

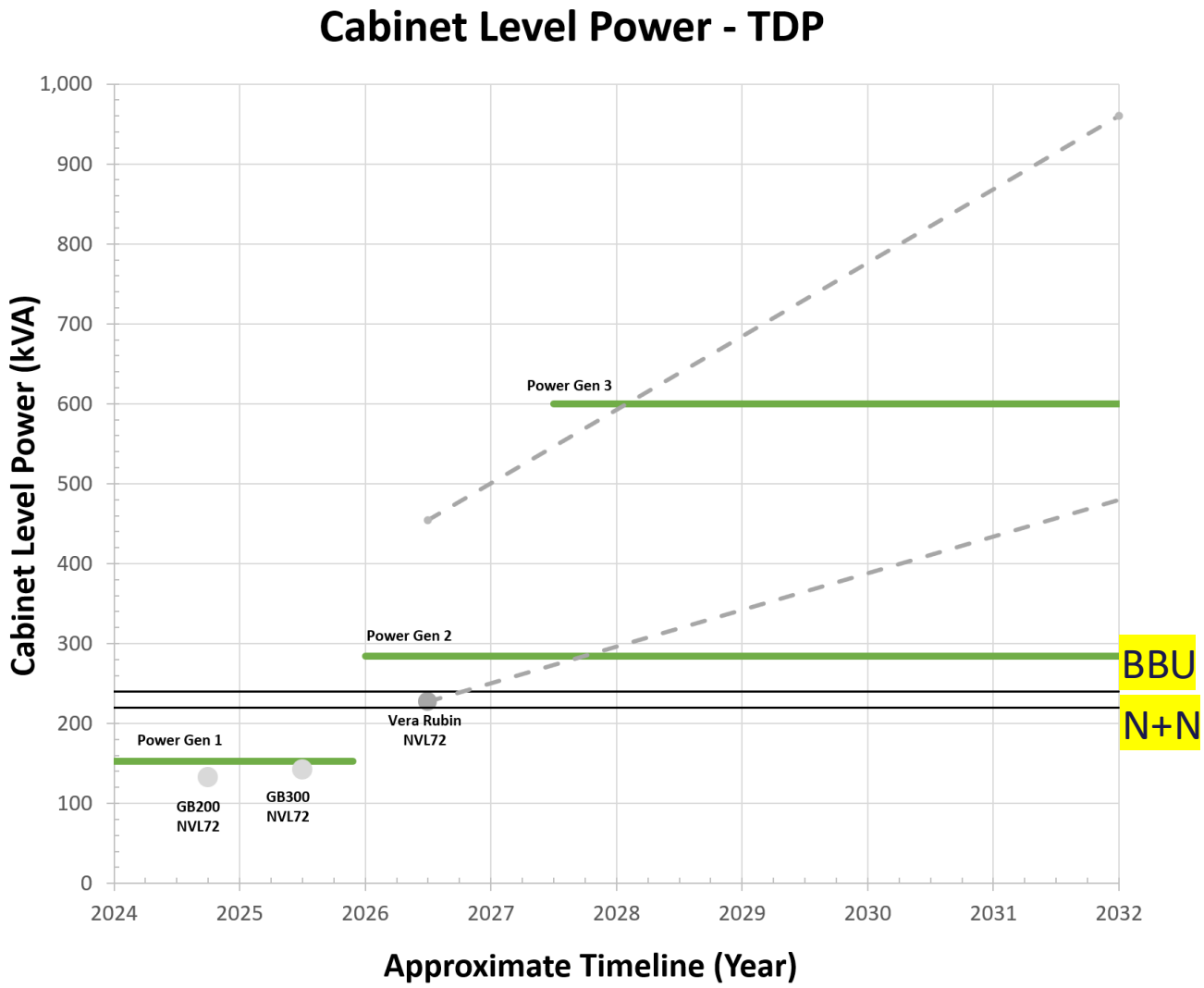
MGX Power Rack Reference Design

Jared Huntington

Power Architect Nvidia

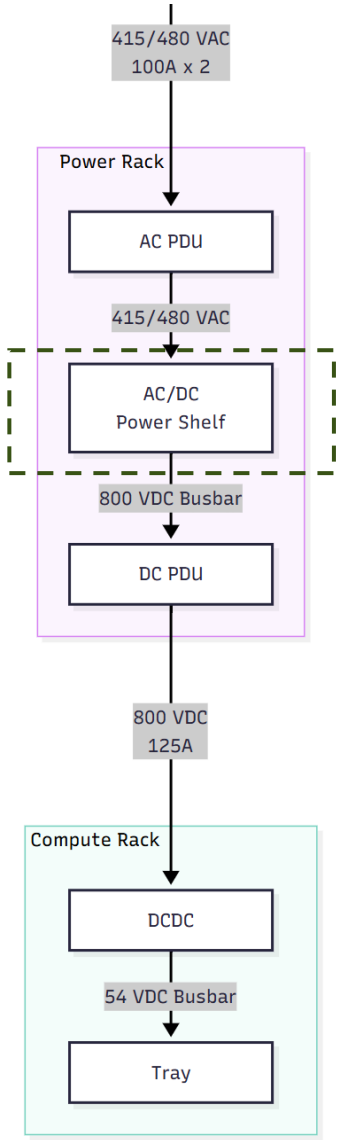
Need for power racks

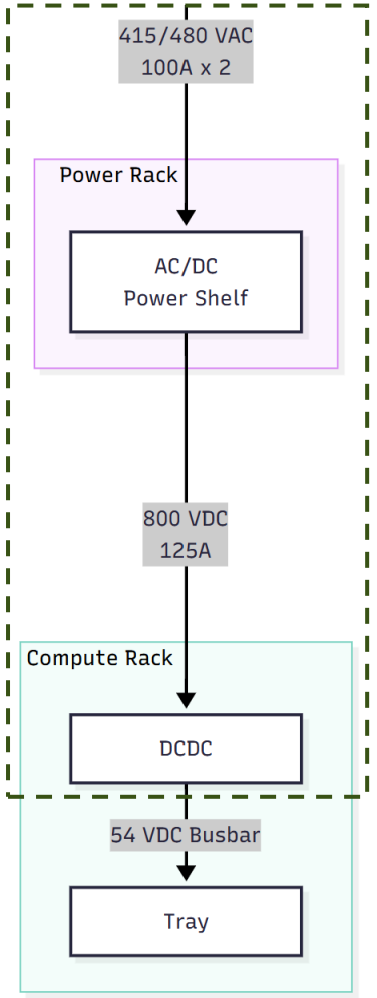
- BBUs and N+N redundancy drive the need sooner
- Long term this is an adapter component



