ARL DSRC's network infrastructure consists of:

- A 40/100 Gb/s local area network (LAN) and
- A 100Gb/s wide area network (WAN)

These networks provide connection to the Defense Research and Engineering Network(DREN). Cisco and Arista devices are utilized in the network core. The ARL DSRC also operates a 10/40 Gb/s private storage network which supports the CWFS and EDF. This network utilizes an Arista Networks switch infrastructure. Nodes that will mount the CWFS will require a 10/40 Gigabit Ethernet connection to the storage network. This connection will be in addition to any Ethernet connections to the public network and will only be utilized for accessing the CWFS. Private IPv4 addresses (RFC1918) will be assigned to interfaces connecting to the storage network.

Data transfer nodes should support 100Gb/s LAN interfaces (Cisco QSFP-100G-SR4-S or Arista QSFP-100G-SR4) on public connections, while all other public/storage interfaces should support 40Gb/s LAN interfaces (Cisco QSFP-40GSR4-S).

Floor Plan



Test and Development System (TDS)

Water cooling is required for the TDS.

480V 3-phase power is preferred. 208V 3-phase power is acceptable.

The system must be delivered and installed in:

Bldg 120, 6791 Aberdeen Blvd.

Aberdeen Proving Ground, MD 21005

Summary for Building 120 Computer Room A-106 TDS

- Available Space for TDS 64 sq. ft
- Subfloor Clearance 14"
- Design load per floor tile 1500 psi
- Uniform Load 575 lbs/sq. ft.
- Ceiling Height 10'
- Door Height 8'

- Available Power 0.2 MW
- UPS/Generator Backup Available? Yes (Generator and UPS)
- Available Cooling Capacity for TDS 50 tons (60 degree F water)
- Generator Backup for Cooling Available Yes (Generator and UPS)
- Under floor cooling and humidity control provided by in room CRAC units

Floor Space

64 sq. ft. of computer room floor space in Building 120 room A-106 will be set aside for TI-26 TDS. The reserved space for the TDS is on the first floor of Building 120 and accessed via a floor-level hydraulic loading dock on the west side of the room. The floor structure is designed to handle 4,000 lb. racks each with an assumed footprint of 2' x 4'. Floor tiles are 2' x 2' in size. Subfloor plenum is used for supplying conditioned air, chilled water, and power.

All networking and system interconnect cabling shall be installed above the raised floor. Any floor alterations/bracing needed to support heavier racks must be included in vendor proposal.

Cooling

Approximately 50 tons of chilled water cooling capacity is available for TI-26 TDS at a supply temperature of approximately 60 degrees F. A second loop currently supplies chilled-water at a supply temperature of approximately 47 degrees F to two 50-ton computer room air handler (CRAH) units and one 17-ton CRAH unit for computer room cooling and humidity control. Building 120 Room A-106 operates at 72 degrees Fahrenheit +/- 3 degrees Fahrenheit and 45%-55% relative humidity.

Power/Electrical

A total of 200 KW of conditioned power with UPS and generator backup will be available for the TI-26 TDS. Four 225KVA power distribution units (PDU) provide dual-sourced power to 208 VAC 3-phase loads. The PDU loads should be designed with dual source power to maintain storage, networks, management nodes, and other critical loads for the proposed machine. Breakers for these racks are located in the PDUs shown at the top of the floor layout (below) and at the ends of the wall in the middle of the designated space. 480v 3-phase power is preferred for compute nodes/racks which will also be supported by UPS and generator. There is a single source of power for the 480v

3-phase power. There are 6 400A 480v 3-phase power panel units (PPU) available for the majority of the computing capacity for the proposed machine. Breakers for these racks will be located in the PPUs attached to the wall in the middle of the designated space.

Networking Infrastructure

The ARL DSRC's network infrastructure consists of:

- A 40/100 Gb/s local area network (LAN) and
- A 100Gb/s wide area network (WAN)

These networks provide connection to the Defense Research and Engineering Network (DREN). Cisco and Arista devices are utilized in the network core. The ARL DSRC also operates a 10/40 Gb/s private storage network which supports the Center Wide File System (CWFS). This network utilizes an Arista Networks switch infrastructure. Nodes that will mount the CWFS will require a 10/40 Gigabit Ethernet connection to the storage network. This connection will be in addition to any Ethernet connections to the public network and will only be utilized for accessing the CWFS.

Private IPv4 addresses (RFC1918) will be assigned to interfaces connecting to the storage network. Data transfer nodes should support 100Gb/s LAN interfaces (Cisco QSFP-100G-SR4-S or Arista QSFP-100G-SR4) on public connections, while all other public/storage interfaces should support 40Gb/s LAN interfaces (Cisco QSFP-40G-SR4-S).

Floor Plan

The TDS will be located in Bldg. 120 Rm A106

