# Overview of OCP Open Rack Standard V3 – Power System

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# Key ORv3 Power Features

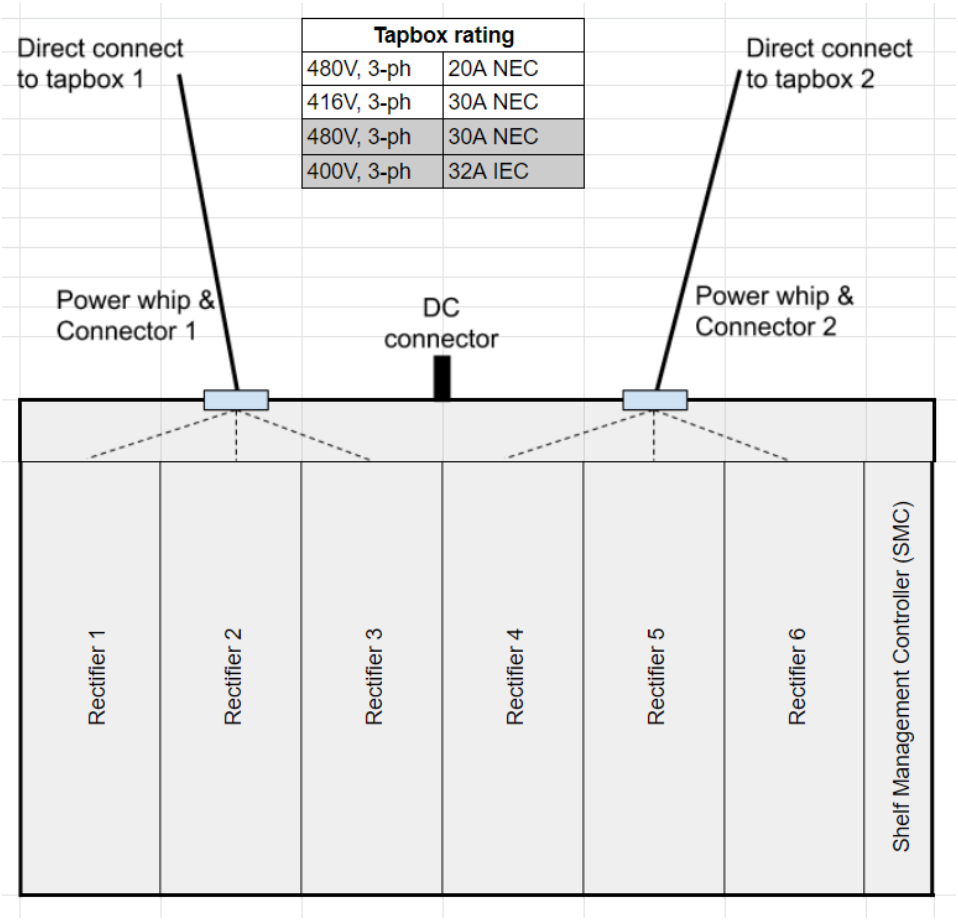
- One power zone with 48V output voltage.
- Flexible and modular power system
  - can add more power and/or backup as needed.
  - can be placed anywhere in the rack.
- Independent Power & Battery systems – Higher reliability.
- Peak power shaving - with regulated battery backup approach.
- Universal AC power Whip – whip part of data center.

# Main V3 New Power Components

1. Power shelf – 3 options.
2. 48V rectifier module – 3kW.
3. Shelf Management Controller (SMC) for Power & Battery shelves.
4. Power/Battery shelf output connector.
5. Universal 7-pin Input Connector for the Power Shelf.
6. Independent Battery Shelf.
7. Regulated Battery backup module.

# Power Shelf – Option 1

- 1U shelf with two AC power input.
- 6x 3kW rectifier slots.
- Output power:
  - 15kW with N+1 and dual cords.
- 3-phase 480/277 Vac input rated.
- Direct connect to tap-boxes/facility – no intermediate PDU.