Point to point vs. Common Bus

Power Shelves or BBU/CBU

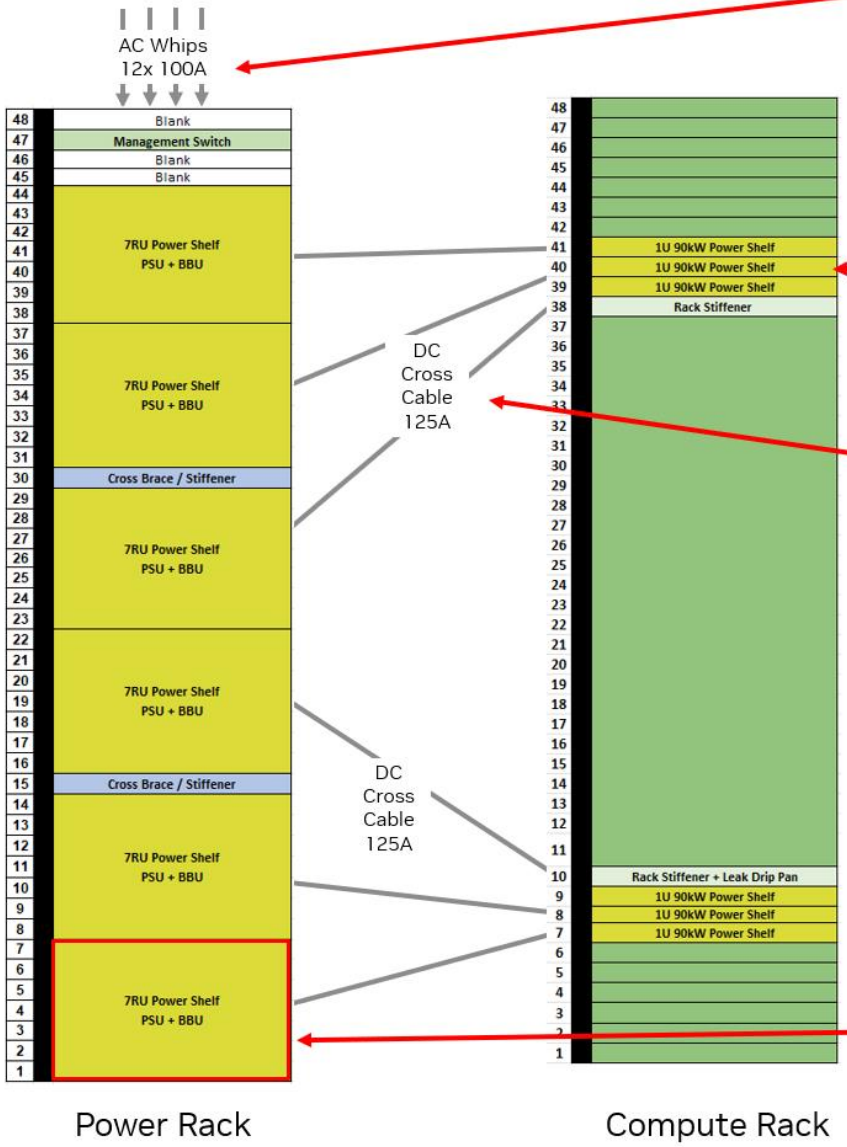


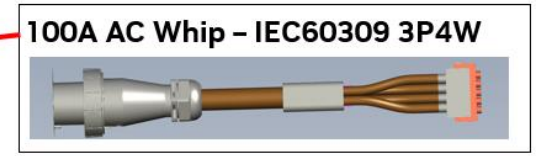


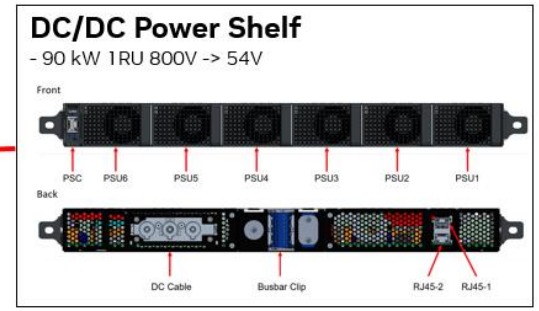
Repeating Power Blocks

Power System Overview

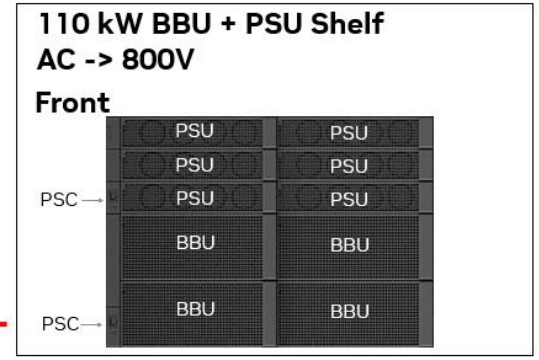
- Using a point-to-point approach
- BBU / non-BBU option
- Bulk capacitors for power smoothing











