Powering AI infrastructure

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AGENDA

1 | AI facts

2 | 12 V power architecture

3 | 48 V power architecture

4 | 800 VDC architecture

5 | PDB architecture

6 | Sum-up

7 | Connect with us

AI impact everywhere

$15T in economic contributions in 2030[1]

>$6T in productivity gains[1]

>$9T in consumption effects[1]

1ST WAVE UNDERWAY 2023

AI training clusters and tools

2ND WAVE RAMPING 2025

Broad enterprise use case adoption from edge to cloud

BY 2029

$1 trillion worldwide data center IT capex[2]

BY 2030

Cloud service provider infrastructures will host ~65% of AI workloads in EU, US[3]

33% CAGR for AI-ready data center capacity through 2030[3]

1. PwC: "Sizing the Prize" published in 2017 and updated in 2023
2. Dell'Oro Group: "Data Center Capex to Surpass $1 Trillion by 2029," February 5, 2025
3. McKinsey & Company: "AI power expanding data center capacity to meet growing demand," October 29,2024

The evolution of AI
Power requirement rapidly increasing

AI power architectures

Generation 1: 12 V architecture

Pros:

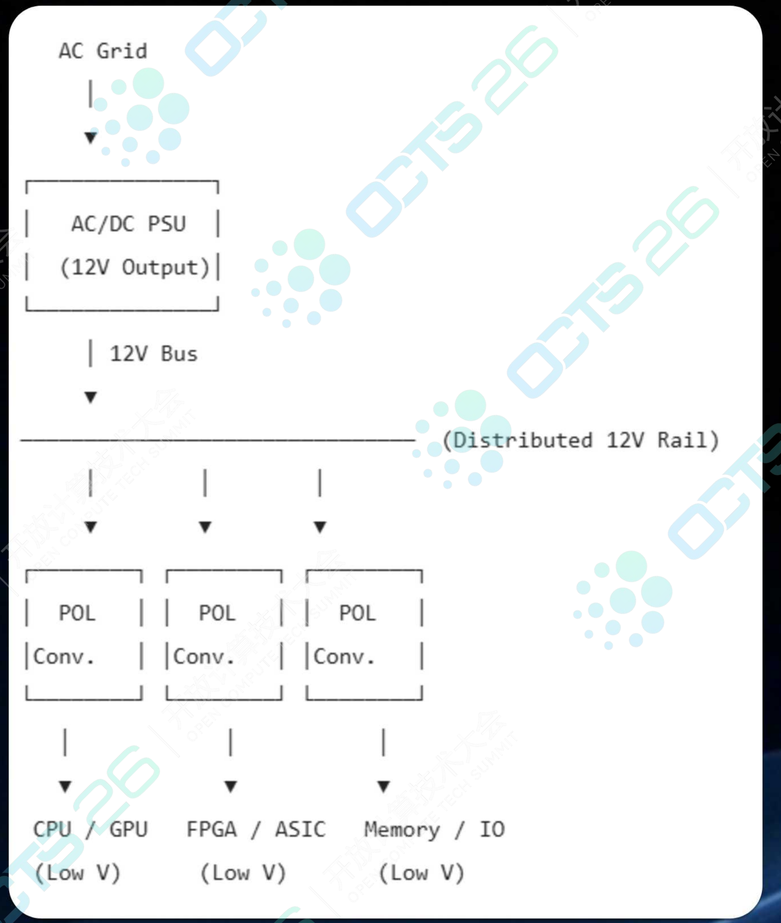
- Simple, standardized
- Legacy ecosystem

Cons:

- High current = I^2R losses
- Poor efficiency
- Not scalable for AI racks > 30kW

Conclusion:

- 12 V fails due to current scaling



Representative diagram only; created using Microsoft Copilot

AI power architecture evolution

Generation 2: 48 V architecture

Pros:

