# AMS Computing resources at CERN

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# Current Science Operations Center in B892

- Processes all AMS data;
- Ensures Data Backup, Archiving and Distribution to AMS Collaboration;
- Provides data access for physics analysis;
- Coordinates AMS MC Production;
- Provides user support;
- Have sufficient capacity to process AMS data during first 6 month of operations on ISS.

# Data storage, archiving and distribution

| Data Type | Volume (TBytes/Year) | DataBase Access | Compression |
|---|---|---|---|
| House Keeping & Ancillary Data | 0.04 | Yes | No |
| Event Tags | 0.06 | Yes | No |
| Science Raw Data | 15-20 | Catalogs Only | Optional |
| Reconstructed (ESD) Data | 65 | Catalogs Only | Yes |
| Simulated (MC) Data | 90 | Catalogs Only | Yes |

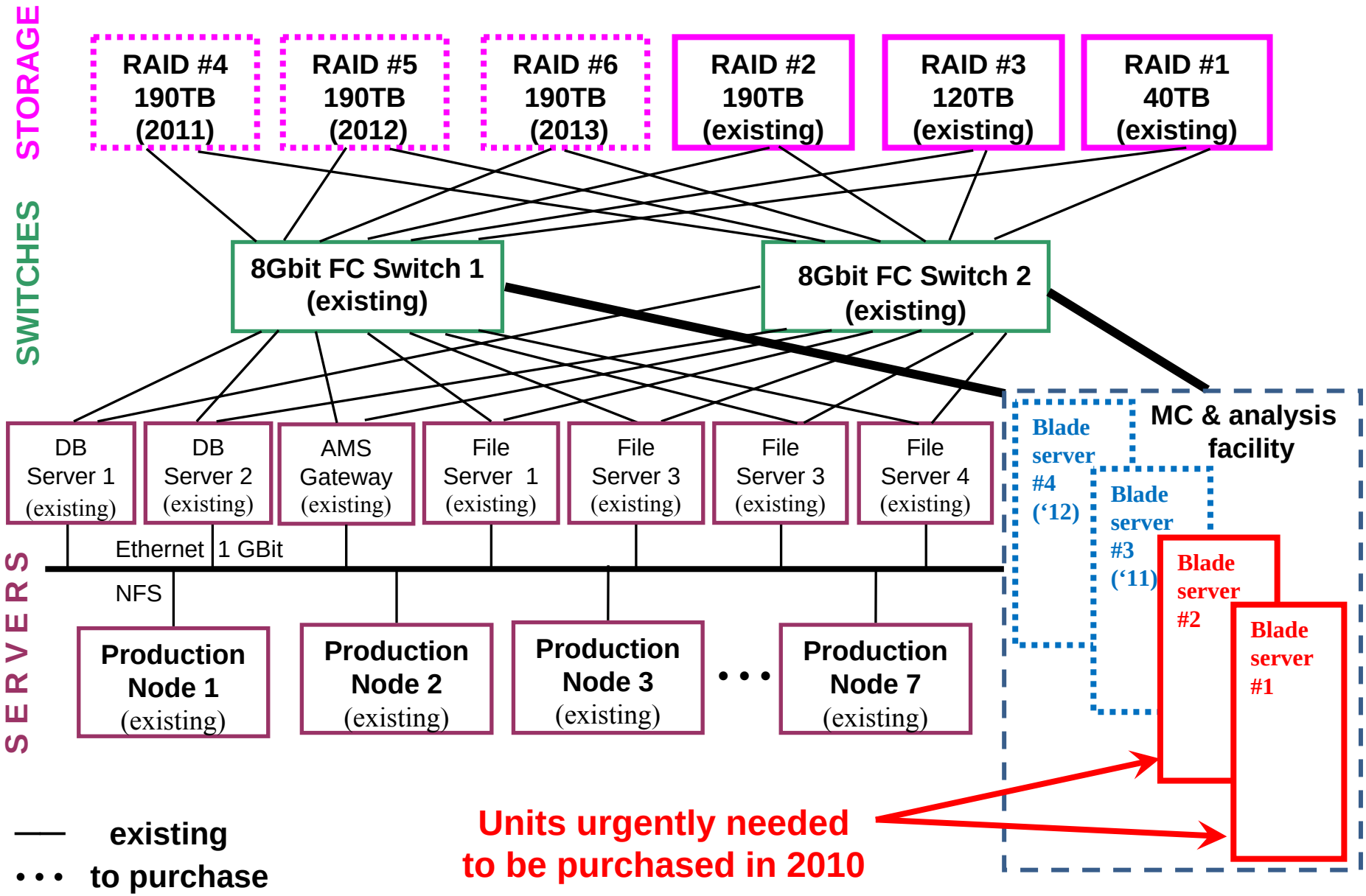
