

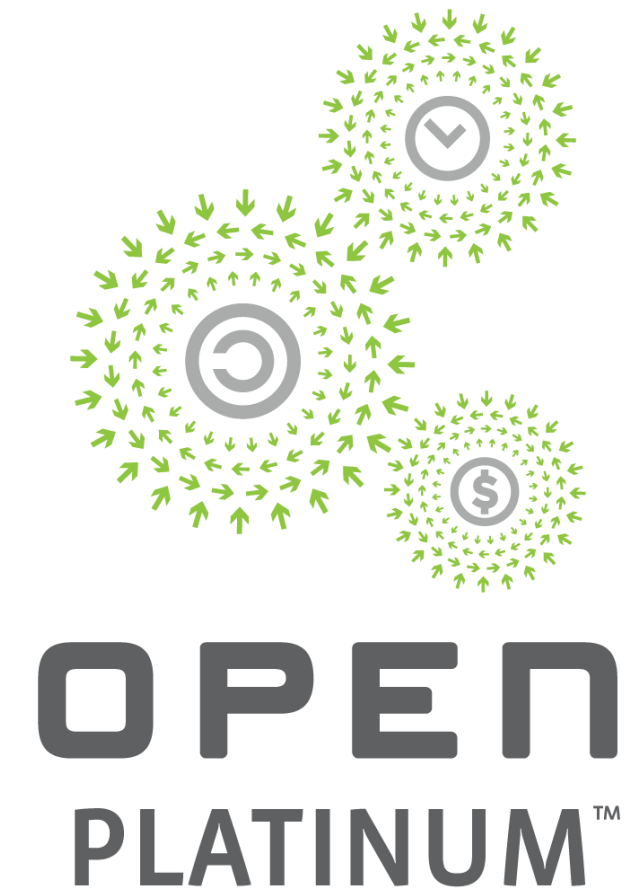


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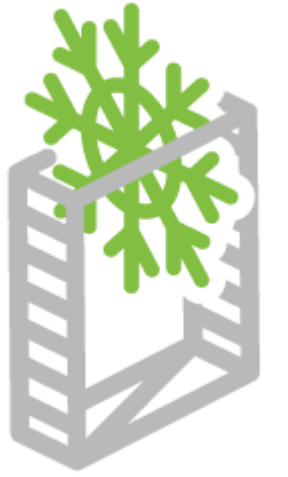
Modeling Immersion Cooling Compatible with OCP Profile



Shao Yen , Senior Engineer , Wiwynn



OCP Advanced Cooling Solutions (ACS)



- A sub-project of OCP Rack & Power
- Immersion Standards and best practices
- Version 1.0 Feb 20, 2019 Final community approval
 - Immersion technology definitions
 - Quality and safety requirements
 - Management and monitoring

https://www.opencompute.org/wiki/Rack_%26_Power/Advanced_Cooling_Solutions

Who Are We?



MANAGEMENT

- A leading player of rack-level integrator
- Delivered **27000+** racks in 2018
- ORv2, OCS, Open19, EIA 19”
- A leading player of OCP certified products
- **20** out of **30** OCP Accepted server/storage products are designed and/or made by Wiwynn.



Case Studies

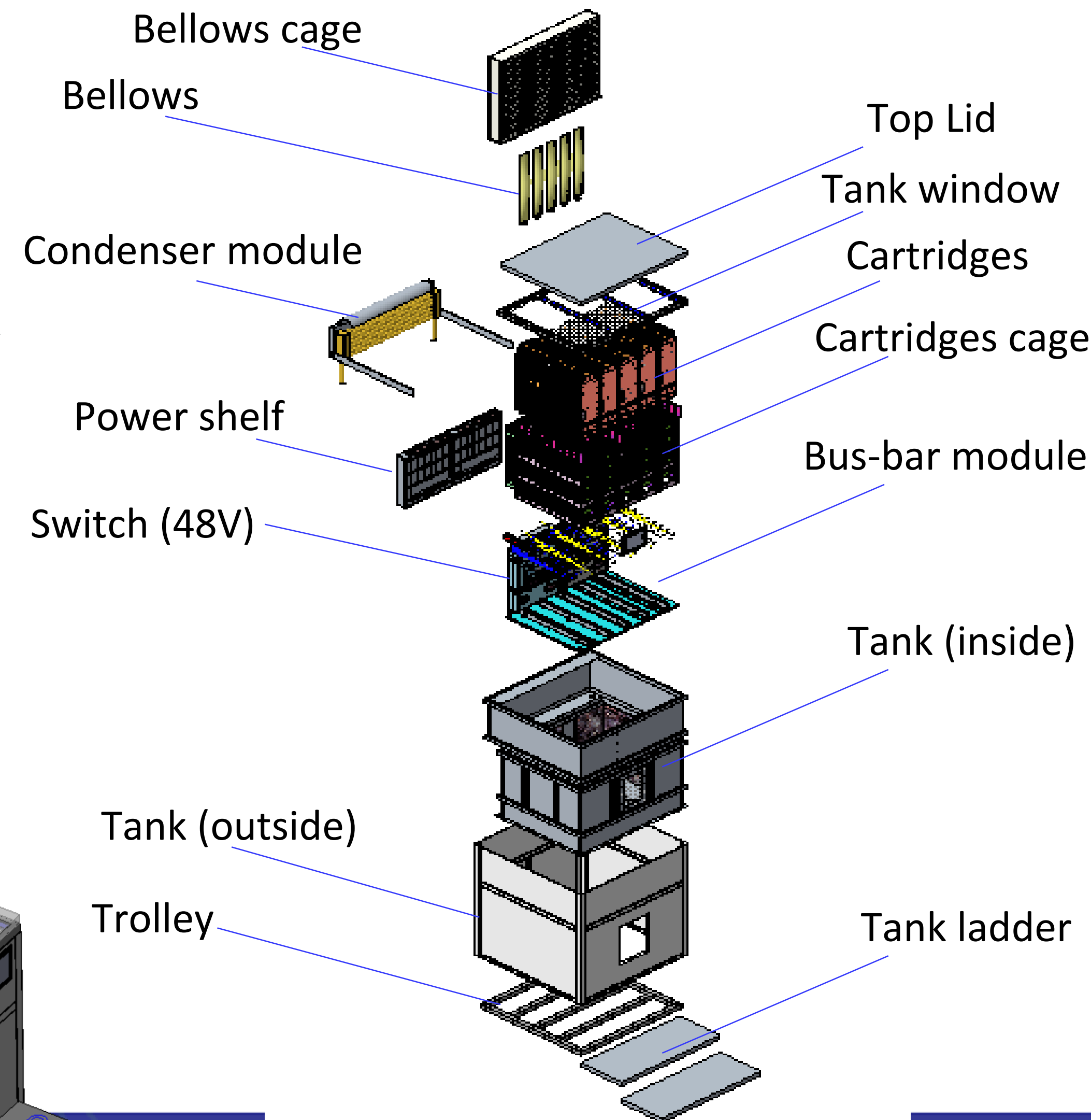
Where Are We?