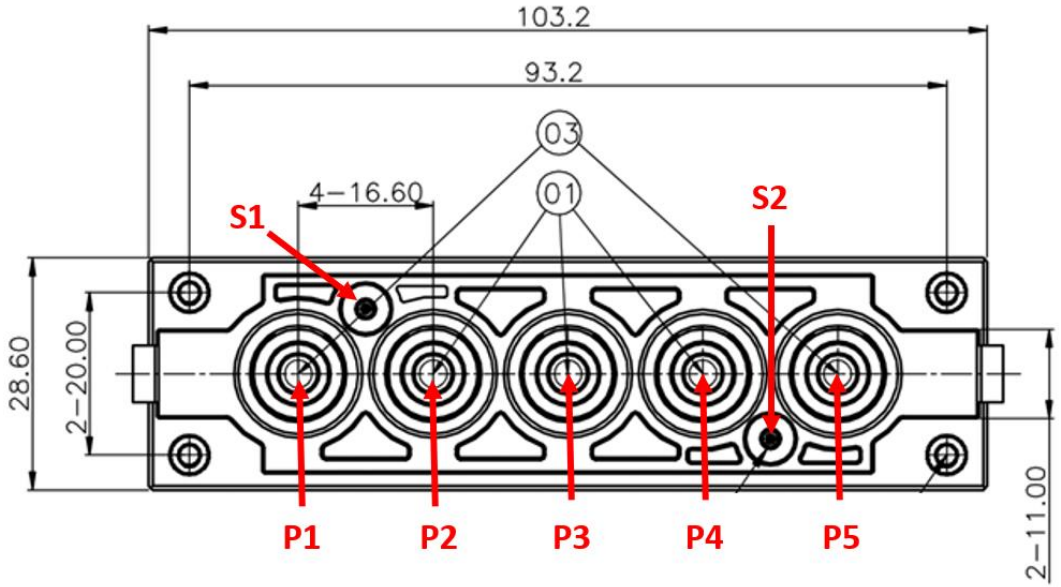
Improving Power Whips

- 5 wire to 4 wire
- Symmetrical connector design for both top and bottom feed
- Move to individual conductors

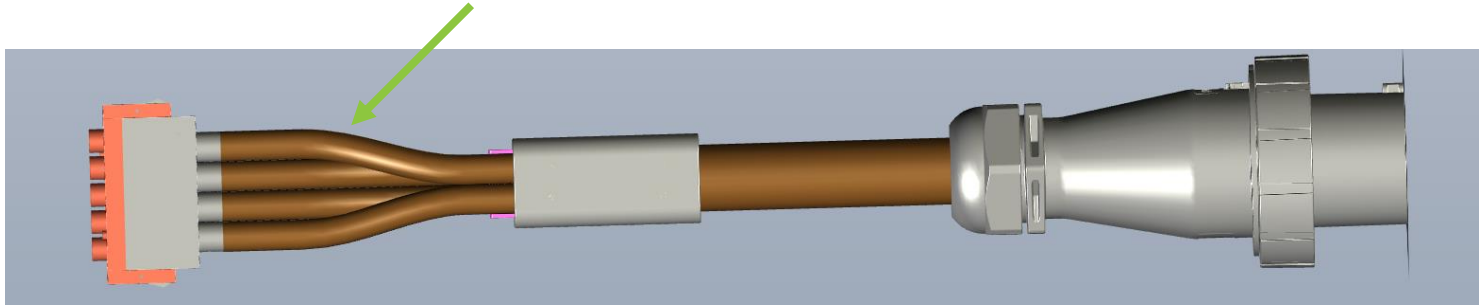
  -> 64% reduction in bend radius
- Develop new Silicone Insulation

  -> 50% reduction in bend radius

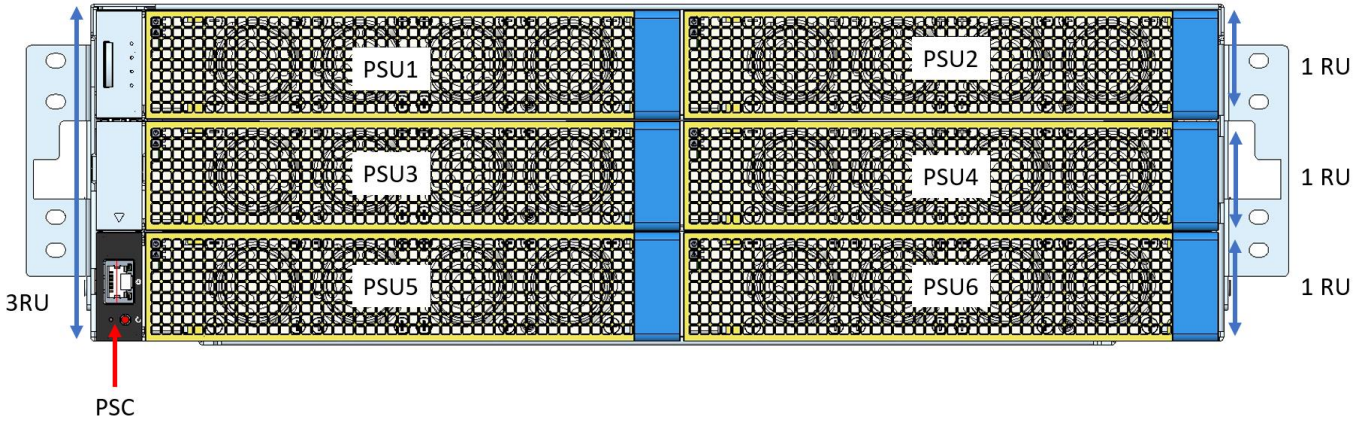
  UL 2137 (Silicone rubber)