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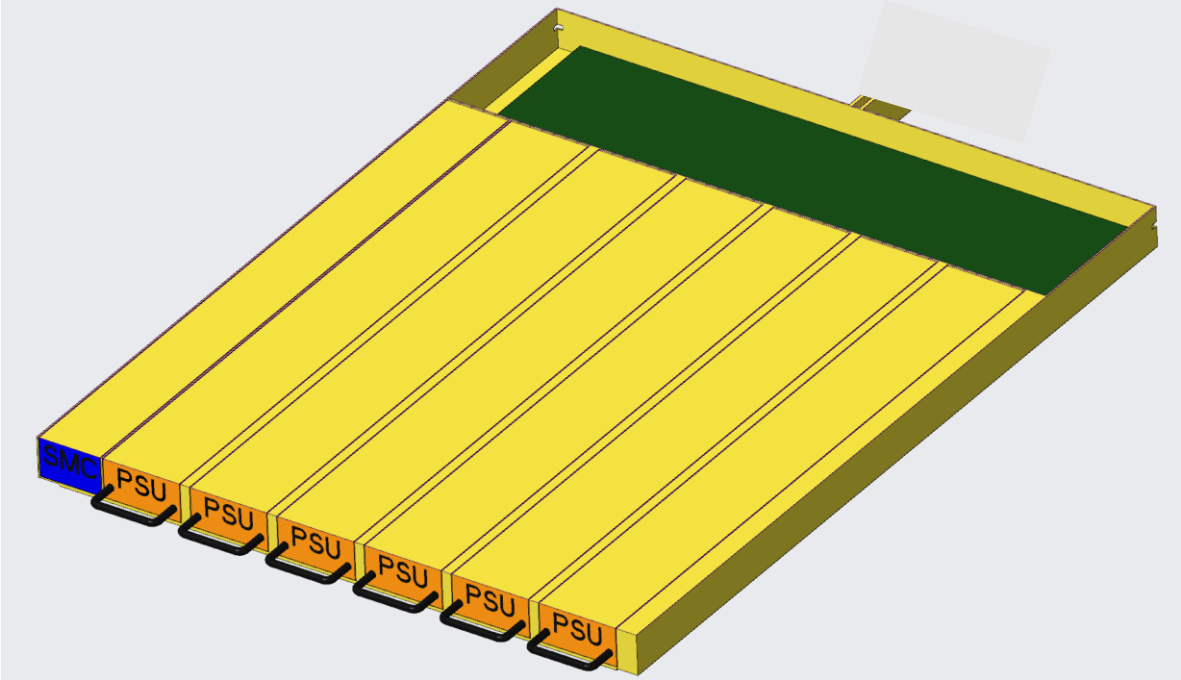
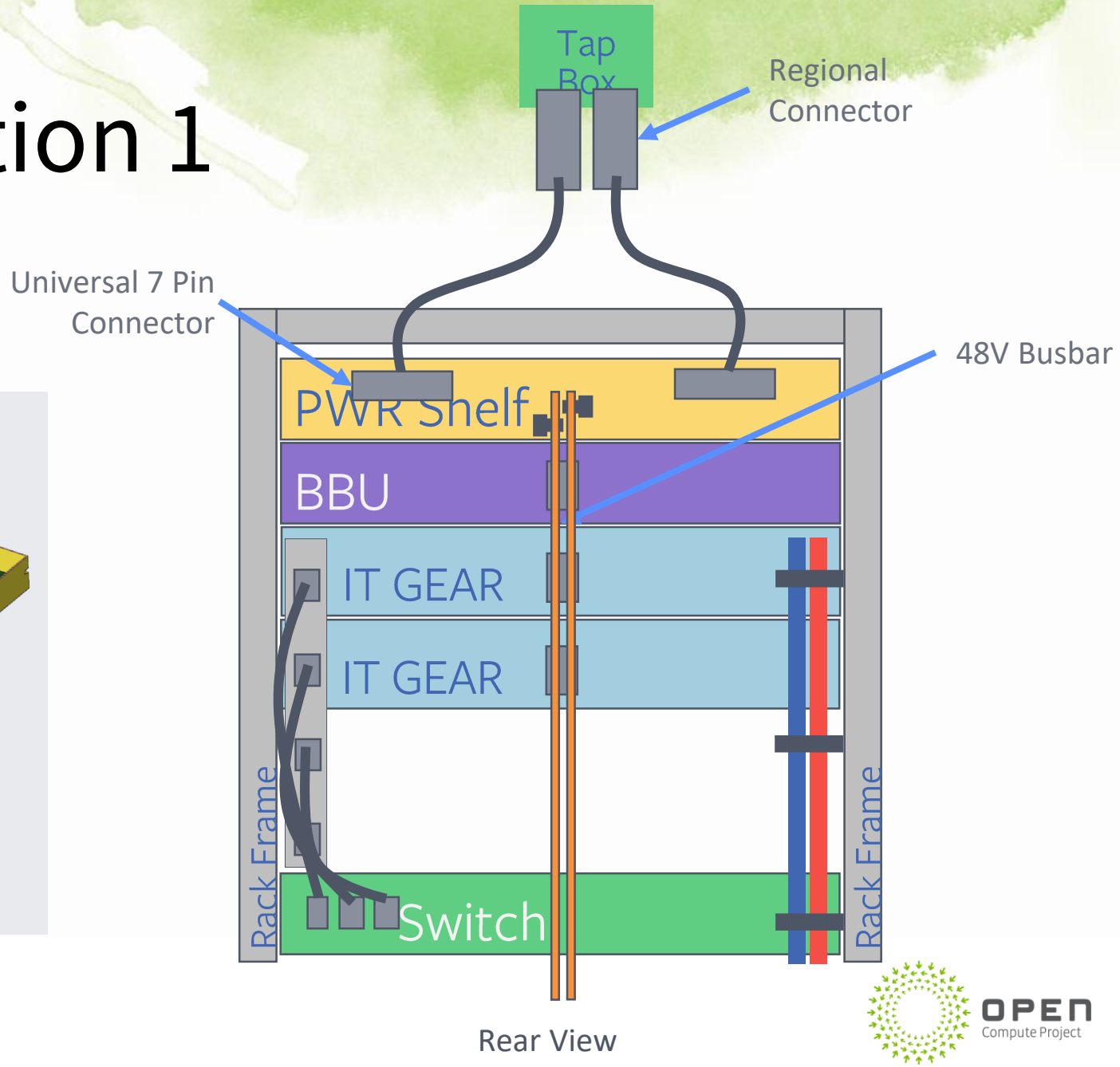
# Power Shelf – Option 1