- Wiwynn's whitepaper submission on immersion standards was approved
- Wiwynn is prototyping the use of Redfish to manage its immersive cooling tank

Building a Tank

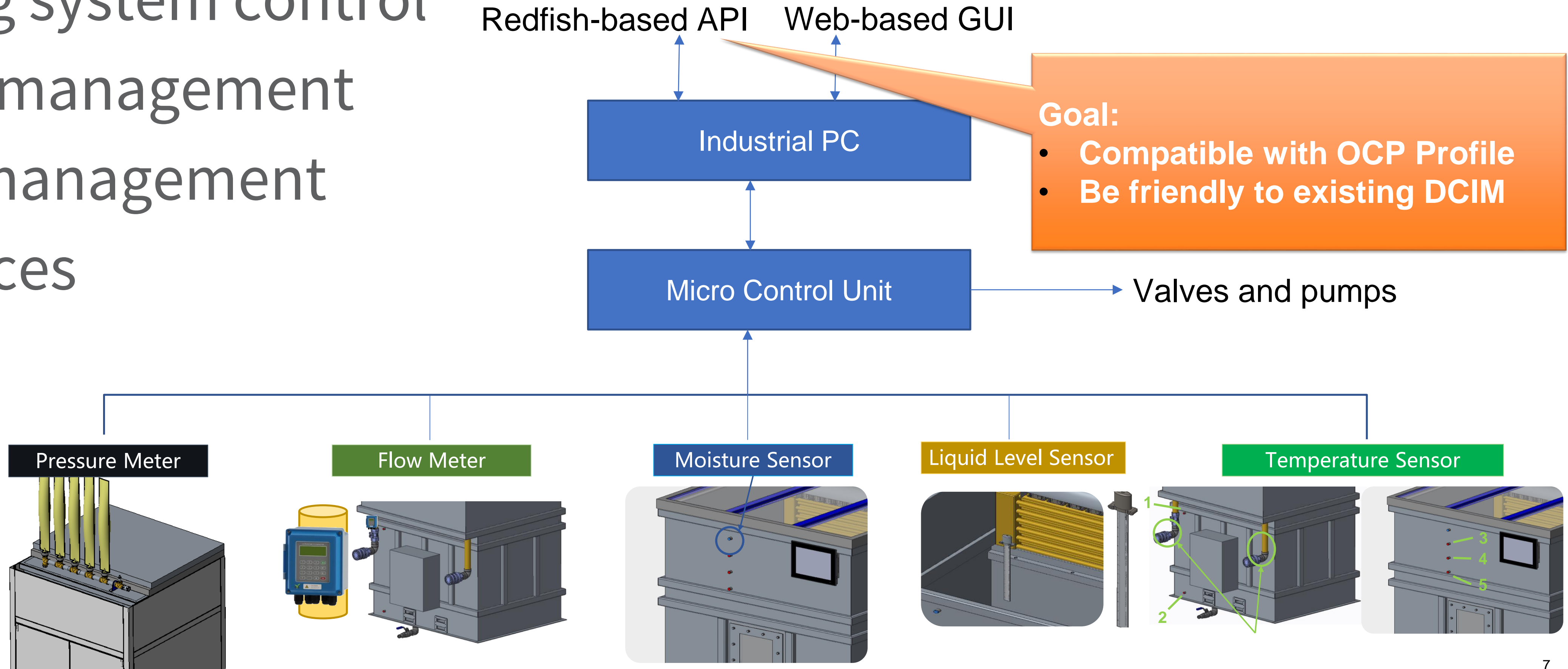
Key features

- High-density - 100 nodes per Tank
- Low PUE
 - Two-Phase Immersion Cooling
 - 48V DC power distribution