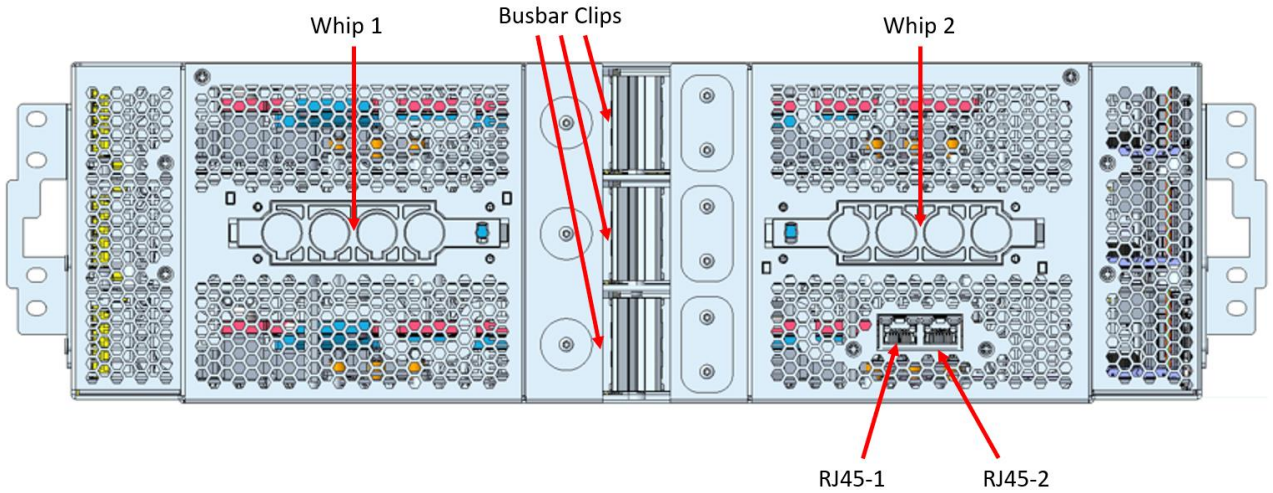


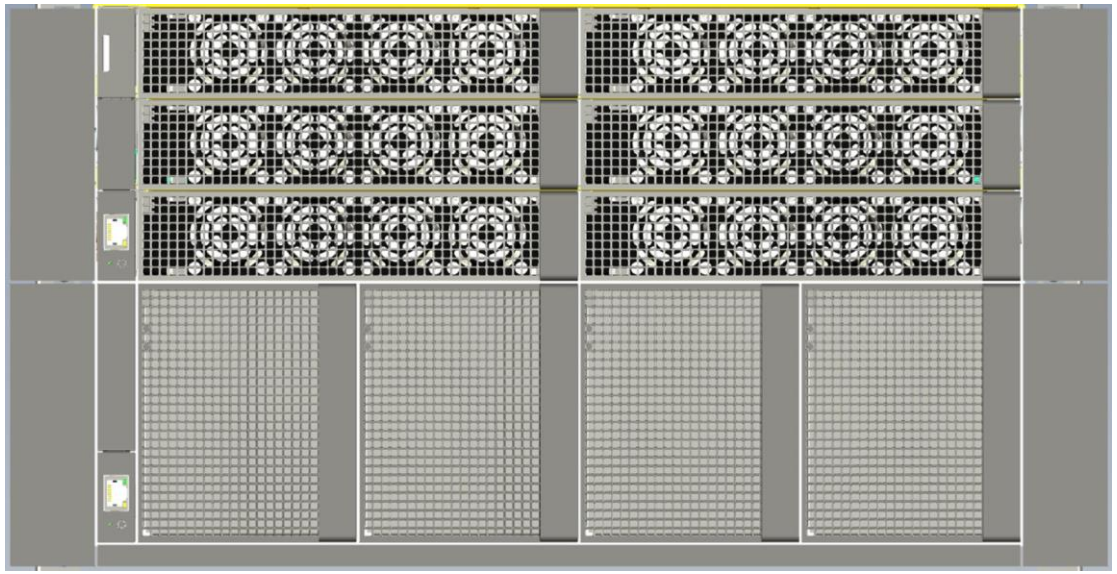
Individual Strands



AC/DC Power Shelf

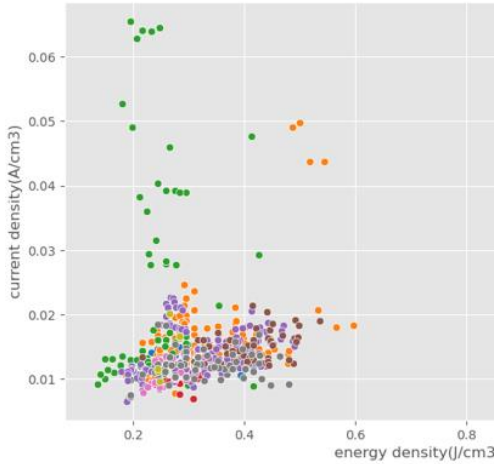


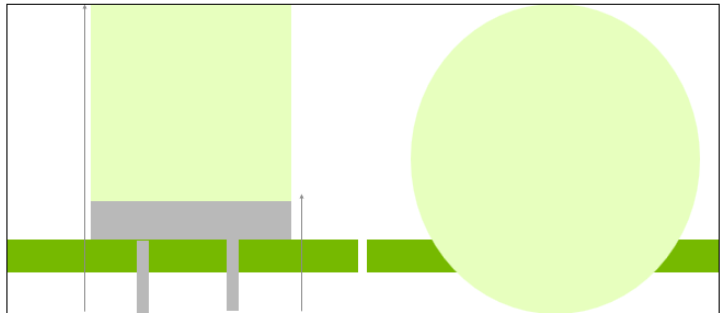




Maximizing capacitance

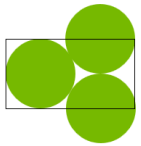
- Best in class caps
- Maximize packing
- Longer caps are more energy dense



