Door Heat Exchanger: Specification for Open Rack V3

Kenneth Kiernan, Boyd Corporation

John Fernandes, Meta Platforms Inc.

Connect. Collaborate. Accelerate.

OPEN Compute Project®

Objectives & Scope

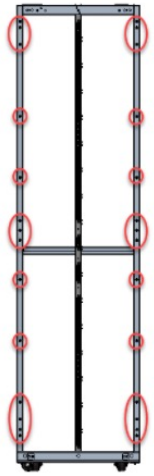
- Define a solution specific to the capability and feature set of Open Rack V3 (ORv3)

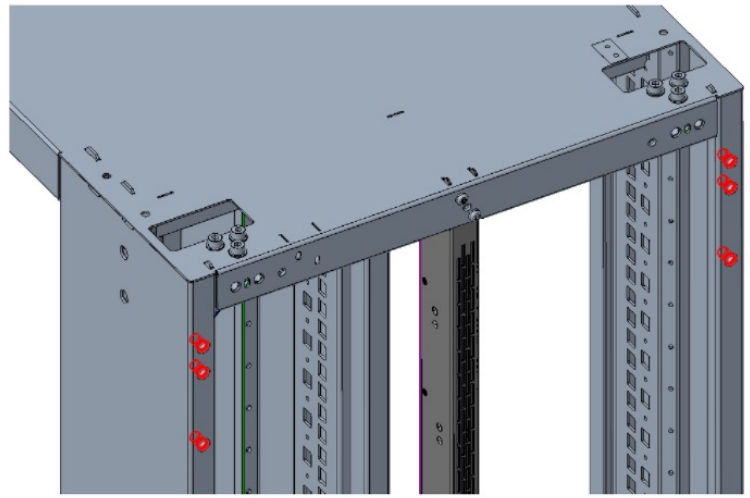
- Compliant with (or accommodate) concurrent ACS efforts
  - Blind-mate manifolds
  - RPUs & CDUs
  - Large, interchangeable QCs (manual)
  - Other related areas

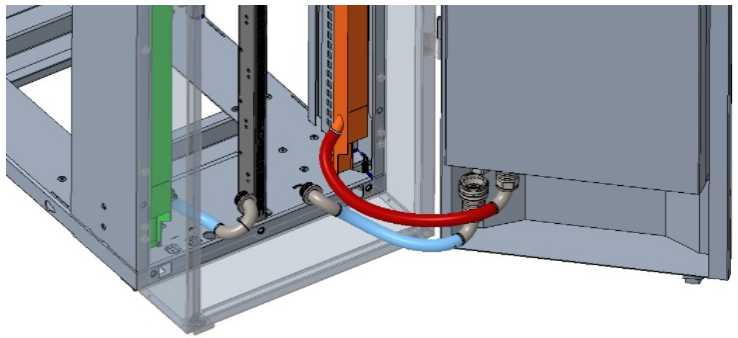
- Support on-going efforts such as DC efficiency, heat reuse, sustainability/circularity, etc.

Sizing for ORv3

- Standardized mounting features (adapter frame)
- Weight restrictions (and other considerations)
- Defining overall Door HX solution dimensions to function with other Open Rack v3 features
  - Pipe routing
  - Power delivery (from rack busbar)



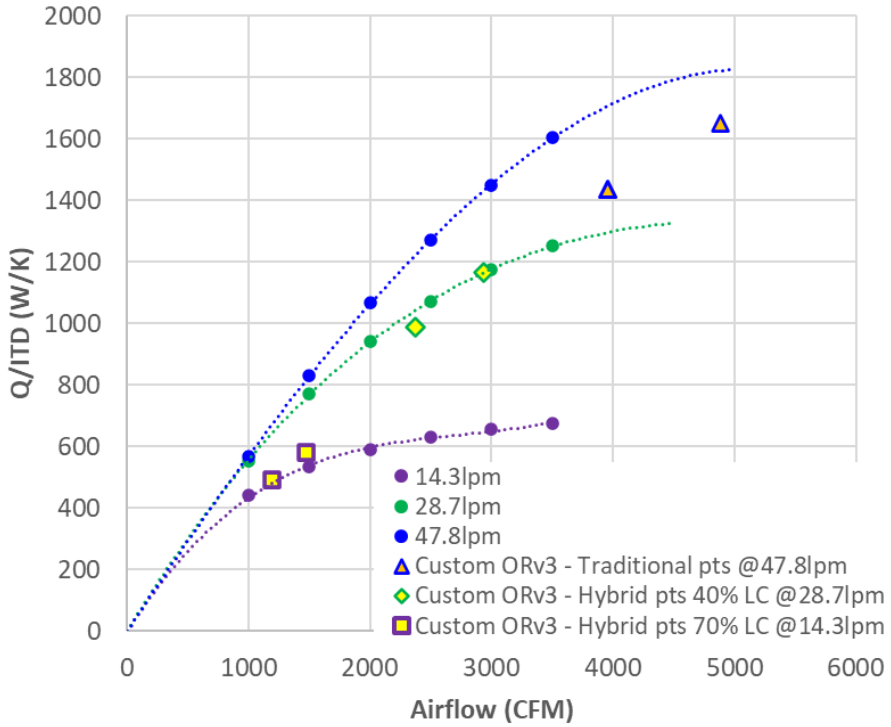




Performance Requirements

- *Example*: Support 33kW of rack power (and W27 FWS setpoint)