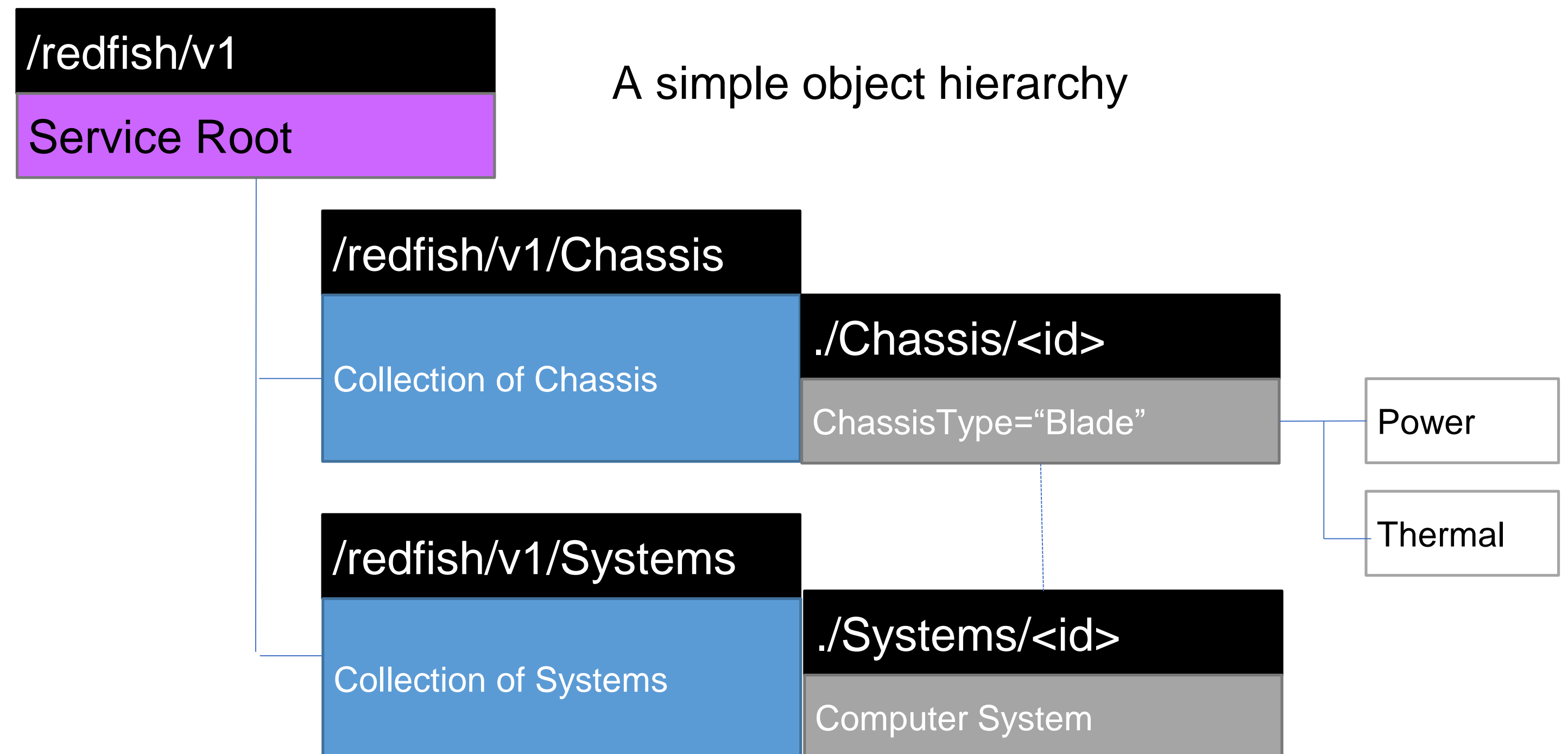
Management Software for the Tank

Cooling system control