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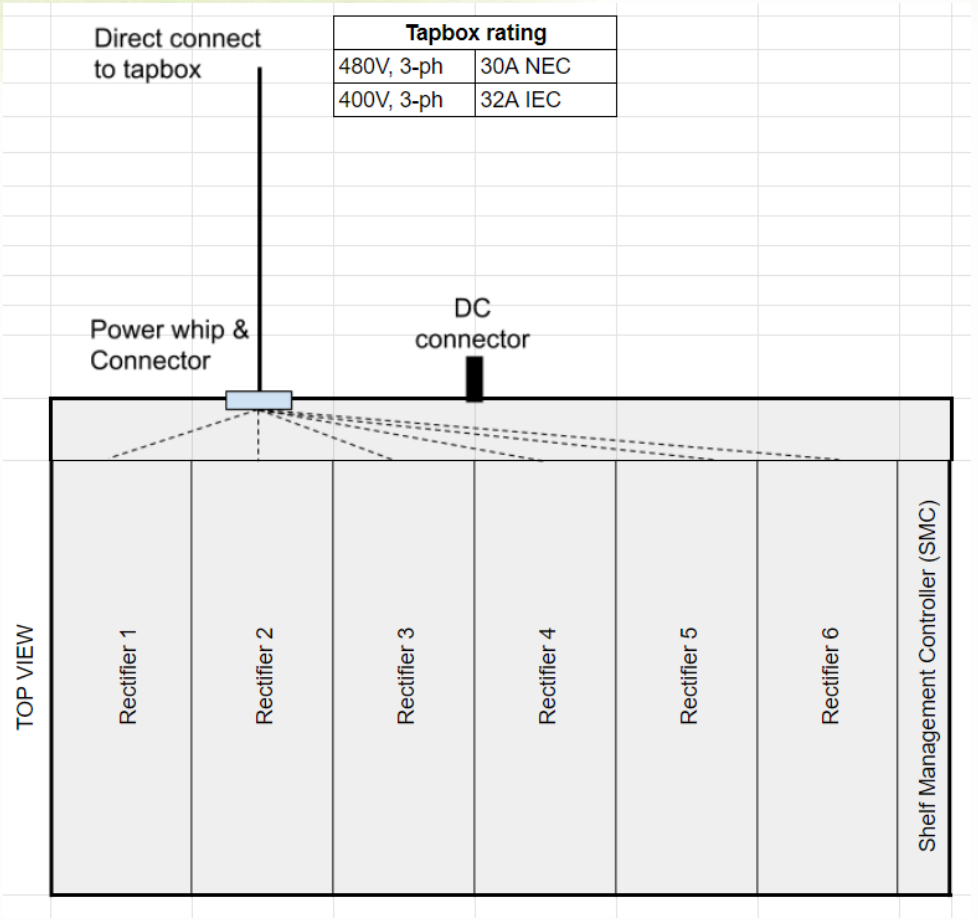
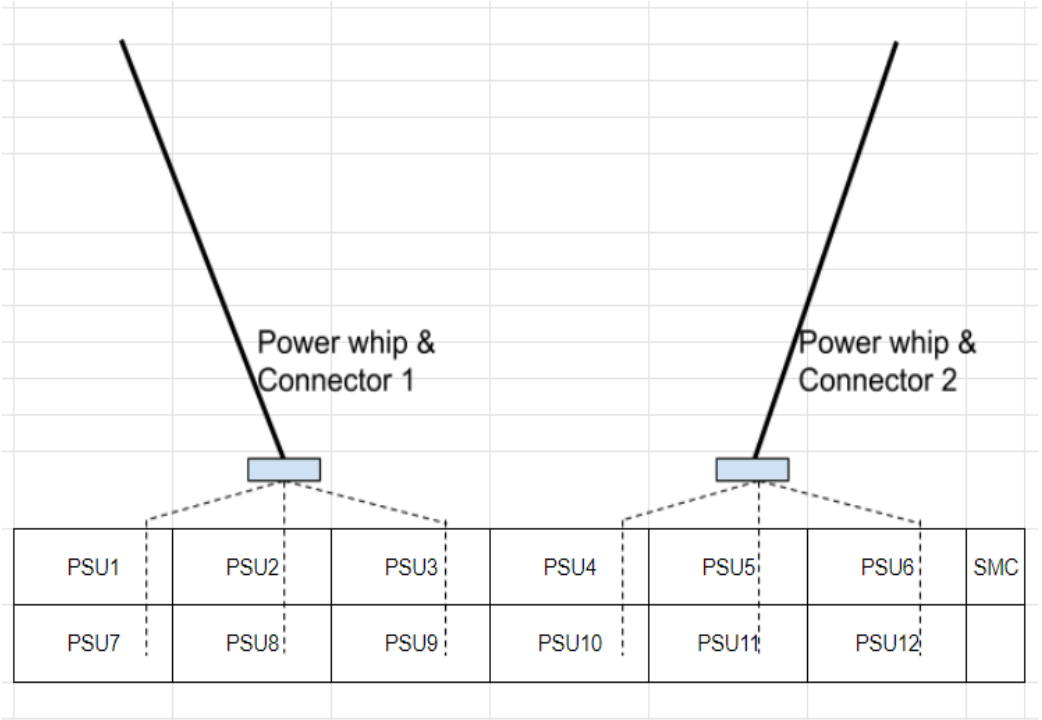
# Power Shelf – Option 2

