



HPC System – JUWELS (Jülich Wizard for European Leadership Science) Cluster Modul

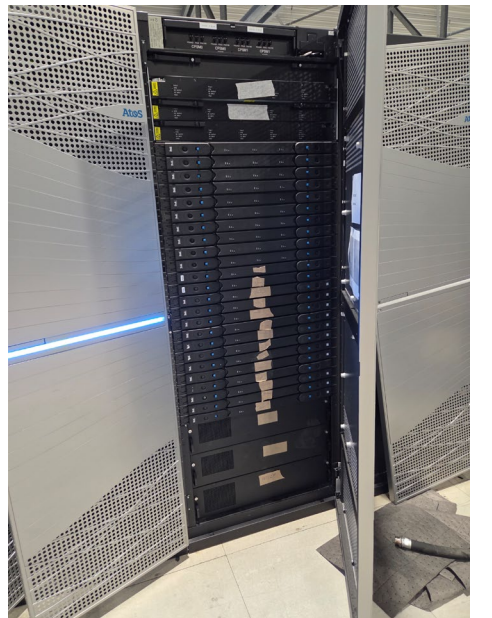
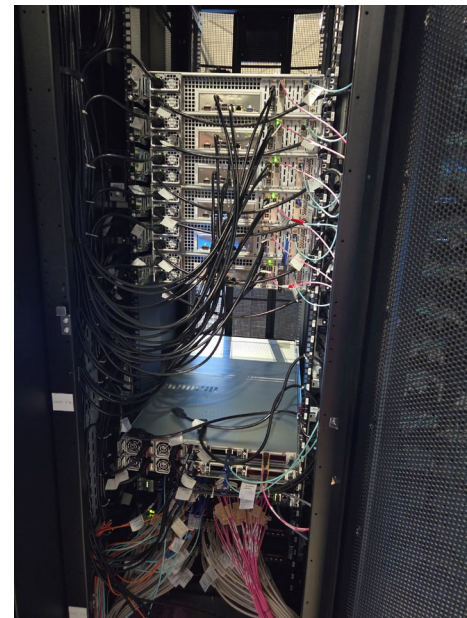
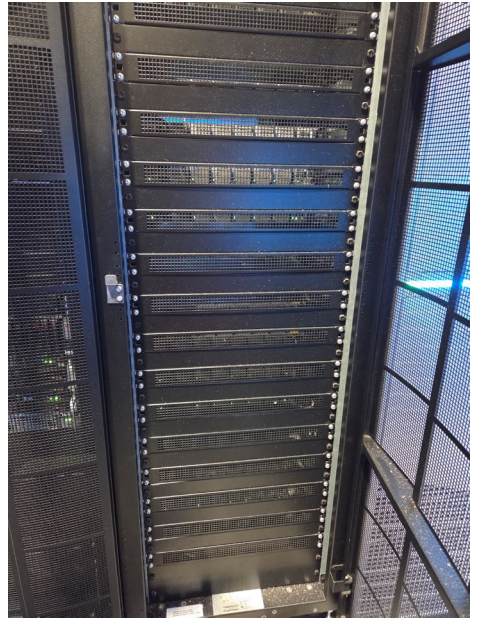
VEBEG VA 949, GK 924826