Power management
Node management
Interfaces



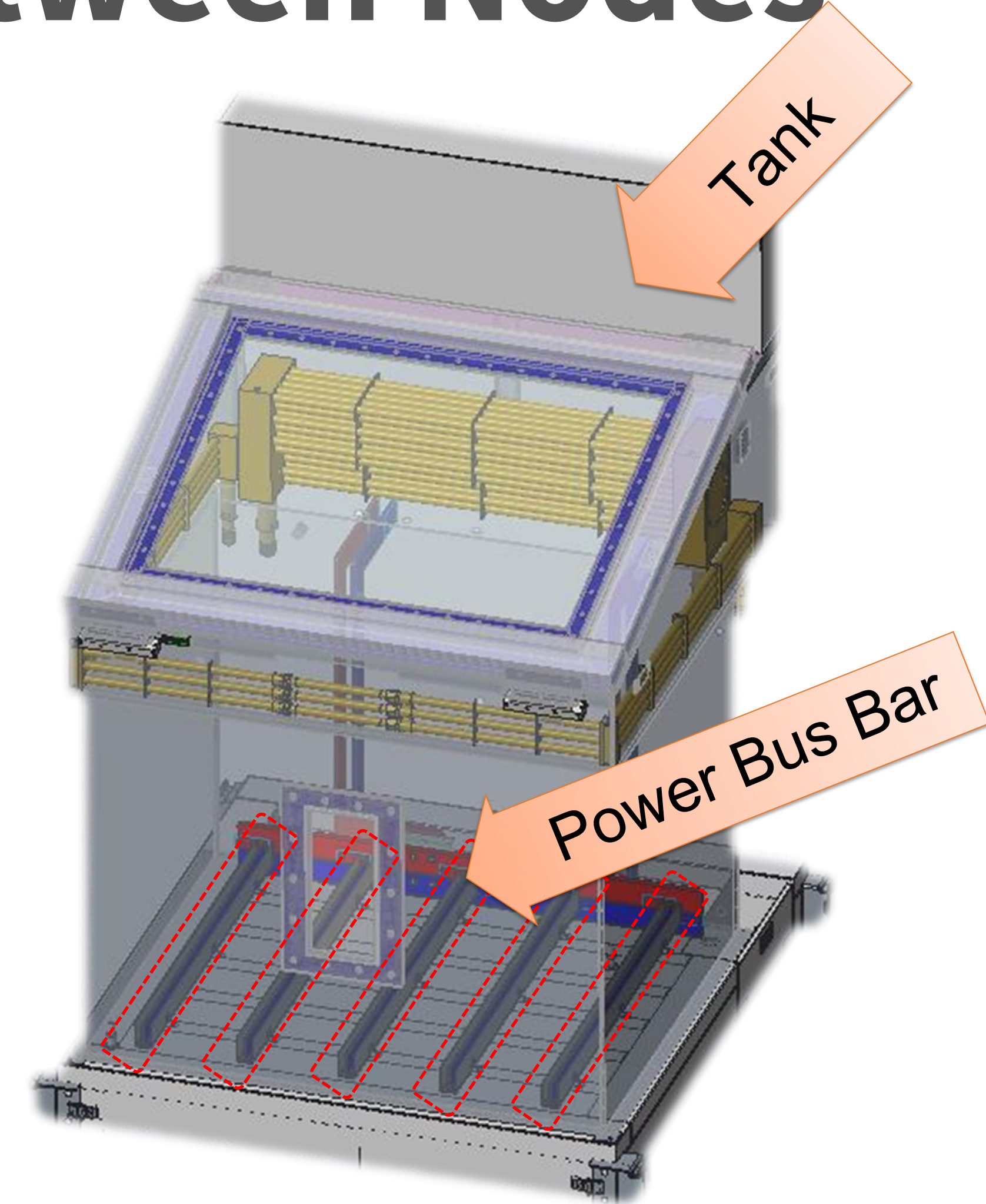
