



OCP SUMMIT

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RECOMMENDED PROFILES FOR NEXT GENERATION OCP RACKS

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Agenda

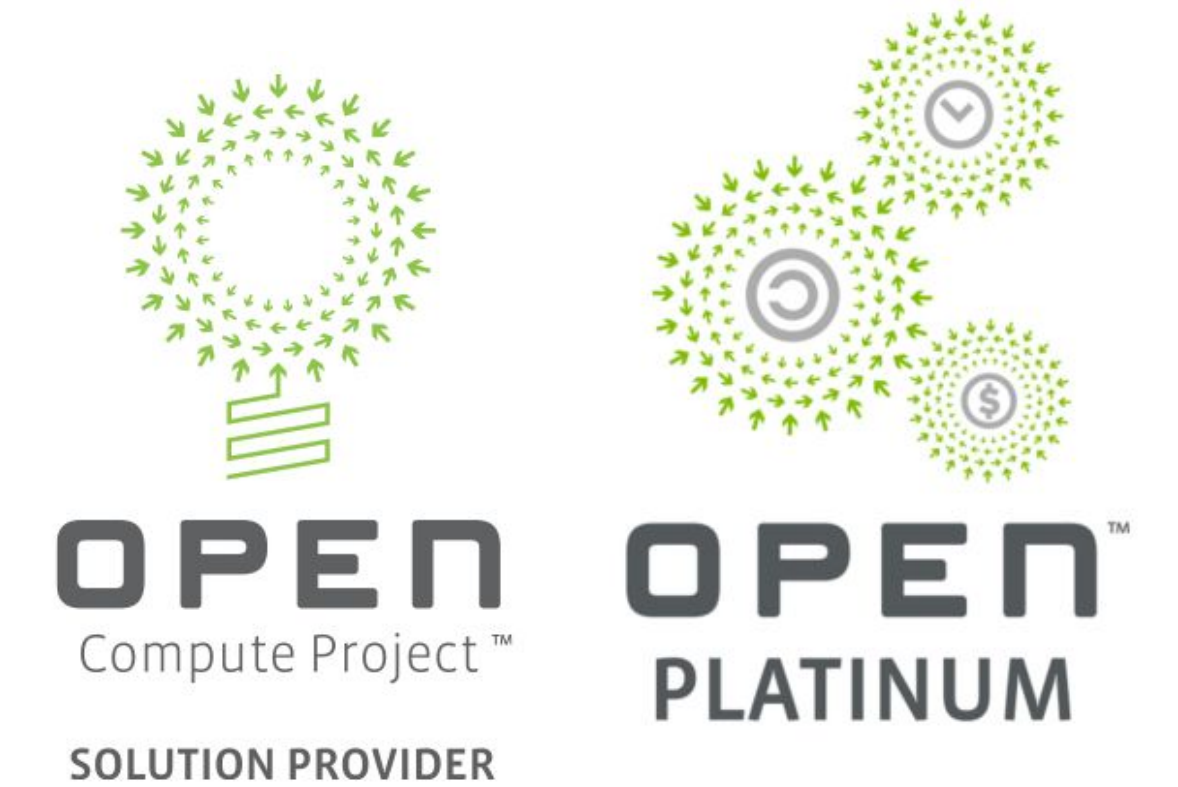
- About Penguin Computing (and why we care about OCP standards)
- Open rack evolution
- Rack profile overview
- Notable rack profiles
- Optimization imperative
- Recommended Changes
- Conclusion
- Discussion



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About Penguin Computing

- U.S.-based 20 year old, global provider of HPC hardware, software, and services
- Home to Scyld® Beowulf cluster software and bare metal HPC on cloud Penguin Computing On-Demand™
- Over 300 OCP racks delivered to date based on Tundra™ Extreme Scale design
- Platinum OCP member, Penguin CTO Phil Pokorny is HPC representative of the OCP Incubation Committee



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Open Rack Evolution

- Open Rack
 - Innovative standard since 2012
 - Enlarged rack unit and width
 - Cold aisle installation and service
- Key updates since latest version (v2.0)
 - Two depths (800mm, 660mm)
 - Two DC busbar voltages (12Vdc, 48Vdc)
- Multiple Options
 - (2) Depth x (2) Bus bar voltages x (2) Bus bar no. x (2) Rack units x.....






Source: Open Rack Standard

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Rack Profile Overview



		Short (660mm)	Deep (800mm)	Short (660mm)	Deep (800mm)
Voltage	12V		 		
			II	I	
		Short (660mm)	Deep (800mm)	Short (660mm)	Deep (800mm)
48V					Others
		3		1	
		DC Bus Bar No.			