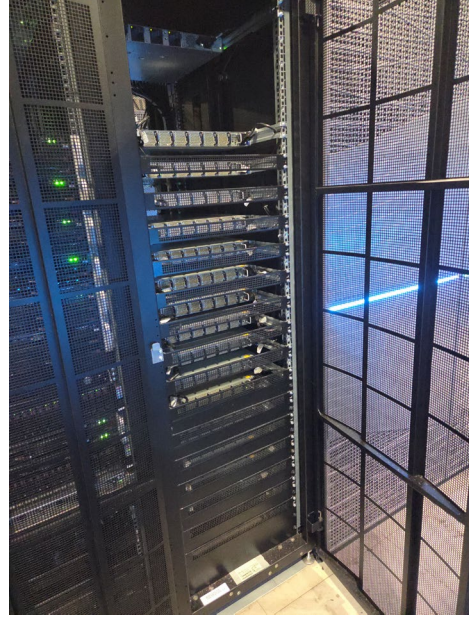
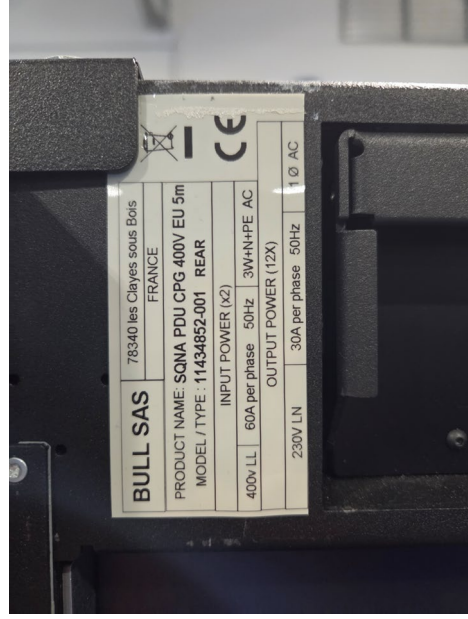
Fotos der abzugebenden 2 Module

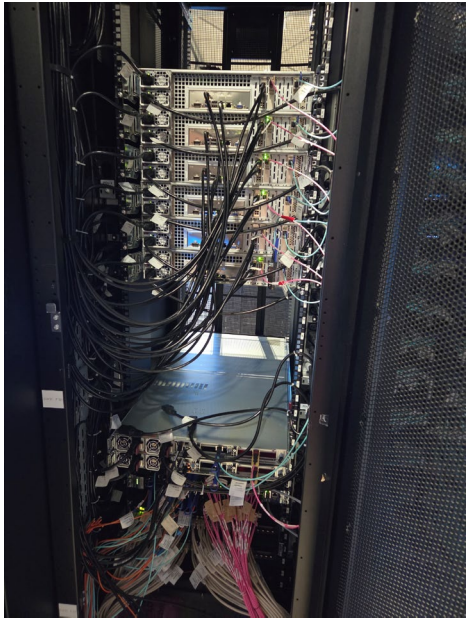




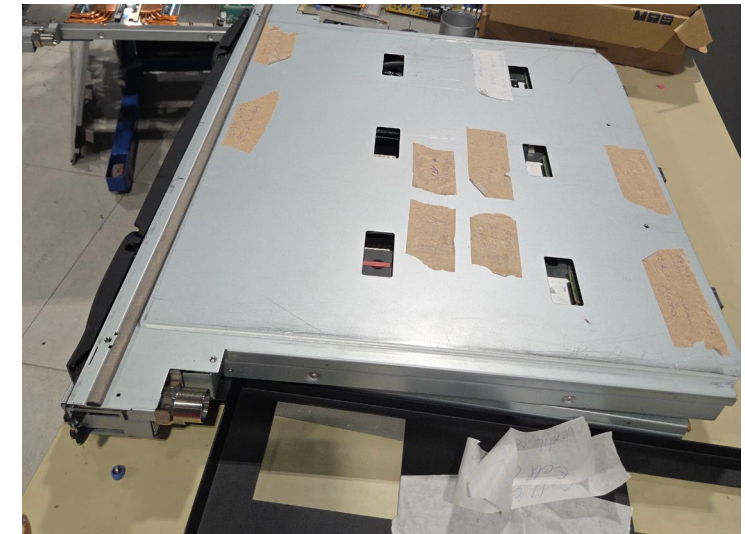
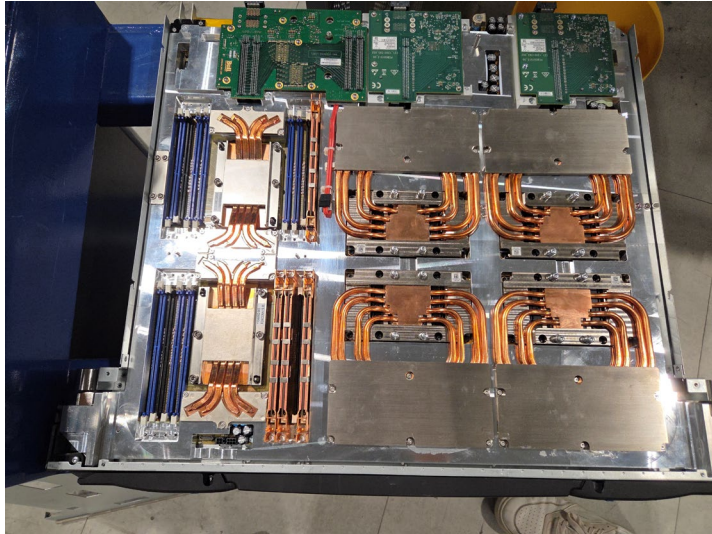
JUWELS currently consists of two modules. The first module deployed in 2018 is so-called Cluster module. The Cluster is a Bull Sequana X 1000 system with Intel Xeon Skylake-SP processors and Mellanox DER InfiniBand.