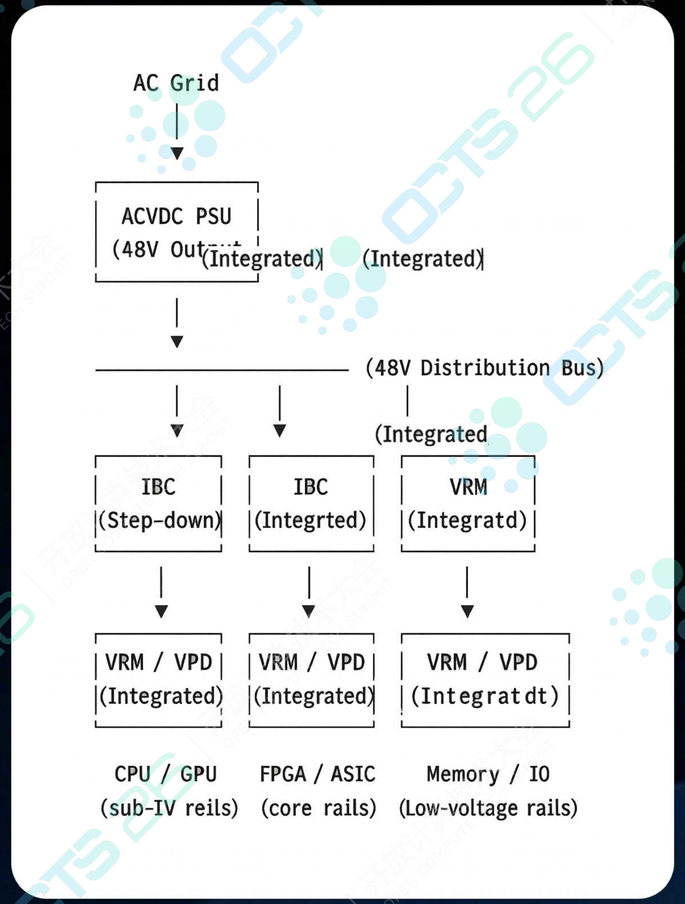
- Enables higher rack density
- Supports VPD – customized power

Cons:

- Significant copper losses
- Board space
- Thermal constraints

Conclusion:

- 48 V is the bridge and required but not the end state



Representative diagram only; created using Microsoft Copilot

AI power architecture evolution

Generation 3: 800 VDC architecture

Pros:

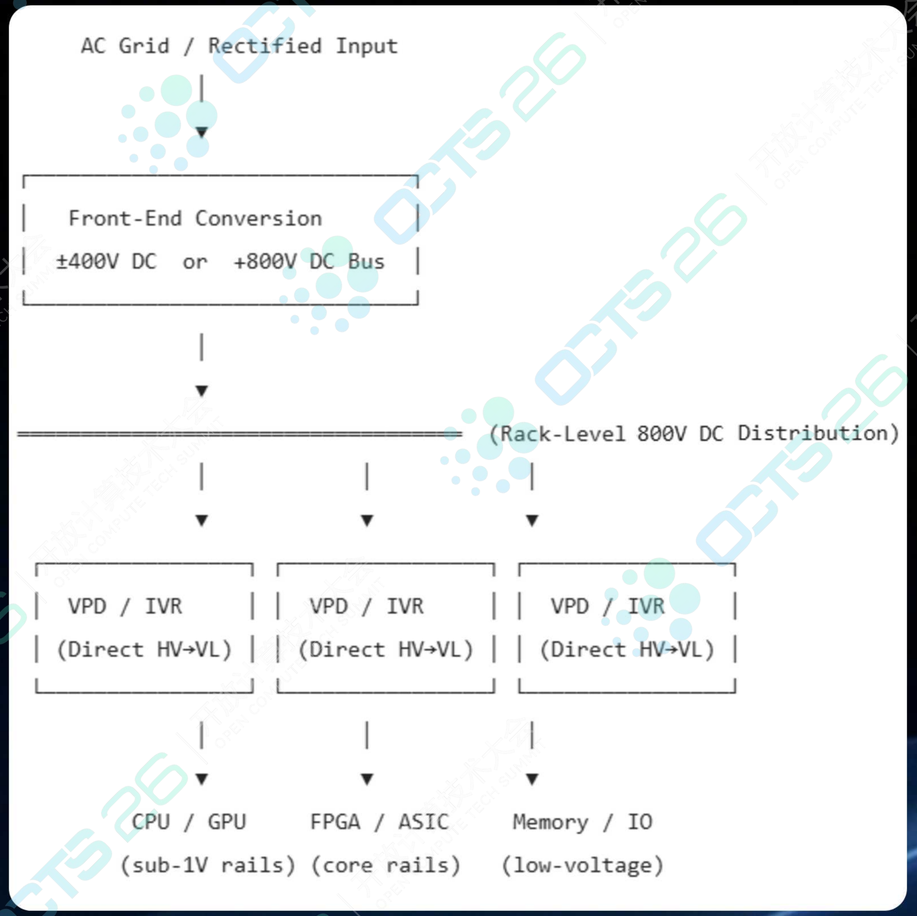
- Drastic current reduction
- Lower distribution losses
- Simplified power chain