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Notable Rack Profiles

- 12Vdc + 1 DC Bus Bar
 - Open Rack v2
 - Deep depth (800mm)
- 12Vdc + 3 DC Bus Bar*
 - Open Rack v1
 - High density, power capacity and robustness
 - Deep depth (800mm)
- 48Vdc + 1 DC Bus Bar
 - Higher voltage for better power usage effectiveness (PUE)
 - Both short (660mm) and deep (800mm) depths



* Spec in submission to OCP Foundation for technical review - Q2'18

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Optimization Imperative

The deduction of build cost is limited by too many options, so is the acceptance of OCP design

Infrastructure design optimization is imperative to support increased demands of efficiency, flexibility, and scalability

- Determine the parameters that lead to the best ‘performance’
- Reduce waste



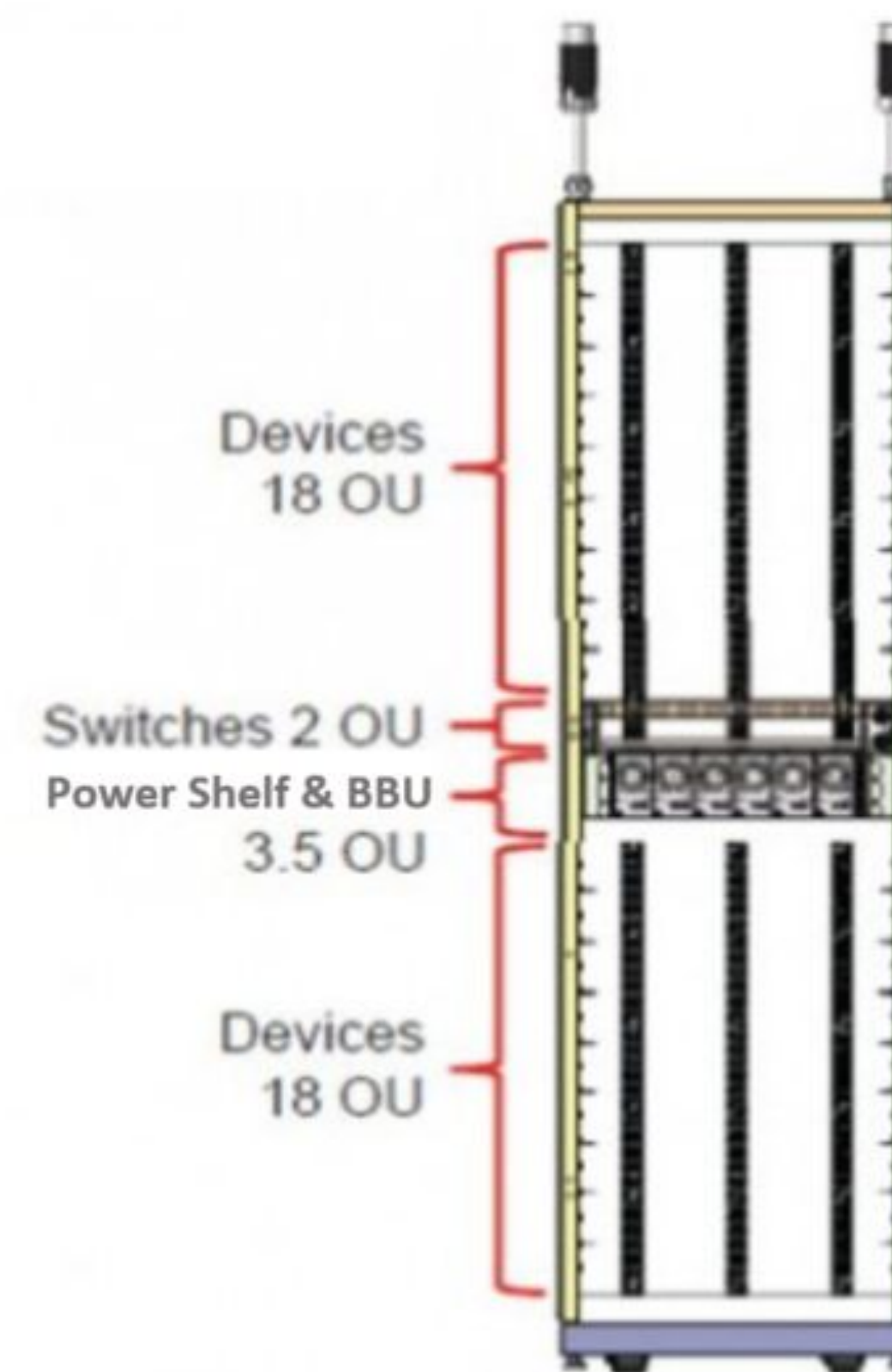
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Recommended Changes to 48Vdc Rack

- Maximize the density
 - Use specification executed in Tundra 1U server with 3 busbars to support 100+ nodes per rack.
- Cost Effective
 - Easier (and cheaper) to deliver more than 33kw with three bus bars instead of one.
 - Easier to distribute powers to the whole rack by placing the power shelf in the middle.
- Flexibility
 - 3 busbar location is more flexible to adopting existing IT devices.



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Conclusion

- Recommend to embrace three bus bars design when moving to 48Vdc
- 800mm depth to contain existing IT gear and power shelves
- Cheaper, more flexible way to deliver >33kW



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Discussion

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