- 1U shelf with one AC power input.
- 6x 3kW rectifier slots.
- Output power:
  - 15kW with N+1 and single cord.
- 3-phase 480/277 Vac input rated.
- Direct connect to tap-box/facility – no intermediate PDU.



# Power Shelf – Option 3

- 2U shelf with two AC power input.
- 12x 3kW rectifier slots.
- Output power:
  - 18kW with N+N.
  - 36kW with 2 units (4U) N+N.
  - Can be considered 33kW with N+1.
- 3-phase 480/277 Vac input rated.
- Direct connect to tap-boxes/facility – no intermediate PDU.

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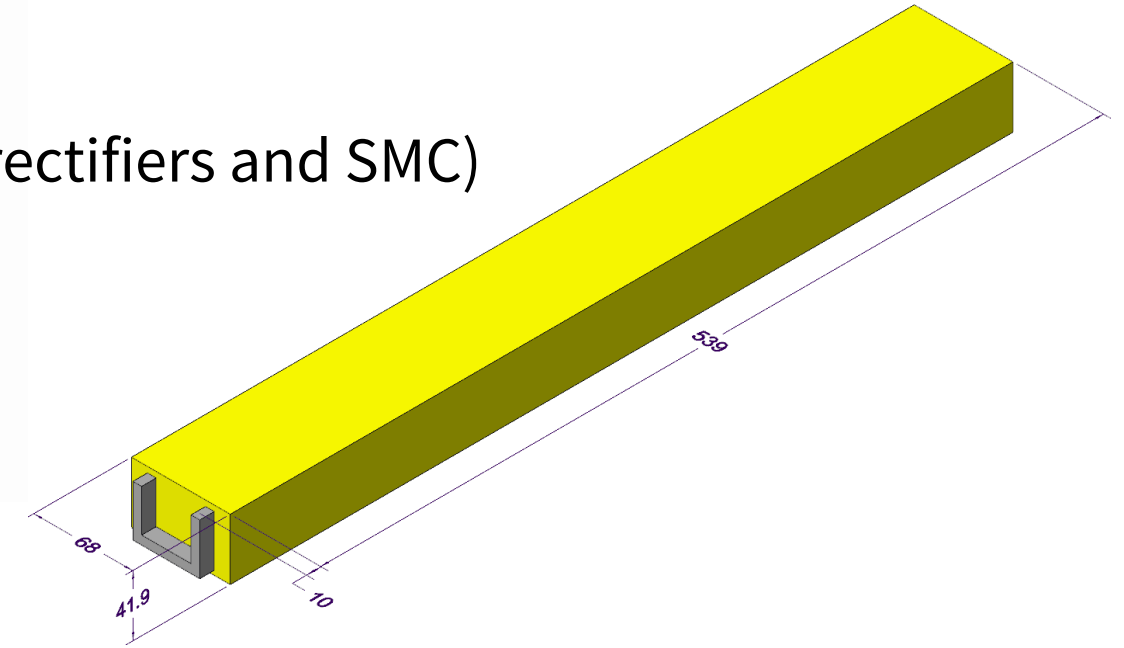
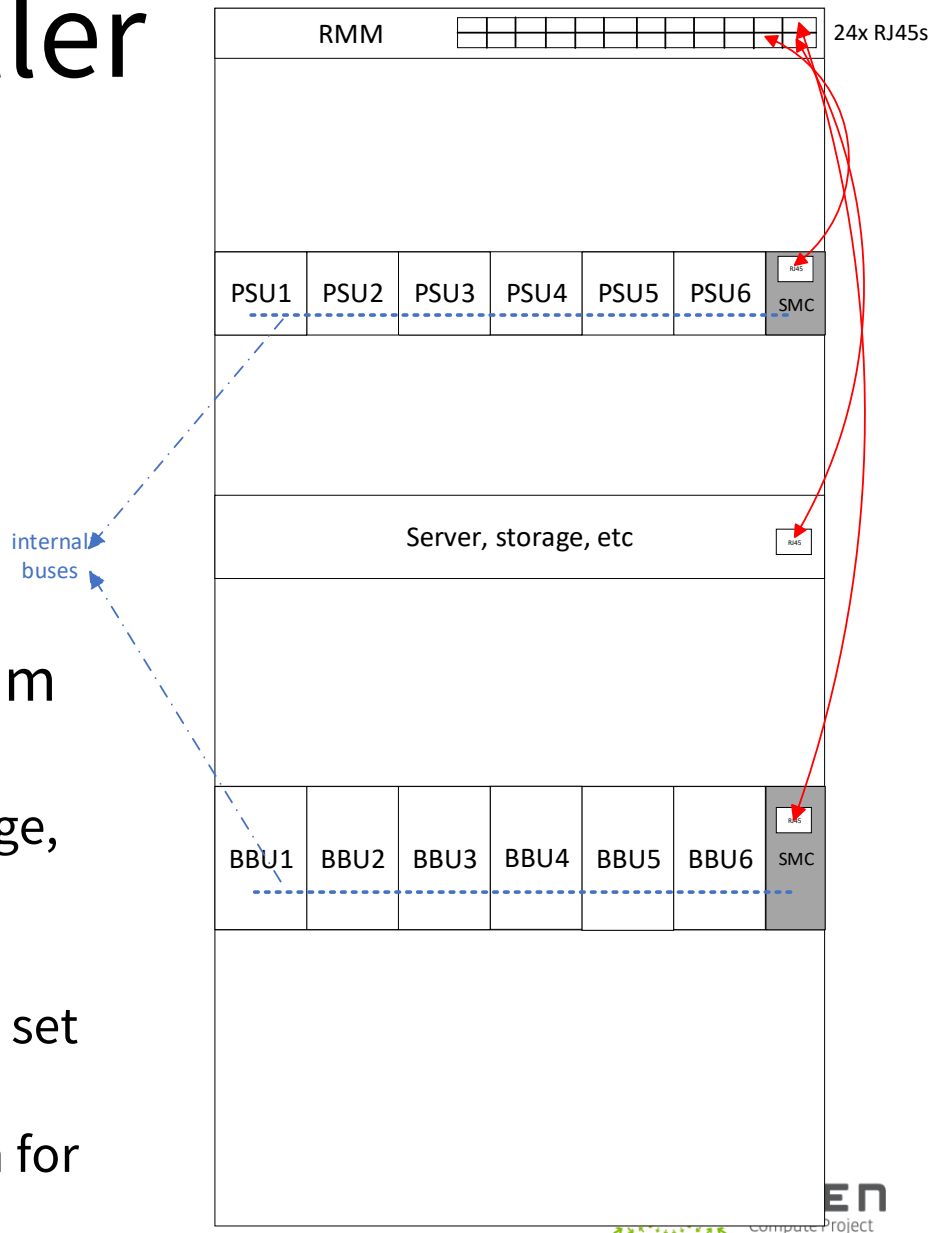
# 3kW 48V Rectifier