Cons:

- Safety & protection
- New standards

Conclusion:

- 800 VDC is a structure shift in power delivery



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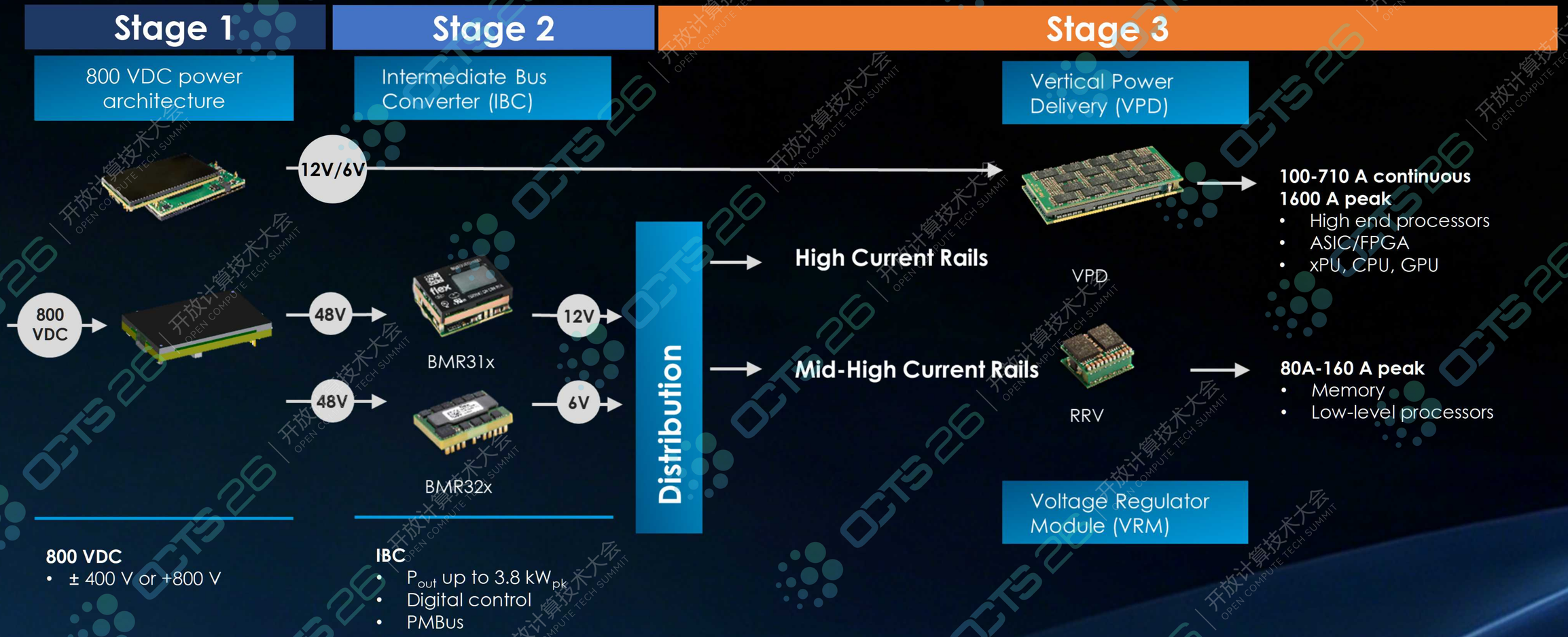
3 stage power conversion