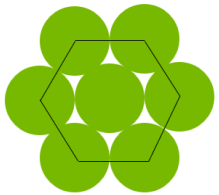




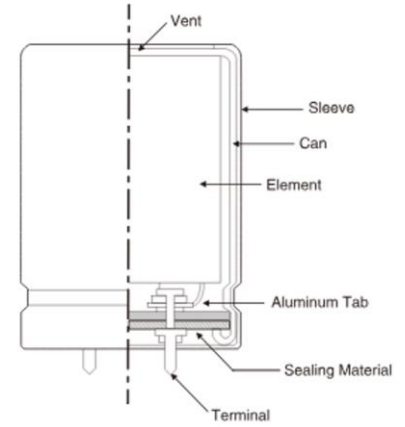
79% packing



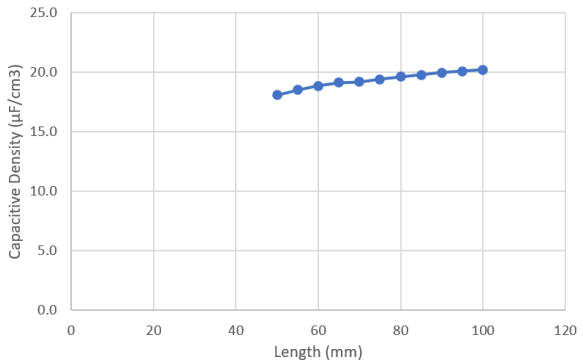
84.5% packing
7% width reduction



90.9% packing



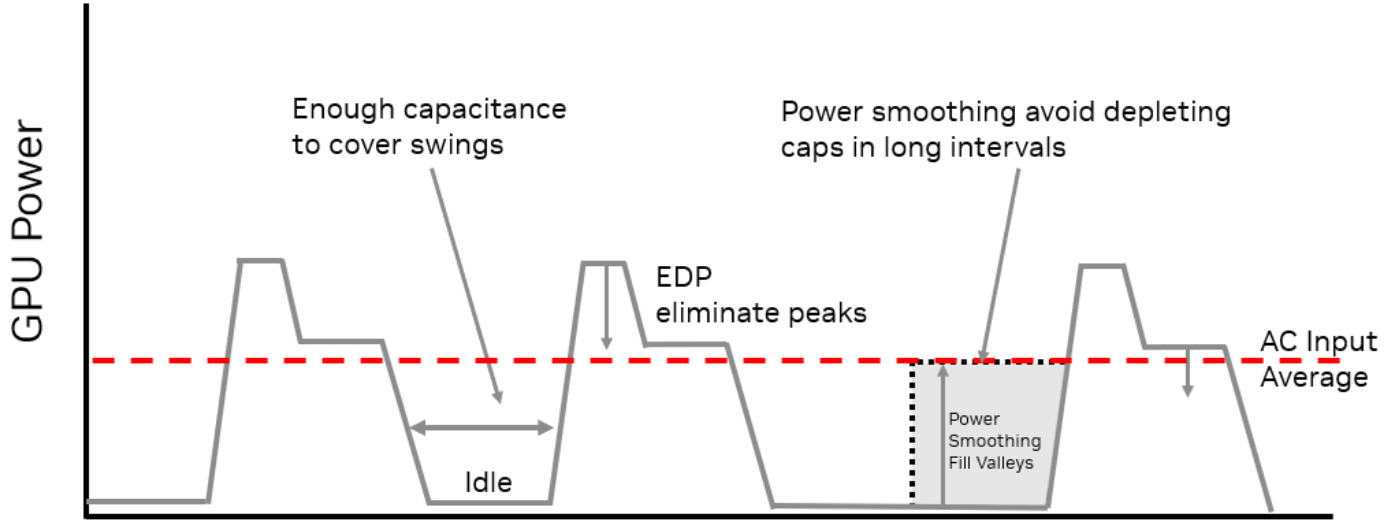
Snap-in Type

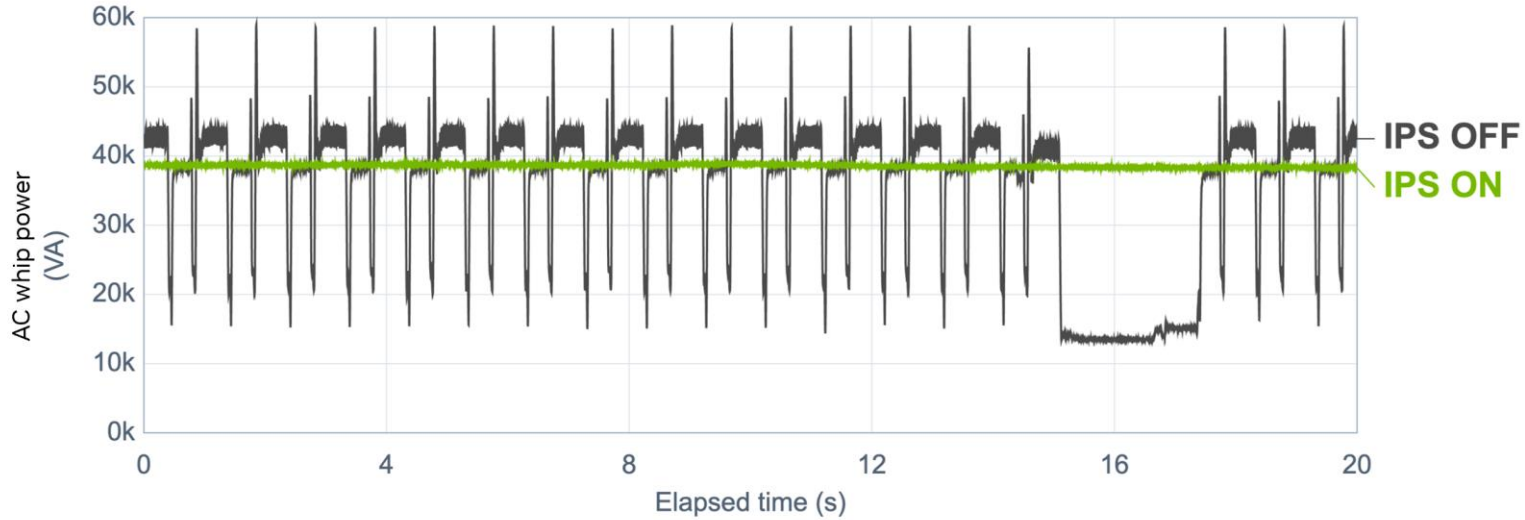


IPS

- Moving to electrolytic caps for all input current shaping
- Hardware backstop for longer delays allows for controlled rate of change on PFC.