- Input: Single-phase, 200-277V, 50/60Hz.
- Single Output: 42-58V (adjustable), 54.5V nominal.
- Efficiency (incl. fan):
  - Peak: 97.5%
  - Full-load : 97%
- Communication: single CAN bus (with other rectifiers and SMC)
- Active current sharing (through CAN bus.)
- EMI: EN55022 Class A.
- THD: <5% for AC input current.



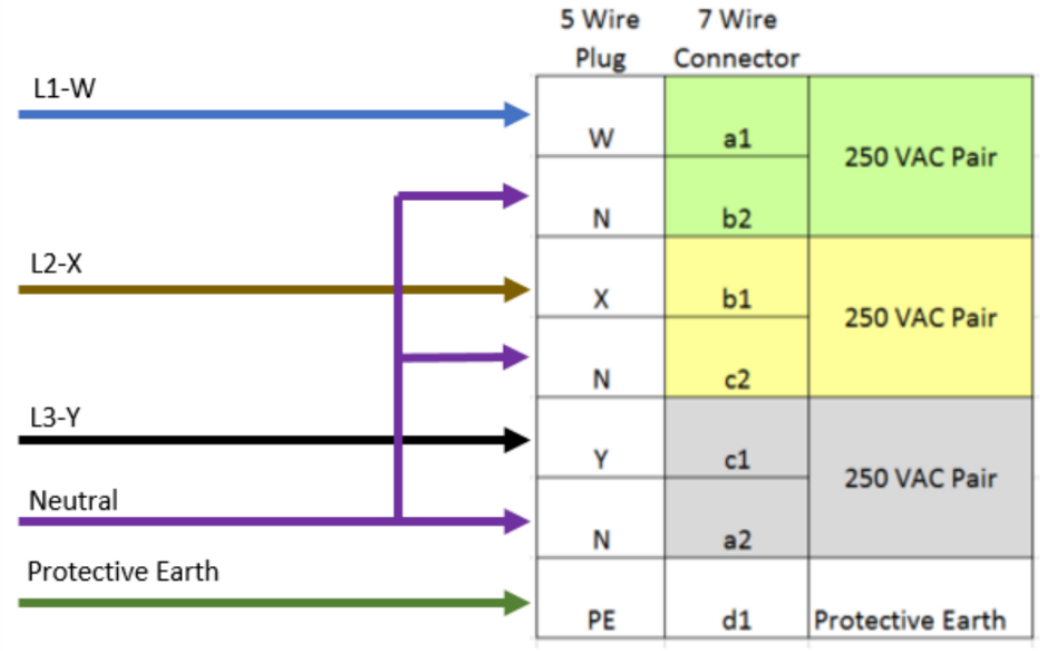
# Shelf Management Controller (SMC)

- Universal shelf monitoring and control module
  - Used for both battery and power shelves.
- Communication upstream through:
  - Modbus (RS485)
  - Ethernet
- Single CAN bus for communication with downstream components (rectifiers or battery packs)
  - Monitors and collect each component parameters (voltage, current, SOH, faults, etc)
  - Remote Firmware Update
  - Send command to each/all components (change voltage set point, battery test, etc)
  - Components use same CAN bus for inter-communication for active current sharing.



# Universal Power Shelf Input Connector

- 7 pin connector to be configurable as:
  - Star connection
  - Delta Connection
  - Single phase
- Includes branching on the connector plug, e.g. 5 wire cable to 7 pin.
- 50A/480V rated.
- Pluggable solution - whip part of data center.