Beispiel der Bestandteile/Service Teile

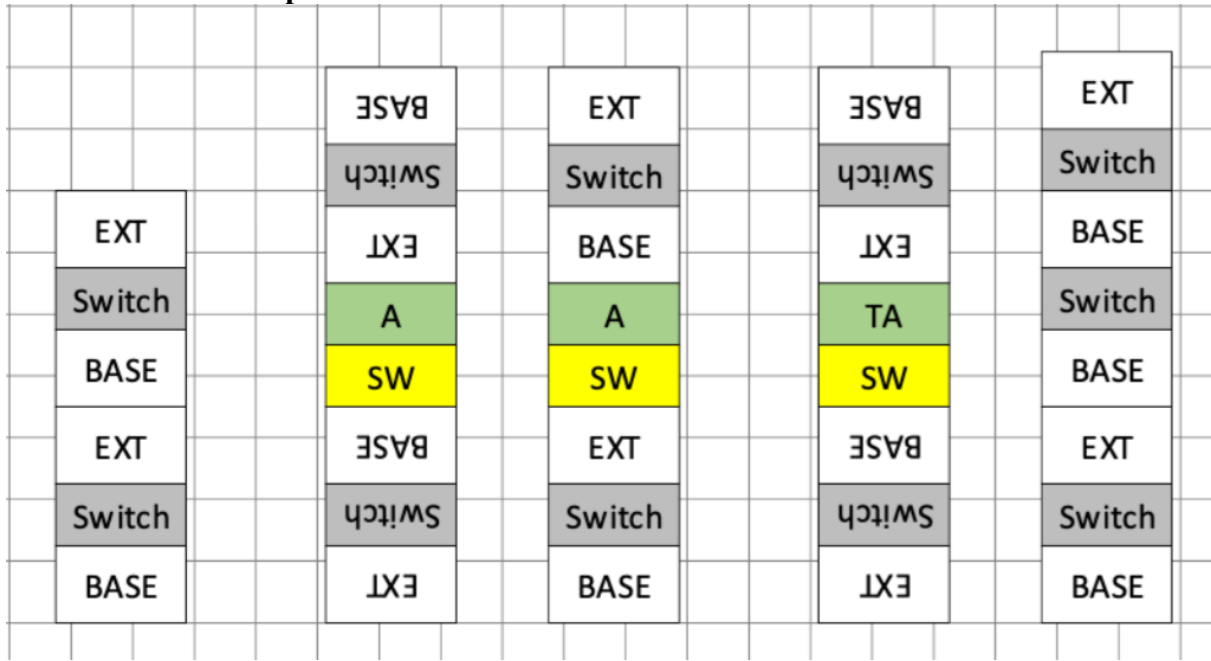


Transportweg: durch Hallentüre,
ebenerdig bis zur Verloaderampe E4/E5 oder Rampe E3