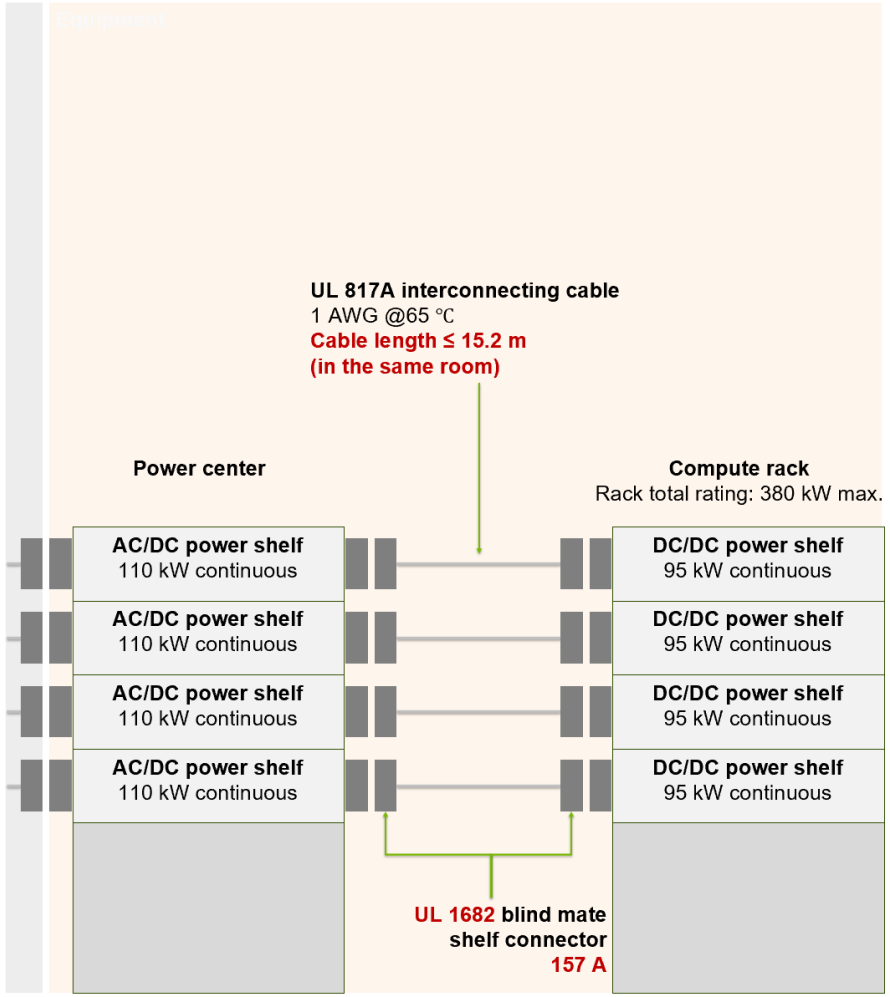




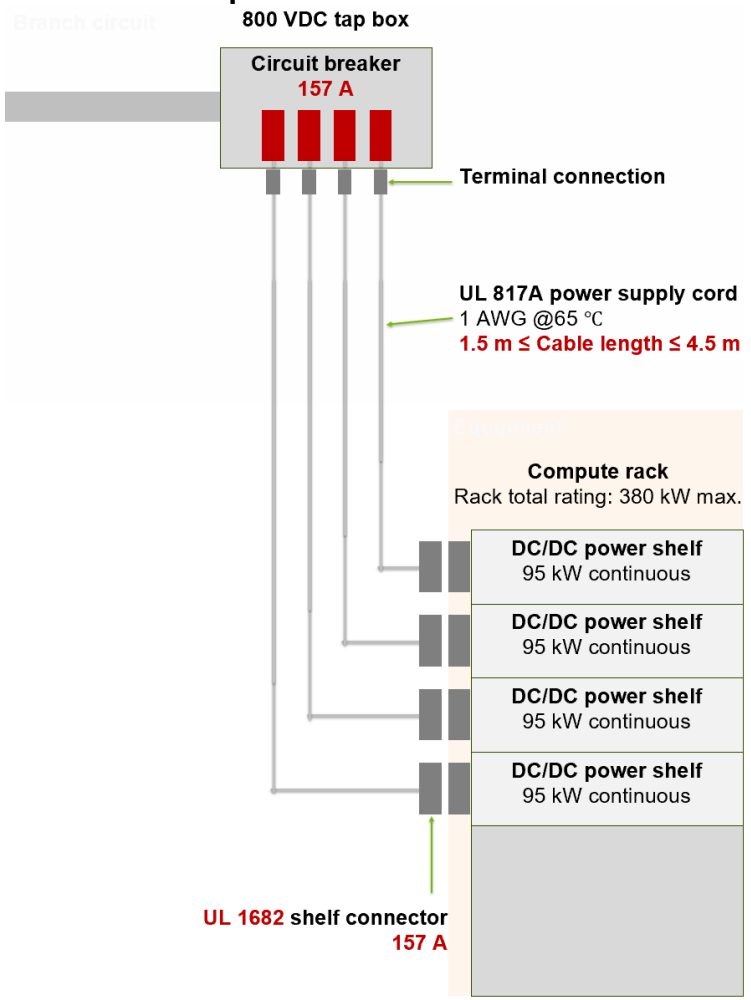


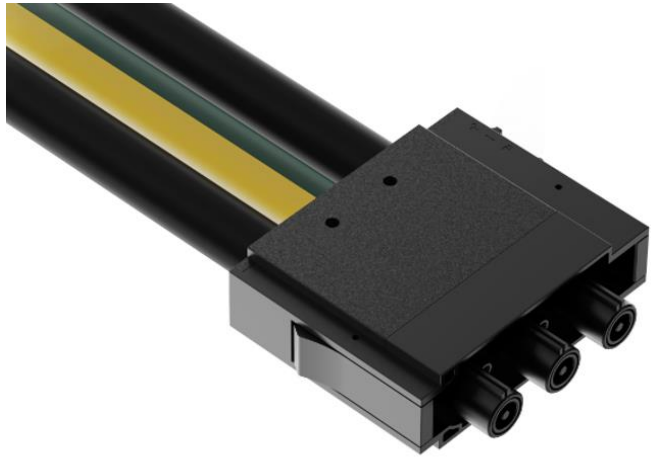
800 VDC 157/125A Connector

Power center to compute rack



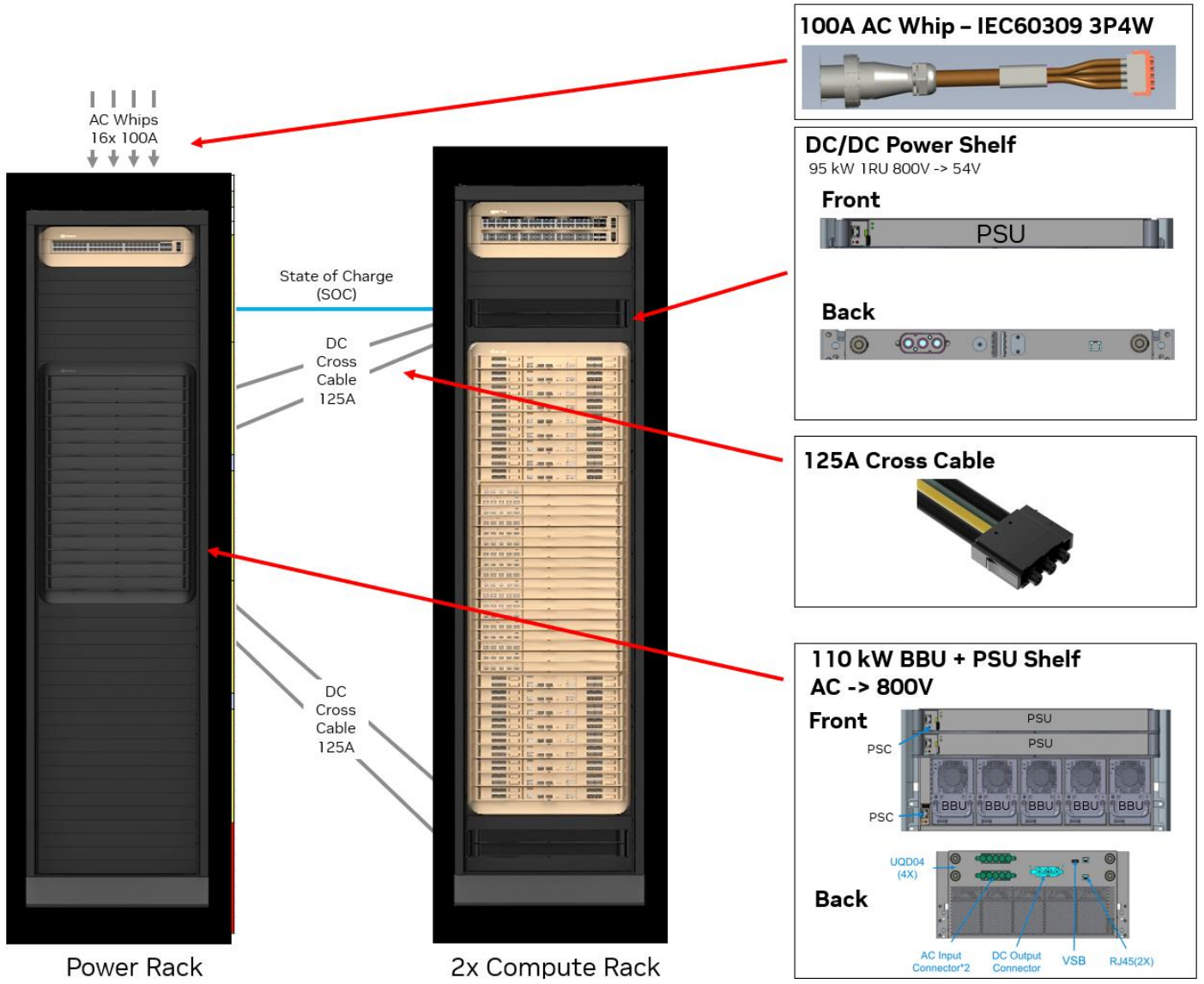
Tap box to compute rack
Hardwired drop cord





Second Generation