	Use case: Traditional Door HX					*No need for CDU*			*Air-side load*
	Rack (kW)	Ambient (°C)	Airside dT	cfm/KW	cfm	FWS Supply	TCS Supply	Q/ITD (W/K)	lpm @ 10°C
	33.0	35.0	12	148	4884	27.0	N/A	1650.0	47.8
	33.0	35.0	15	120	3960	27.0	N/A	1434.8	47.8
	Use case: Hybrid Solution - assuming at least 40% liquid cooled						*CDU accounts for 3°C approach*		*Air-side load*
%LC	Rack (kW)	Ambient (°C)	Airside dT	kW AirCool	cfm/KW	cfm	FWS Supply	TCS Supply	Q/ITD (W/K)	lpm @ 10°C
40%	33.0	35.0	12	19.8	148	2930.4	27.0	30.0	1164.7	28.7
40%	33.0	35.0	15	19.8	120	2376.0	27.0	30.0	990.0	28.7
70%	33.0	35.0	12	9.9	148	1465.2	27.0	30.0	582.4	14.3
70%	33.0	35.0	15	9.9	120	1188.0	27.0	30.0	495.0	14.3



Physical Interfaces

- Comply with *ACS Door HX requirements document*

LC Connections

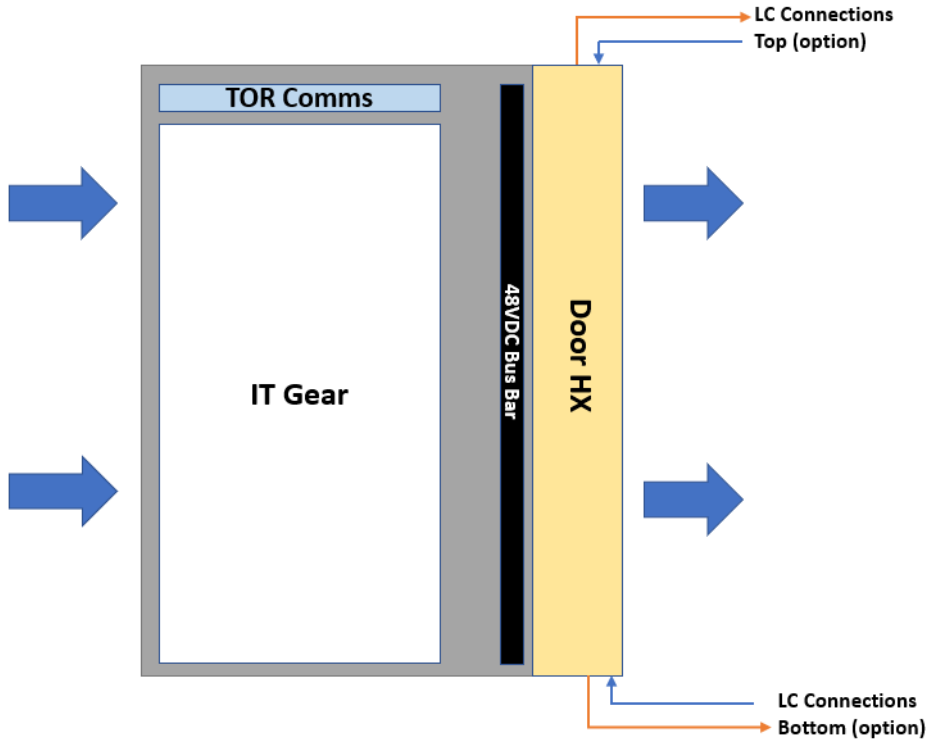
- Top and bottom

Power Connection

- 48VDC from rack busbar

Communication

- Rack manager
- TOR switch



Benefits to ORv3 and Beyond

- Open Rack v3 = Fully architected and flexible solution (from power and cooling standpoints)
- Potential for multi-generational use
  - Manufacturers usually support Door HX products for 10~15 years
- Enable/support existing OCP efforts such as
  - Sustainability/circularity/TCO
  - Heat reuse
  - Energy-efficient operation (both rack and facility)

Next Steps

- Call-to-action: Encourage participation and feedback (how can this work for you?)
- Open to review this effort with fellow OCP tracks/groups
- Join the mailing lists
  - ACS Door HX Stream: https://ocp-all.groups.io/g/OCP-ACS-Door-Heat-Exchanger
- Project wiki
  - Cooling Environments Wiki
  - ACS Door HX Wiki
- Biweekly calls on Thursdays at 9 AM PST