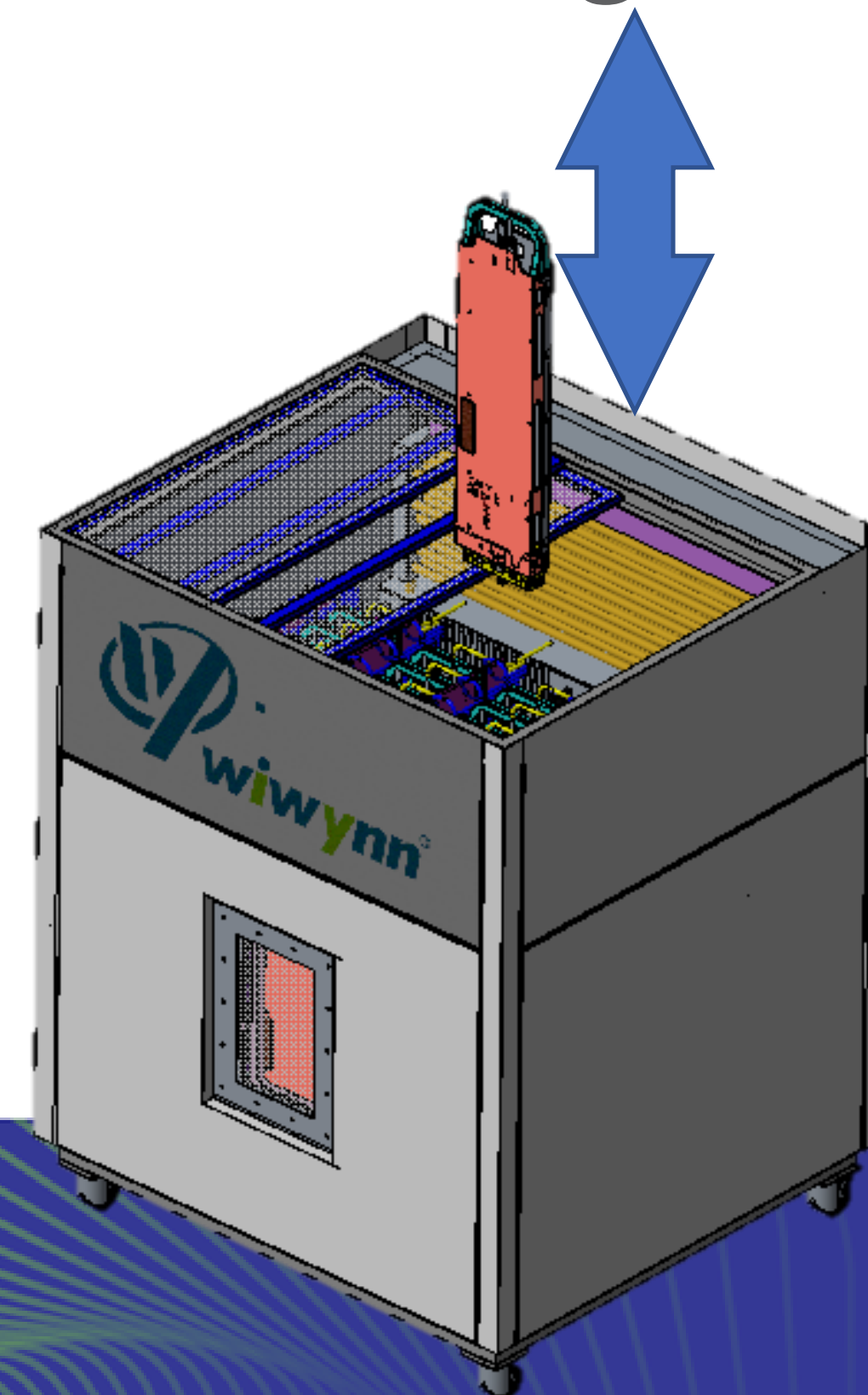
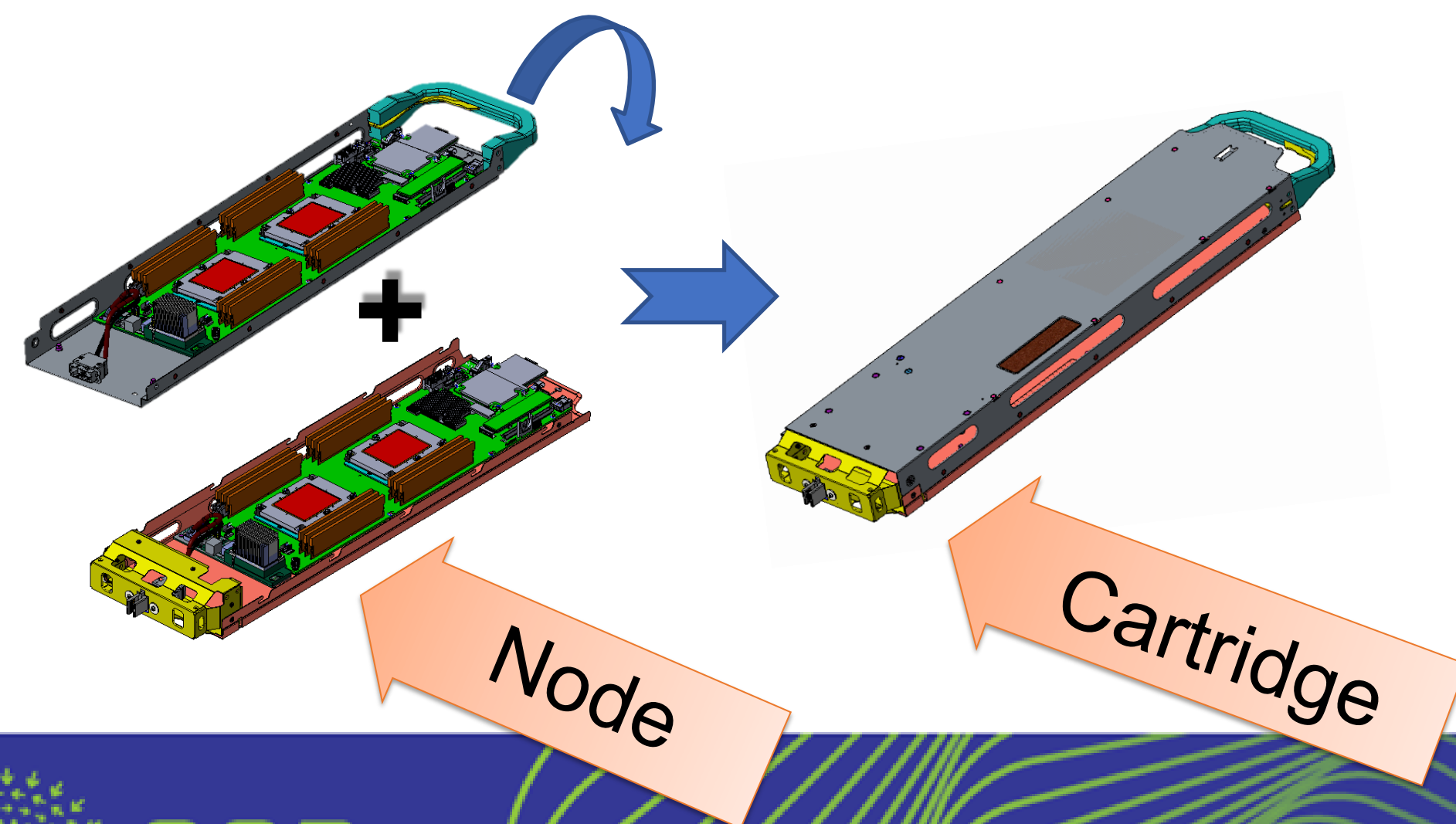
Challenges