- Moving to 100% liquid cooled
- Increased energy storage
  - 65 J/kW -> 100 J/kW
- 880 kW N w/ BBU
- 90s holdup time



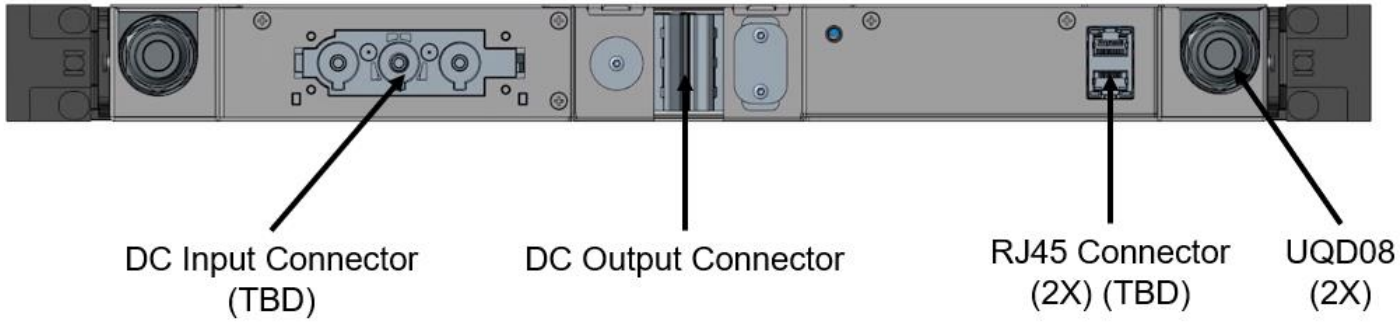
100% Liquid Cooled

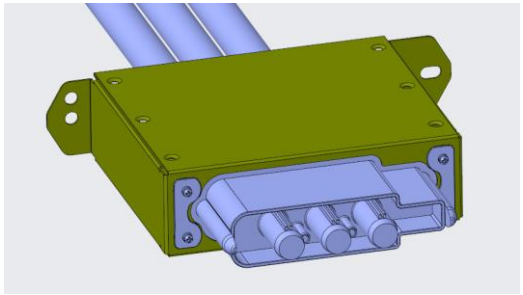
- 1RU = 1 PSU
- Recover space from cold plate
- No internal manifold
- Integrated BMC