**MC needs: ~1000 Intel 2GHz Cores**

**Requires distributing computing**

# SOC in CERN Computing Center

- AMS SOC equipment will be ultimately installed in CERN Computing Center and will be maintained by CERN IT Division;
- Technical details are being sorted out between AMS and IT;
- For 2011-2013 operation SOC will adequate capacity (~1000 intel cores and ~1PB of disk space) to handle Data Production and Physics analysis needs at CERN.

# AMS SOC at CERN 2010 – 2028
# phase 1: 2010 - 2013



# AMS SOC at CERN 2010 – 2028
# phase 1: 2010 – 2013, Proposed Layout, Racks 1-4

## Rack 1 (existing)

| | |
|---|---|
| AMS gateway | 6U |
| DB server1 | 4U |
| DB server2 | 4U |
| File server 1 | 4U |
| File server 2 | 4U |
| FC switch1 | 1U |
| FC switch2 | 1U |
| UPS Optional | 2U |
| Max Wattage | 4.7kW |

## Rack 2 (existing)

| | |
|---|---|
| File server3 | 2U |
| File server4 | 1U |
| File server5 | 2U |
| File server6 | 2U |
| RAID #1 40TB | 12U |
| RAID 10TB | 3U |
| UPS Optional | 2U |
| Max Wattage | 5.4kW |