Example: 5 wire cable to 7 pin connector branching

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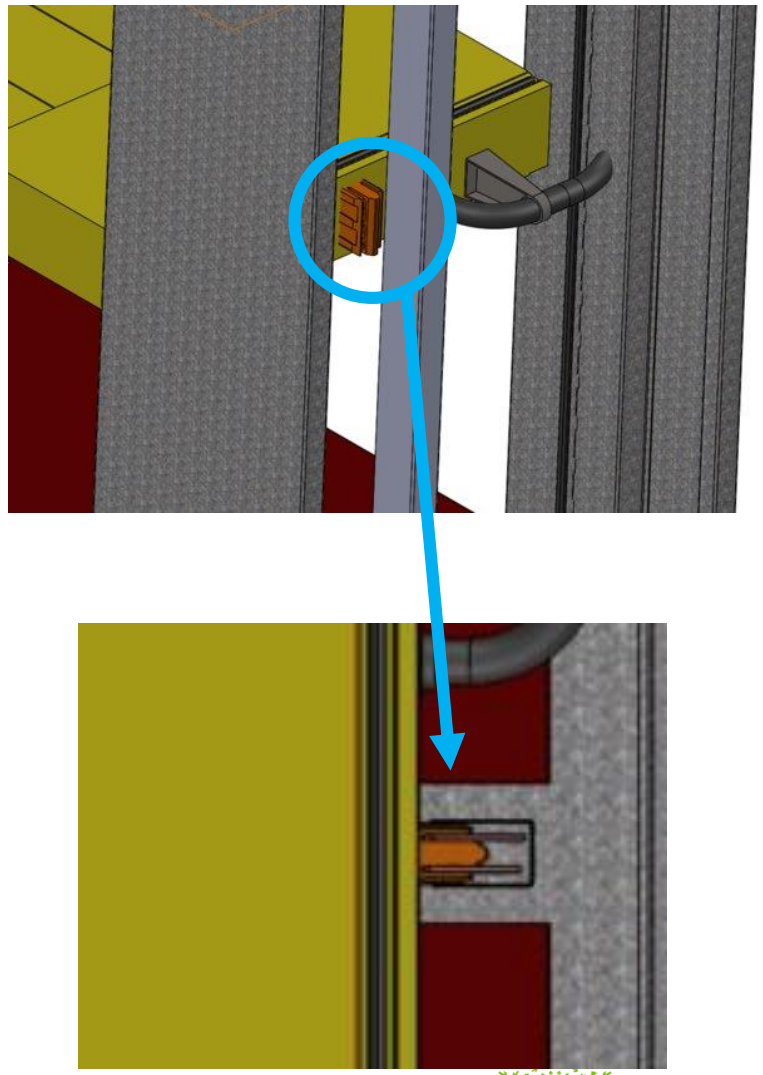
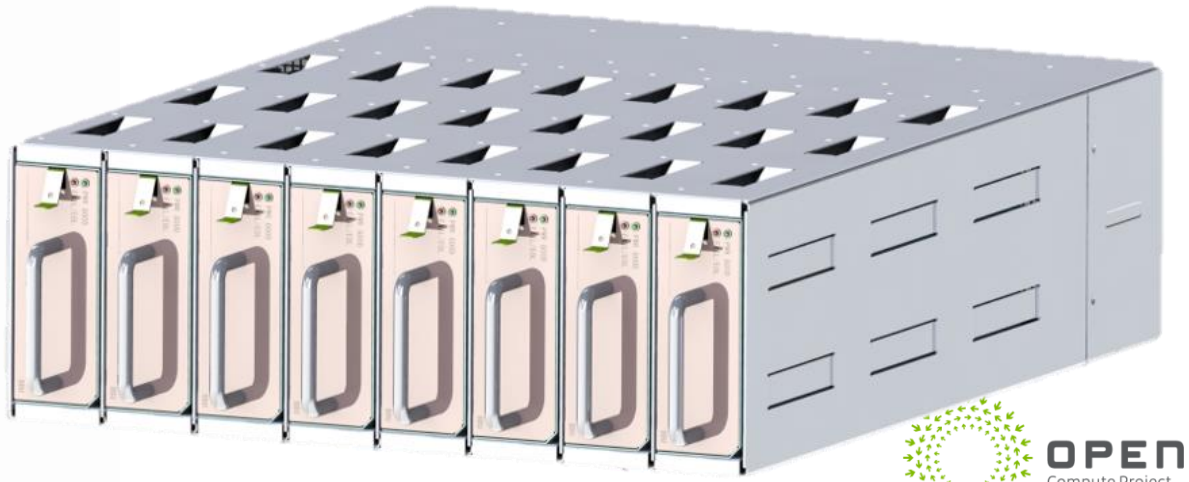
# Power and Battery Shelf Output Connector

- Floating connector blindmates to busbar.
- Assembled on the rear side of the power and battery shelves.
- 12/48V, 500A rated.
- Floating connector blindmates to busbar, so gives the flexibility of:
  - Place power and battery shelves any desirable location on the rack.
  - Can add more power and/or battery shelves as needed.