Front View



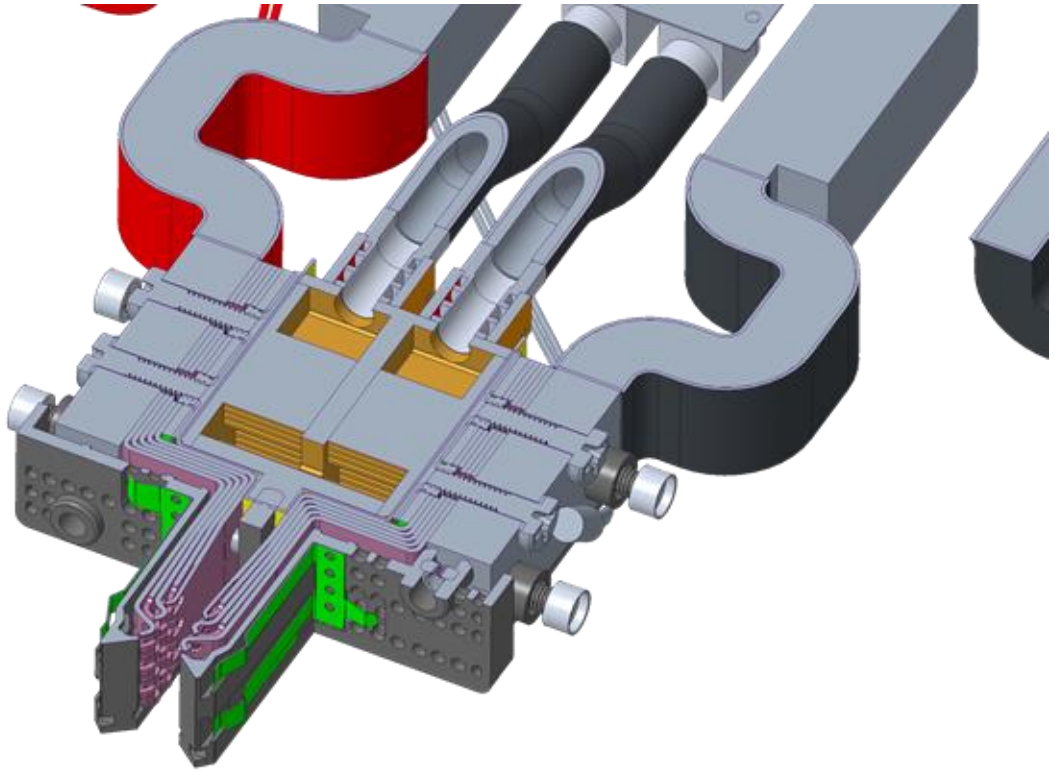
Rear View





Liquid Cooled Busbar Clip

- 2036A Busbar Clip
- +11% RMS heating



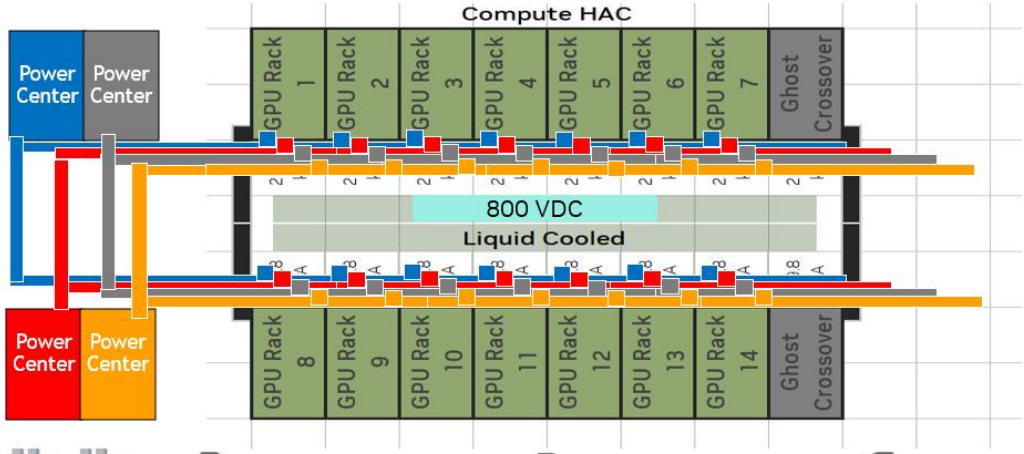
Power Center

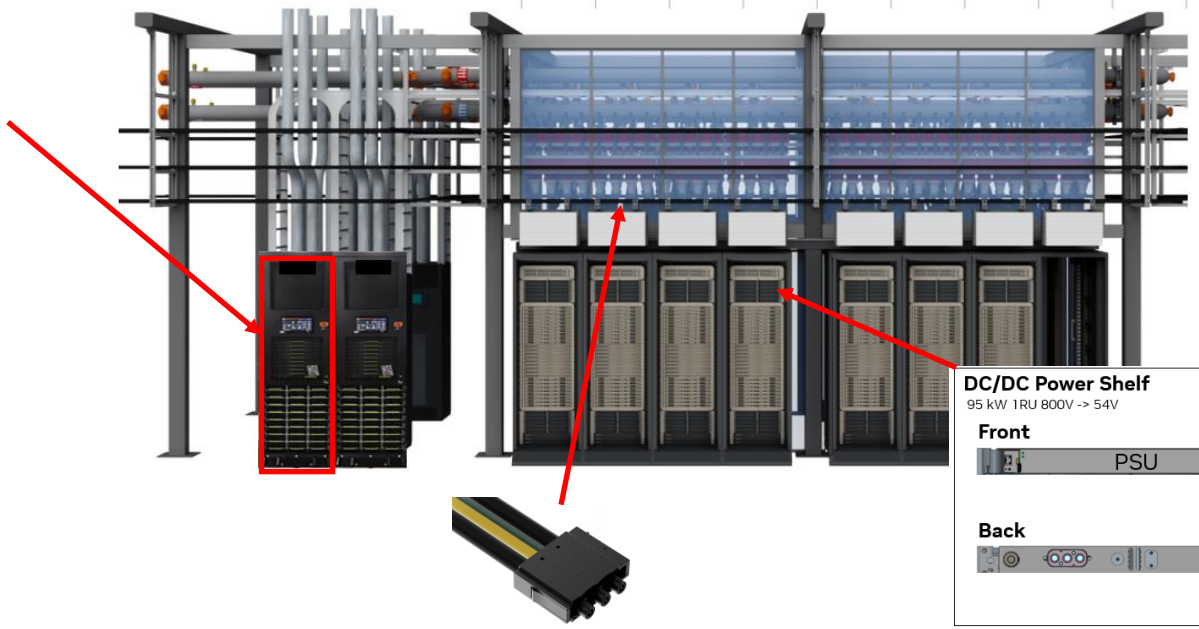
Front



Back







Call to Action

- Evaluate 125 A / 157 A 800 VDC Connector as standard connector / block size
- Evaluate 100 A multiconductor whip as standard interface
- AC input current shaping as standard requirement for AI workloads
- Liquid cooling as standard power cooling moving forward

Thank You!