HPC System – JUWELS Cluster Modul (including Test Modul) Specifications

Infrastructure floor plan



Hardware Information - JUWELS Cluster Modul

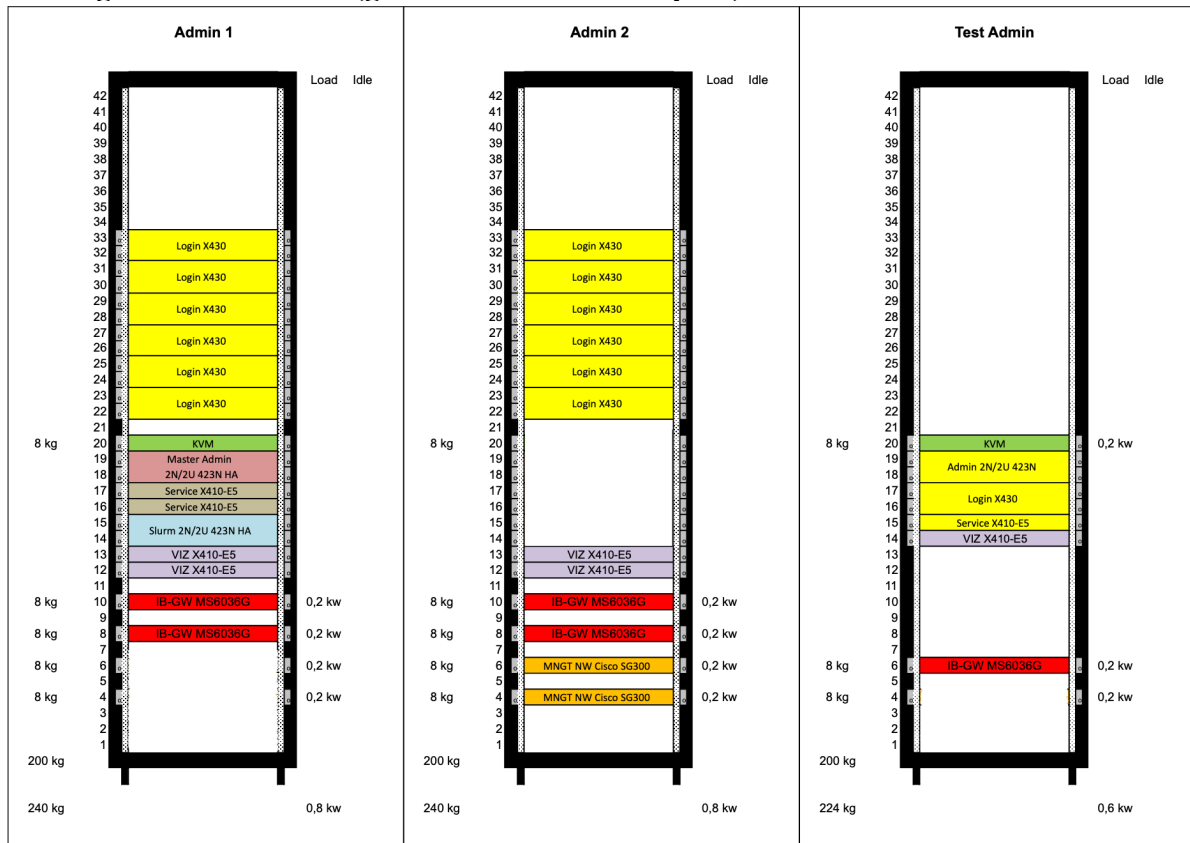
- **22 Service Nodes** installed in 3 Admin Racks (green marked in floor plan)
 - **2 Master:**
 - bullx R423-E4m 2U 2N HA E5-2650v4 -128GB-18TB
 - 4 x bullx-R 1800GB 10krpm 2.5" SAS3 HDD Server
 - 2 x Eth 10G card 2*port SR-LC LP/PCIE gen3-X8
 - 2 x ConnectX®-5 VPI adapter card, EDR IB (100Gb/s) and 100GbE, single-port QSFP28, PCIe3.0 x16, tall bracket, ROHS R6
 - **2 Slurm:**
 - bullx R423-E4m 2U 2N HA RnR E5-2650v4 -128GB-9TB
 - 2 x Eth 10G card 2*port SR-LC LP/PCIE gen3-X8
 - 2 x ConnectX®-5 VPI adapter card, EDR IB (100Gb/s) and 100GbE, single-port QSFP28, PCIe3.0 x16, tall bracket, ROHS R6
 - **2 SubnetManager:**
 - X430-E5 1U-1N-RnR, Mono socket, No CPU RAM HDD
 - 1 x X400 Xeon SKL S-4110 8C (2.1GHz-9.5GT-85W)
 - 6 x bull sequana 8GB DDR4 RDIMM 2400MT/s DR (1x8GB)
 - 1 x bullx-R 500GB 7.2Krpm 3.5" SATA3 HDD 64MB
 - 1 x ConnectX®-5 VPI adapter card, EDR IB (100Gb/s) and 100GbE, single-port QSFP28, PCIe3.0 x16, tall bracket, ROHS R6
 - **12 Logins:**
 - Dual Intel Xeon Gold 6148
 - 2x 20 cores, 2.4 GHz,