# Battery Backup Module and Shelf

- Independent Battery system – Higher reliability.
  - Doesn’t rely on the power shelf for the power transfer.
- Peak power shaving - with regulated battery backup approach.
- Matches the power of the power shelf: 15kW w/ N+1.
- Current design target:
  - 10 minutes backup time in 4U at end of life.



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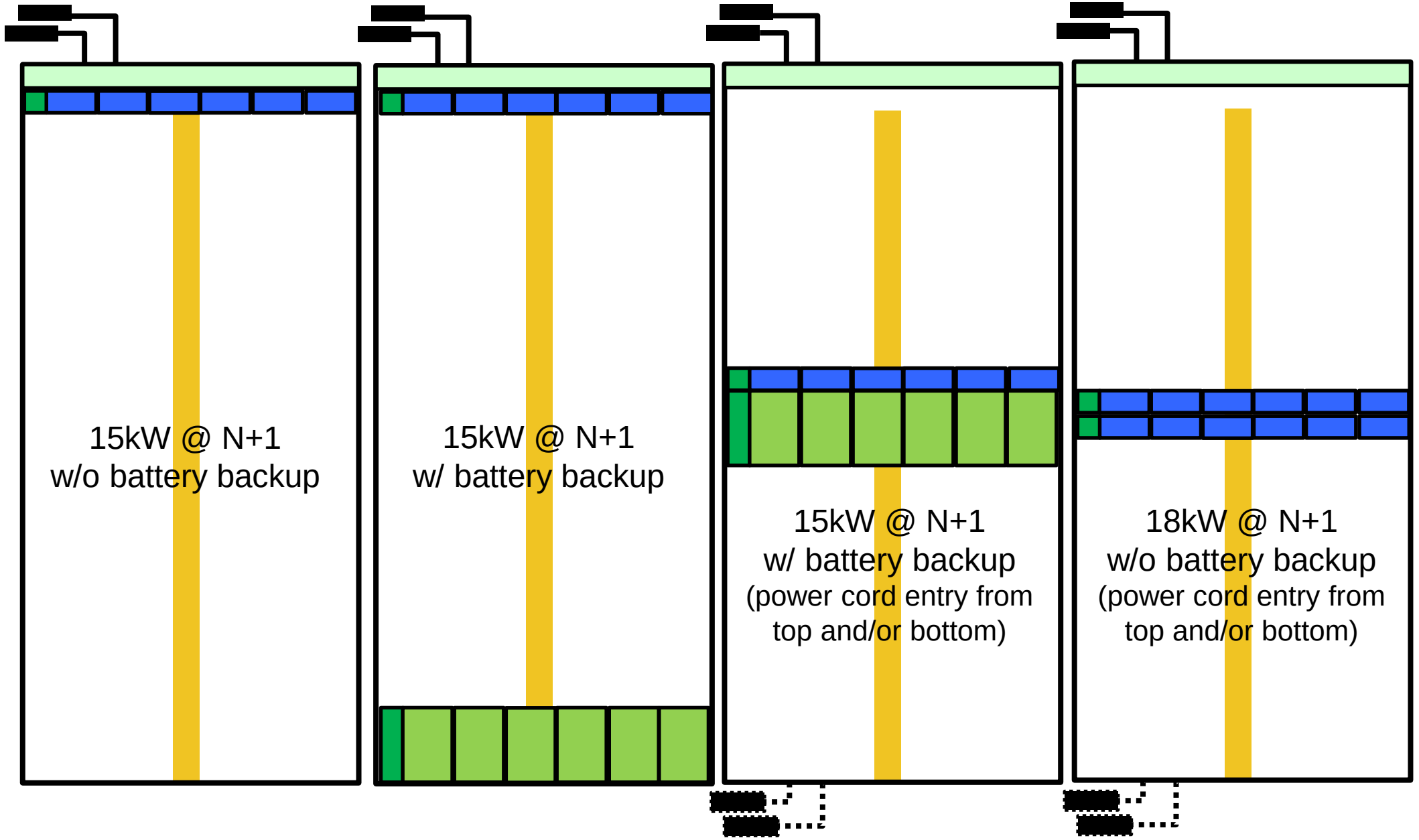
# Some rack power config examples

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# THANK YOU

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