- Additional relationship between nodes
- Additional actions
- Different orientation

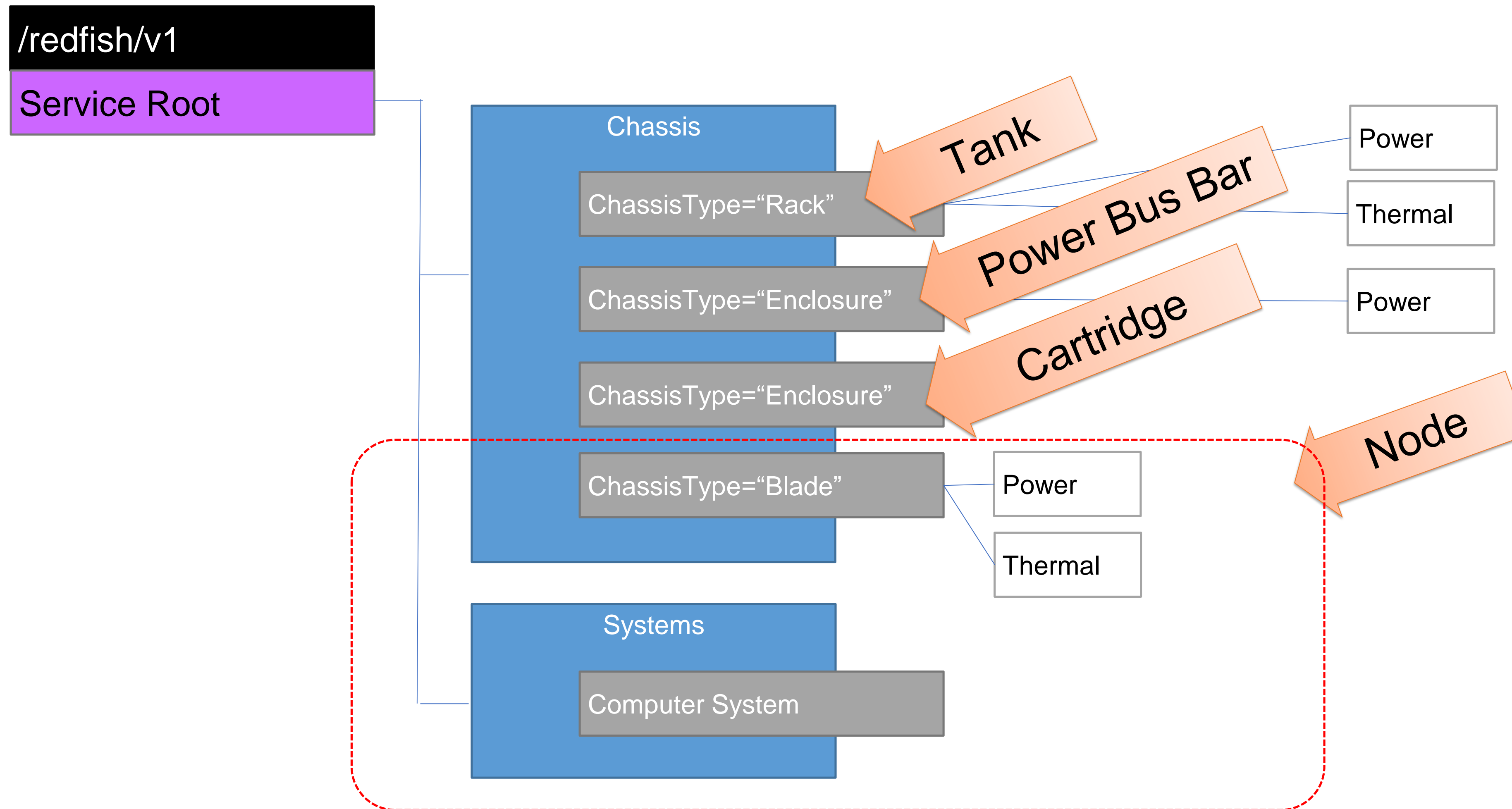


Additional Relationship between Nodes

- Topology of power distribution, e.g.,
 - Power Bus Bar
- Nodes that share presence state, e.g.,
 - Cartridges



The Implemented Hierarchy



Additional Actions

Dynamic power capping according to air pressure

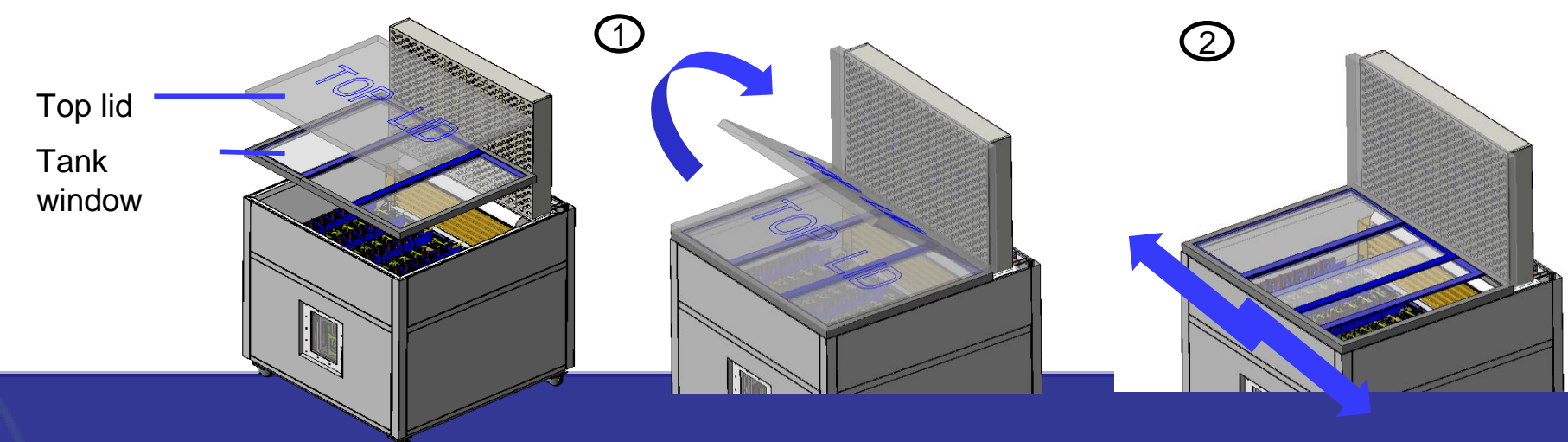
- Enable power capping when air pressure hits threshold

Lid opening

- Throttle or shutdown ComputerSystems till the liquid temperature below boiling point