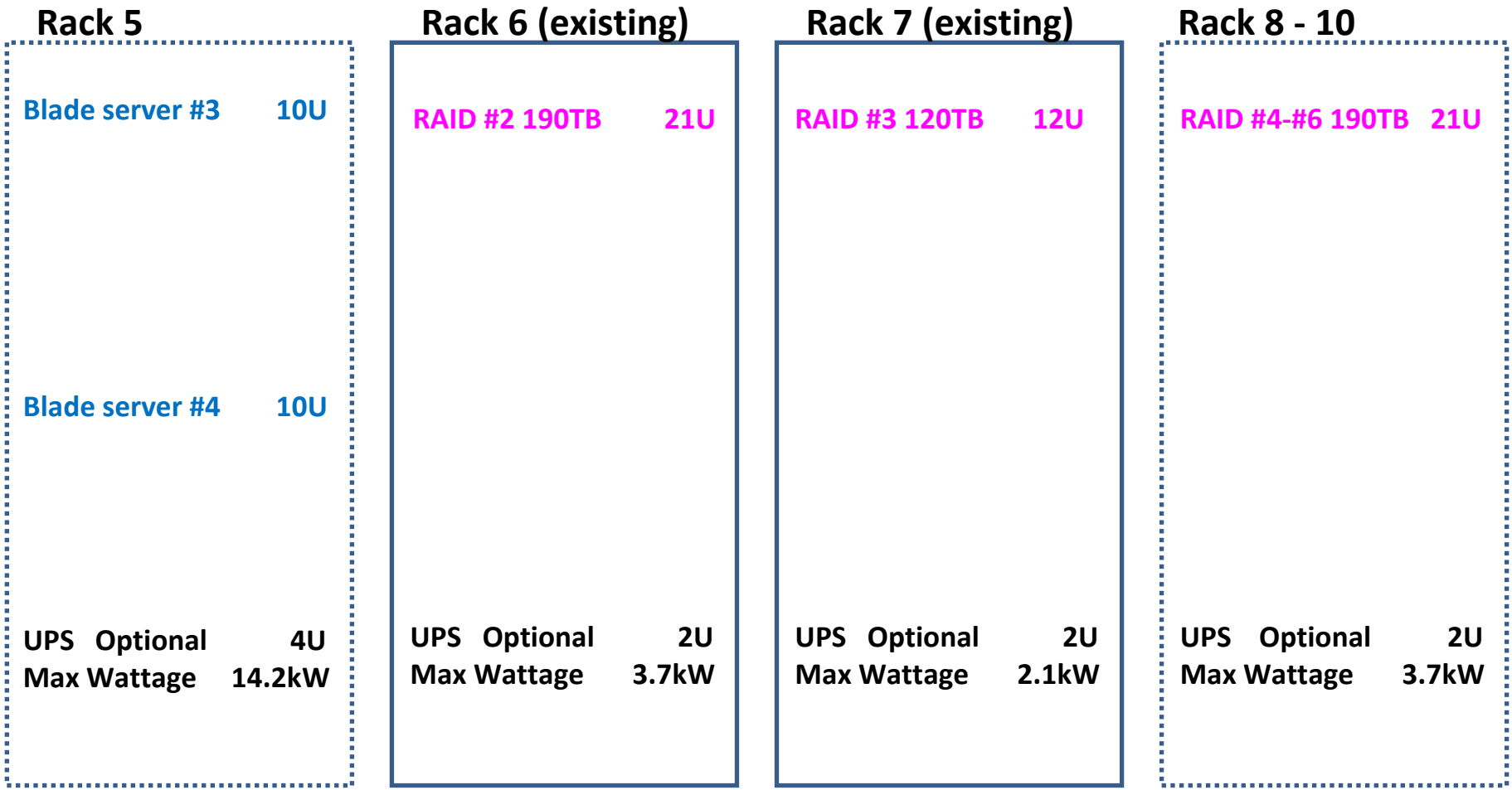
## Rack 3 (existing)

| | |
|---|---|
| Production node1 | 1U |
| Production node2 | 1U |
| Production node3 | 1U |
| Production node4 | 1U |
| Production node5 | 1U |
| Production node6 | 1U |
| Production node7 | 1U |
| 2x1Gbit Eth Switch | 2U |
| 2x1Gbit Eth Switch | 2U |
| 1/10Gbit Eth Switch | 1U |
| UPS Optional | 2U |
| Max Wattage | 4.0kW |

## Rack 4

| | |
|---|---|
| Blade server #1 | 10U |
| Blade server #2 | 10U |
| UPS Optional | 4U |
| Max Wattage | 14.2kW |

# AMS SOC at CERN 2010 – 2028
# phase 1: 2010 – 2013, Proposed Layout, Racks 5-10




During 2014 to 2028 we project
10 additional, similar racks of servers and storage will be required.

# IT perspective (summary of the discussion at CERN)

**There are two possible approaches to AMS SOC that could be adopted:**

- AMS has a dedicated set-up (which nonetheless has to conform to the standards of the CC as described above)
- AMS uses resources from a pool in the same way as existing experiments, including the LHC experiments

**The second approach is preferred by IT as it is easier to manage and offers more flexibility. In addition, this latter option has significant benefits for AMS;**

- AMS would benefit from the knowledge and experience of IT in the provisioning of hardware to meet its needs
- AMS does not have to purchase dedicated equipment
- Capacity can be rapidly and easily adjusted to the needs of AMS, i.e. using existing resources and without the need for a lengthy purchasing process
- AMS's existing equipment could be incorporated into the global pool of CC resources and hence offset against its use of CC resources
- AMS can benefit directly from all the standard services of the CC management teams, e.g. installation, monitoring, intervention in the event of alarms, etc.

**IT (Bernd Panzer-Steindel) will produce a note describing the computing needs of AMS based on its understanding of the requirements as well as any areas where more information is required. This can then be used as a basis for further discussion and to determine the feasibility of hosting the AMS SOC computing capacity in the CC.**