- 768 GB memory (12 x bullx-R 64GB DDR4-2400 ECC LRDIMM QR 1.2V)
 - EDR-Infiniband (Connect-X5)
 - 100 GigE external network (DFN)
 - 2x 1TB HDD (Raid 1)
 - **4 VIS-Logins:**
 - 2× Intel Xeon Gold 6148 CPU, 2× 20 cores, 2,4 GHz
 - 768 (12 x bullx-R 64GB DDR4-2400 ECC LRDIMM QR 1.2V) GB DDR4, 2666 MHz
 - InfiniBand EDR (Connect-X5)
 - Intel Hyperthreading Technology (Simultaneous Multithreading)
 - 100 GbE External connection
 - 2x 1TB HDD (RAID 1)
 - 1× NVIDIA Pascal P100 (TESLA P100 GPU card 12GB)
 - Local disks (120 GB available in /tmp)
 - 2 Cisco SG300 Ethernet Switches
 - 1 KVM
- **10 Bull Sequana X1000 cells equipped with** (white and grey marked in floor plan):
 - **2 cells are reduced by 12 HYCs**
 - **2231 standard compute nodes (+ 40 empty standard compute nodes)**
 - 2× Intel Xeon Platinum 8168 CPU, 2× 24 cores, 2.7 GHz
 - 96 (12× 8) GB DDR4, 2666 MHz
 - InfiniBand EDR (Connect-X4)
 - Intel Hyperthreading Technology (Simultaneous Multithreading)
 - Diskless
 - **235 large memory compute nodes (+ 5 empty large memory compute nodes)**
 - 2× Intel Xeon Platinum 8168 CPU, 2× 24 cores, 2.7 GHz
 - 192 (12× 16) GB DDR4, 2666 MHz
 - InfiniBand EDR (Connect-X4)
 - Intel Hyperthreading Technology (Simultaneous Multithreading)
 - Diskless
 - **51 accelerated compute nodes (+ 5 empty accelerated compute nodes)**
 - 2× Intel Xeon Gold 6148 CPU, 2× 20 cores, 2.4 GHz
 - 192 (12× 16) GB DDR4, 2666MHz
 - 2× InfiniBand EDR (Connect-X4)
 - Intel Hyperthreading Technology (Simultaneous Multithreading)
 - 4× NVIDIA V100 GPU, 16 GB HBM
 - Diskless
 - **Mellanox InfiniBand EDR fat-tree network with 2:1 pruning at leaf level and top-level HDR switches** top-level installed in 3 Switch Racks (yellow marked in floor plan)
 - 4 x MS6036G - 36port Gateway Switch 2PS
 - 72 x FDR InfiniBand QSFP assembled optical cable. 10m
 - 48 x QM 8700 Quantum HDR Switch - 40port - 2PS – managed
 - 720 x EDR IB optical cable 15m
 - 720 x EDR IB optical cable 10m