Cartridge drawn out

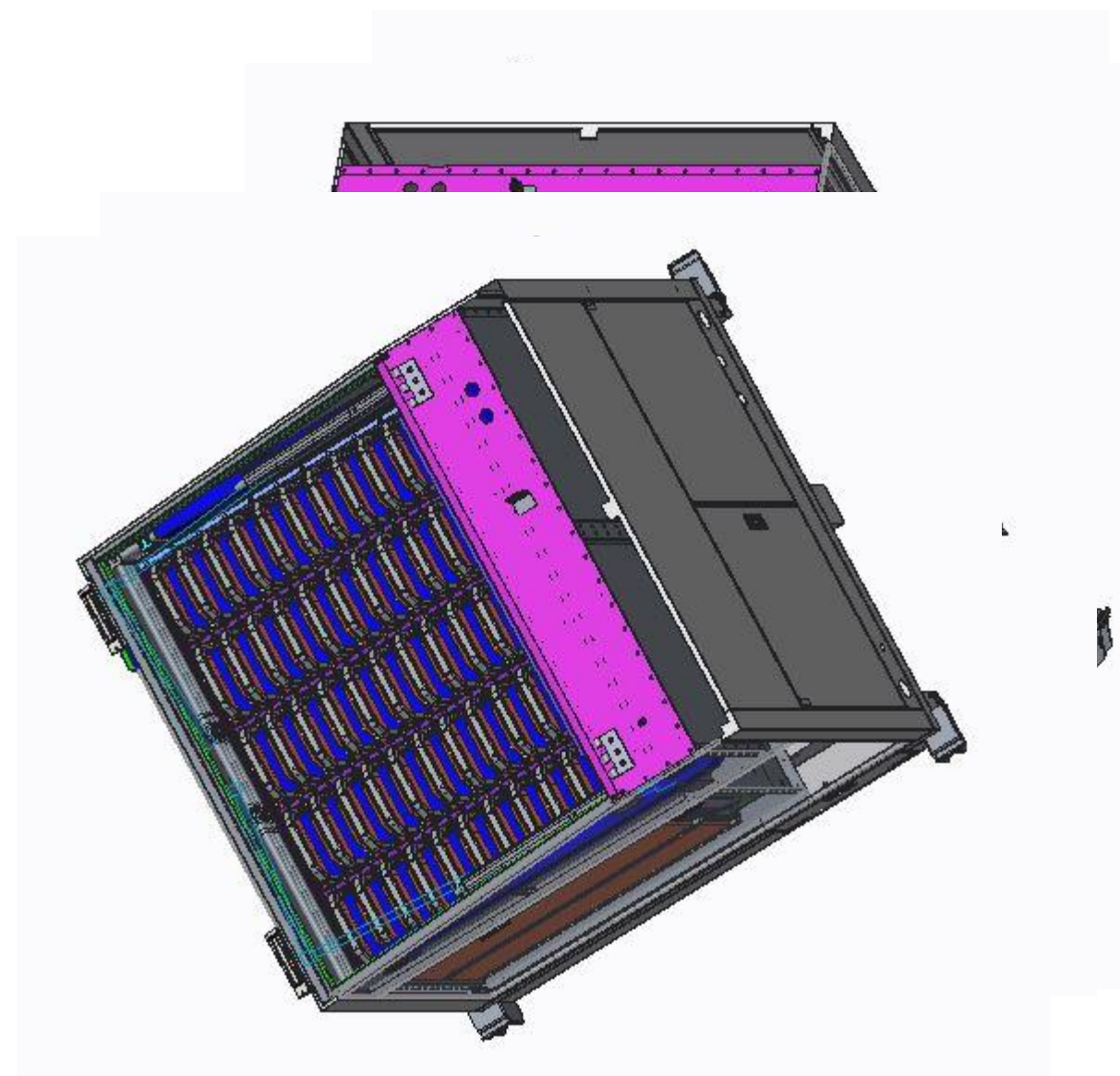
- By crawling the object hierarchy, identify the ComputerSystems that will be impacted
- Send graceful shutdown requests to them