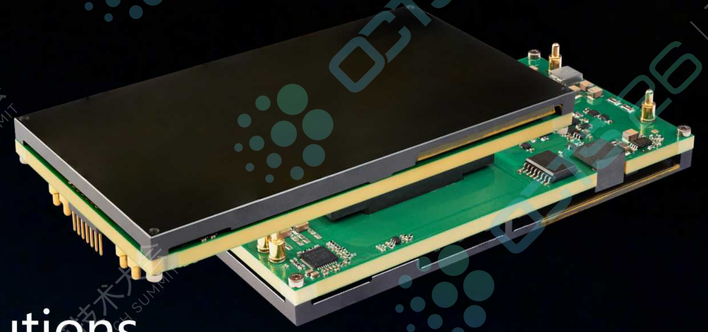


800 VDC products & development

Flex next-gen power modules portfolio

BMR720 – next-gen power in a full brick:

V_{in} = ±400 VDC | V_{out} = 50 V (16:1) | Power = 10kW TDP and 15kW peak | efficiency = 98.5%



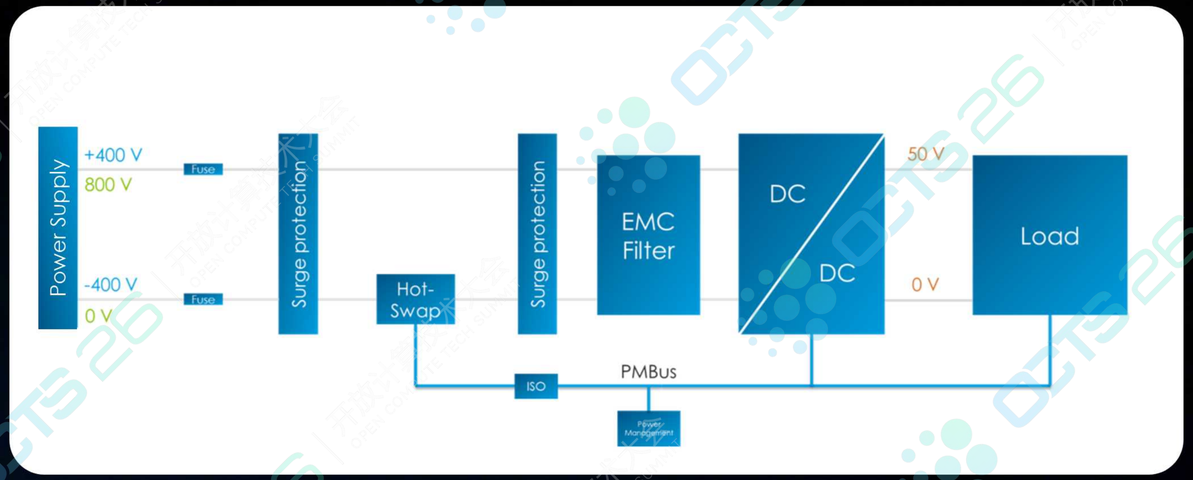
Trends in the market:

- Choice between regulated and unregulated
- Standard brick formats
- Capability to provide custom PDB (power distribution board) solutions
- Units capable of supporting either 800V or ±400V (isolation differences)
- 800 VDC is not the final stage

Power Distribution Board

PDB architecture

- Customized solution
- Fusing
- Surge surpression
- Current measurements
- Hot swap
- EMC filtering
- Bulk capacitance & discharge circuit
- PMBus interface & isolation



Conclusion

- Higher current driven by AI
- Move to higher voltages and fewer conversion steps
- FET technology evolution - GaN&SiC
- Advanced cooling solution

Let´s connect

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