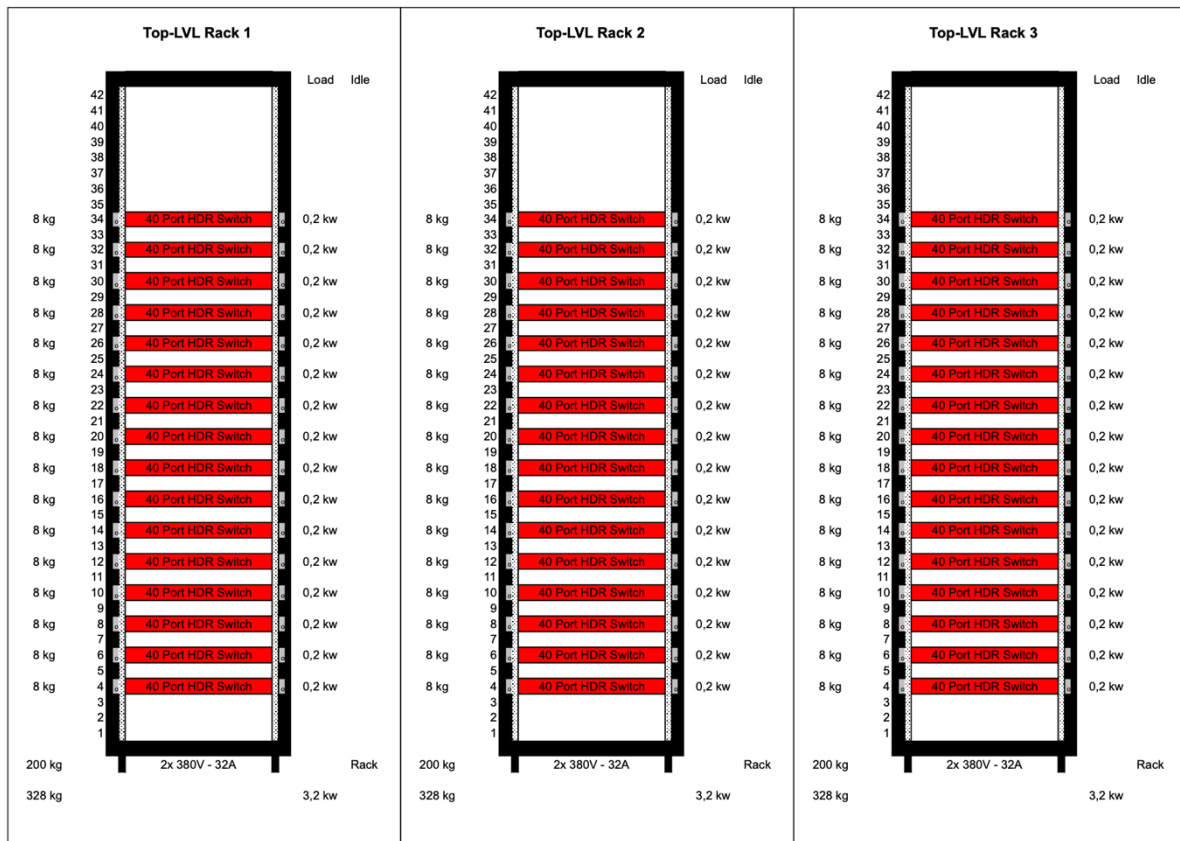
Hardware Information - JUWELS Test Modul

Category	Item	Qty
TEST	Bull sequana X1000 cell EDR - 1 NIC (per node) - Small (22 compute blades max) - Air-cooled PSU - Aesthetic Door - w/o UCM - 400V AC(EU) Power Supply in DC	1
TEST	Bull sequana X1120 blade (3 nodes) EDR - 1 NIC with (per node): 2x Xeon Gold 6148 20c - 96GB DDR4 2667MT/s	1
TEST	Bull sequana X1120 blade (3 nodes) EDR - 1 NIC with (per node): 2x Xeon Gold 6148 20c - 192GB DDR4 2667MT/s	1
TEST	Bull sequana X1125 blade (1 node) EDR - 1 NIC with (per node): 2x Xeon Gold 6138 - 192GB DDR4 2667MT/s - 4 NVIDIA Pascal GPUs	1
TEST	Login Node: X430-E5 (2U/1N)	1
TEST	MS6036G - 36port Gateway Switch 2PS	1
TEST	FDR IB copper cable 3m	4
TEST	VIZ Node : X410-E5	1
TEST	Admin (Slurm)	1
TEST	Service (SM)	1
TEST	Rack'n Roll 1200 42U AIR-cooled	1
TEST	KVM	1

Racking of Service Nodes (green marked in floor plan):