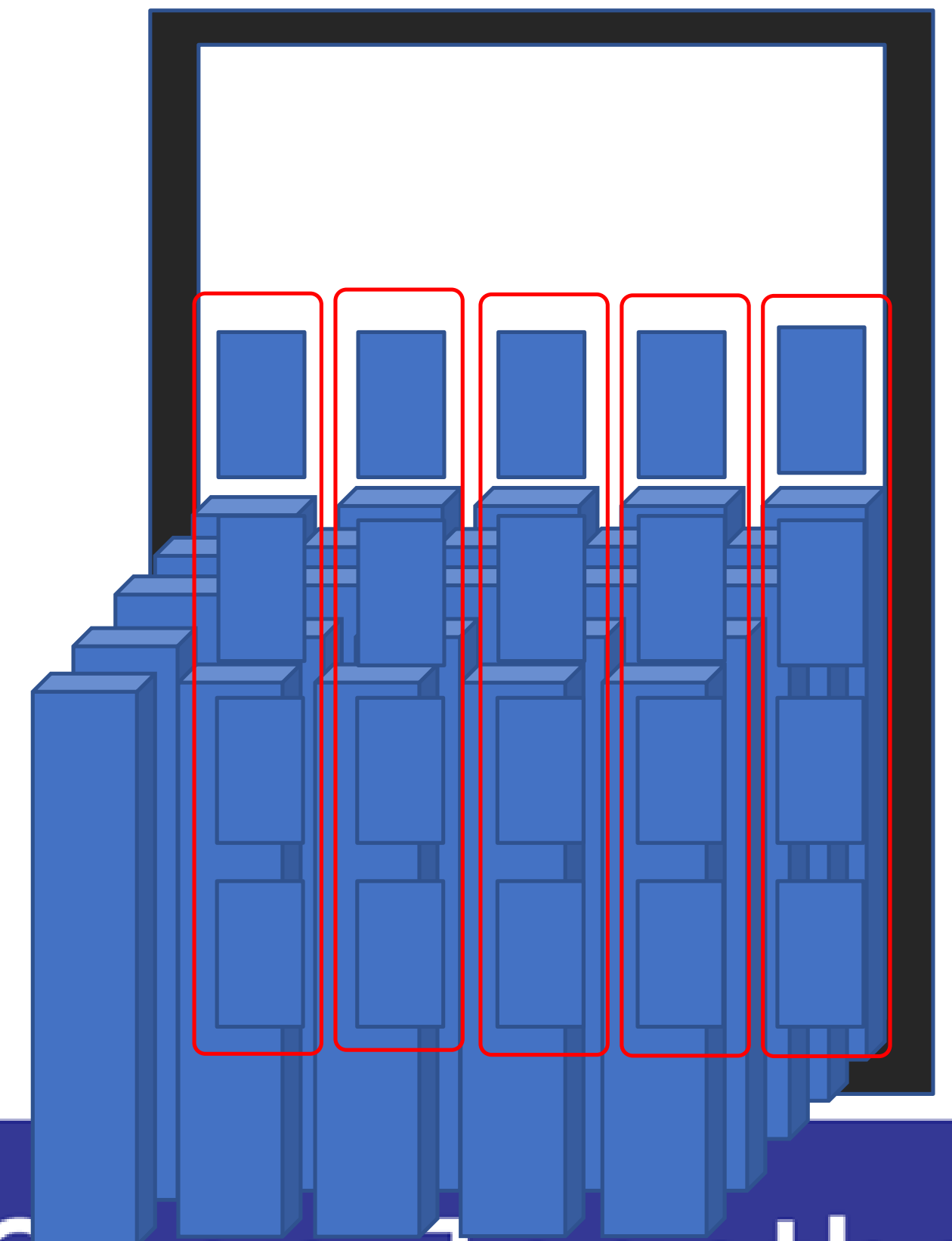
The Orientation

Transform (x, z) to (x, y) to be friendly to existing DCIM

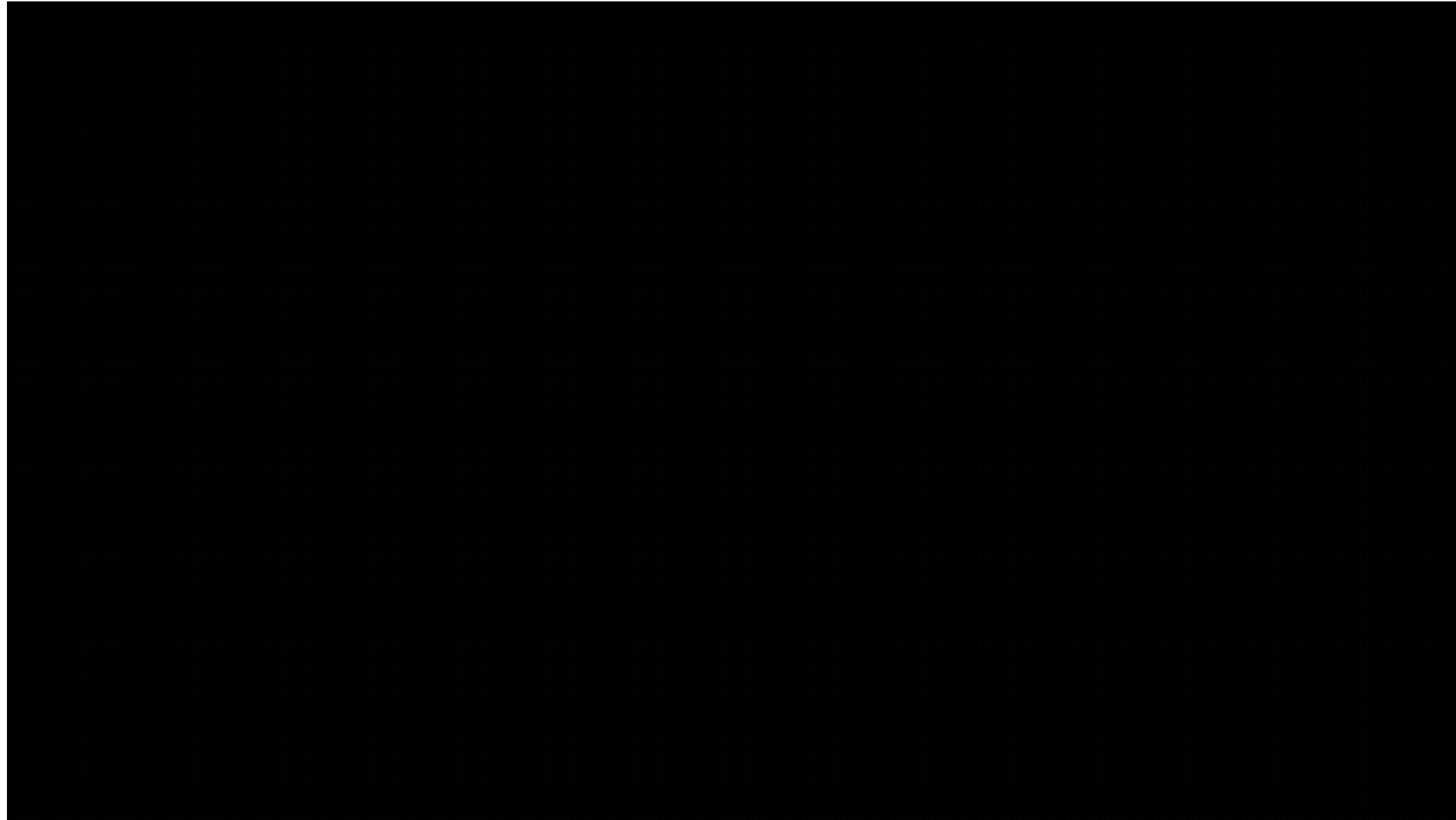
Rotate 90 degree to map power bus to virtual chassis



Redfish-based Chassis and
ComputerSystems



Screenshot and Short Demo Video



Compatibility with Existing DCIM

Wiwynn Cluster Manager

Intel® RSD PODM

Zabbix (under testing)

Call to Action

- Work with the immersion cooling group on the OCP Profile
- Wiwynn will keep following Immersion Standards and best practices.
- Wiwynn is willing to contribute its draft to the profile.
- Work with us to massively deploy immersion cooling to real world datacenters



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OCP Global Summit | March 14–15, 2019