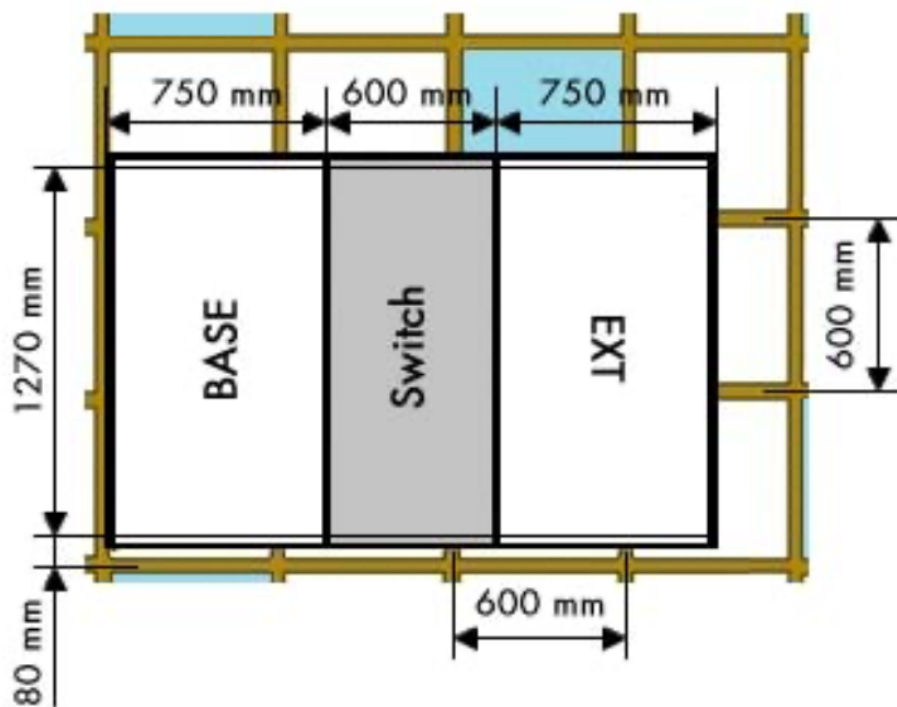


Racking of Mellanox InfiniBand top-level HDR switches (yellow marked in floor plan):



Dimension Information Sequana X1000 cells:

- dimensions of one cell:



Compute Rack Cabinet Dimensions/Weight

1. Compute Rack Cabinet Dimensions

- Mounting Capacity: 42U
- Height without UCM: 202 cm
- Maximum height with UCM: 217 cm
- Width: 75 cm
- Depth: 127 cm

2. Compute Rack Cabinet Static Load

- Distributed static load, fully equipped: 1,040 daN/m²

3. Compute Rack Cabinet Weight – Maximum Values

- Not equipped, without compute blades:
 - Configuration: No PSU, no UCM
 - Installation on castors
 - Maximum weight: 1,000 kg
- Not equipped, without compute blades:
 - Configuration: No PSU, no UCM
 - Installation on pallet
 - Maximum weight: 1,100 kg
- Fully equipped:
 - Configuration: Air-cooled PSUs, no UCM
 - Installation on load spreader
 - Maximum weight: 2,220 kg
- Fully equipped:
 - Configuration: Air-cooled PSUs and UCM
 - Installation on load spreader
 - Maximum weight: 2,320 kg
- Fully equipped:
 - Configuration: Water-cooled PSUs, no UCM
 - Installation on load spreader
 - Maximum weight: 2,300 kg
- Fully equipped:
 - Configuration: Water-cooled PSUs and UCM
 - Installation on load spreader
 - Maximum weight: 2,400 kg

Switch Rack Cabinet Dimensions/Weight

1. Switch Rack Cabinet Dimensions

- Mounting Capacity: 42U
- Height without UCM: 202 cm
- Maximum height with UCM: 217 cm
- Width: 60 cm
- Depth: 127 cm

2. Switch Rack Cabinet Weight – Maximum Values

- Equipped with all switches:
 - Configuration: No UCM
 - Installation on pallet
 - Maximum weight: 750 kg
- Equipped with all switches:
 - Configuration: No UCM
 - Installation on castors
 - Maximum weight: 750 kg¹
- Equipped with all switches:
 - Configuration: Air-cooled PSUs and UCM
 - Installation on load spreader
 - Maximum weight: 830 kg
- Equipped with all switches:
 - Configuration: Water-cooled PSUs and UCM
 - Installation on load spreader
 - Maximum weight: 850 kg

¹ Pallet removed and expansion tanks added.

Compute Blade Dimensions/Weight

Dimensions and Weight

- Height: 4.445 cm
- Width: 60 cm
- Depth: 54 cm
- Approximate weight: 25 kg