# Rack and Power Project Meeting 2018

**Rack & Power Project - Monthly Call**
**Every 2nd Wed 12:00pm - 1:30pm ET**
**Link: https://global.gotomeeting.com/join/461957909**
**Meeting Notes**

**As a reminder, the call-in details are also available on the OCP project calendar**

OCP Project meetings are open, collaborative meetings and may be recorded. Company Confidential material should not presented. Please assure than all material presented during the calls are not marked confidential.

# Agenda Items and Notes

## January 10 2018>>>

Agenda:

Matt St Peter - Radisys - Review Changes to CG19 REV1.1
Ed Fontana - GE - Review proposed Open Rack 2.0 specification changes

Notes:

Matt St Peter - Radisys - Review Changes to CG19 REV1.1
The changes are relatively minor, so I will recommend that they be approved at the next IC meeting scheduled for FEB meeting.

Review proposed Open Rack 2.0 specification changes
We are not sure what the impact of these changes might be, so we will need to do some investigation before future discussions.

Mills to contact Google to see if they see issues with high dI/dt resulting in the busbar voltage dropping below 48V while AC is present. DONE

Mills to socialize the changes with IT Gear builders to see if they have any issues with the proposed changes. DONE

# FEB 2018 >>>

Proposed Agenda:
5 min  Intro - Steve Mills
35 min  Michael Haken - Facebook - Review Indicator Specification
30 min  Harry Soin - Artesyn - Interoperability challenges
15 min  Michael Thompson - Pentair - Collaborate on OCP Rack & Power Redfish Profile that adds capabilities to the OCP Hardware Management Baseline Profile

Indicator review:

Nomenclature:  It is better to use symbols rather than text for non-english speakers.

Telco indicators will be different from OCP IT gear and will make developing gear for OCP and TELCO difficult.  Look into RGB LEDs for HW with a firmware flash for color definition.  Map TELCO icons to OCP version.  What impact does blink rate have on the RGB implementation?  Can you flash the blink rate into the LED controller?

Please add icons to the charts in 6.0 section to help clarify.

Firmware update REQUIRES a bi-color LED in order to indicate.
w
6.5 6.7  TYPO - move (AMBER) under the Fault/LOC heading for chart consistency

Provide example hardware implementations/circuits LED controller chips AVL info.
Are there any RJ45s with and w/o integrated LEDS that are compliant?

Artesyn Call for collaboration to develop a Interoperability specification :
Rob Bunger -Schneider
Harry Soin - Artesyn

REDFISH Collaboration call out:
Michael Thompson - Pentair
Mark Johnson GE
Rob Bunger - Schneider
Richard C - Artesyn

# MAR2018 >>>>

Meeting at the Summit only

# APR2018>>>>

Agenda:
9:00 to 9:05 Intro
Review possible dates and interest for next Engineering Workshop?

- Pedro - Hardware management discussion
- Interop spec discussions
- Rafael - infineon either
- Redfish profile discussion

Based on the number of topics, Steve Mills will engage with the Foundation to setup a face to face workshop in the ~July timeframe.

Open Rack Revision 2.1 Scope

- Busbar tolerance change
- reduce the  rack frame tolerance from datum -A- to hard stop to -0.6/+1.0.
- Add rack-level EMI test protocol as an appendix

Detailed work on the Redfish profile lead by Michael Thompson and Richard Caubang

AI:  Richard please add the following to the components to the current scope:

- PDUs / Power strips (maybe the same thing)
- Rack level Fan wall
- Refrigerated cooling door

Detailed work on the Power shelf interoperability specification lead by Harry Soin

Requirements for scope (from Facebook's perspective):

- PSU module and shelf can mix and match at module level
- Design guideline
- Testing guideline

AI:  David Sun of Facebook to provide some detailed proposal for these requirements

AI:  Steve Mills to generate meeting invite for Interop meeting in 2 weeks

# May 2018>>>>>

Proposed Agenda:

Derek Winsor - Rittal - Busbar KIT specification

- Add linkage between Open Rack specification and this spec to show how to calculate the power shelf fixing screw location from the bottom busbar datum
- Change section 4.7 and 4.8 location calculation method to be vertical height = CCCC x 48 + OFFSET rather than Rittal default height +\-.
- Add another digit to DDD to support larger gap.

Phil Pokorny from Penguin agreed that Penguin would drive an information doc to define the preferred height/power levels configs for Open Rack builds. This is a very high level doc.

Harry Soin and David Sun - Interoperability Spec
Compare Open Rack V2.0 to the Interoperability specification to make sure that any critical parameters NOT included in the generic Open Rack specification are identified. We can use this information to determine what changes need to be made to the Open Rack specification

Steve Mills to check on Rack and Power f2f workshop . Needs to be prior to the end of July which is the cut-off date for Regional summit slides

Harry Soin to determine when the Interoperability team wants to meet and let Steve Mills know

# June 2018 >>>>>>

Discuss details for Rack and Power Engineering Workshop on June 24th in Fremont - OCP- Michael
Richard Symons - Schneider - V2 Rack Implementation
Harry Soin - Artesyn - Power Shelf Interoperability Spec update

# JUL 2018>>>>>>>

Face to Face event @ DELTA in Fremont on Jul 24th. Here are the notes

Delta OCP Workshop 7/24/18

1. **Rack & Power Update**

1.1. We introduced Caleb Lusk who is my new partner as a Rack and Power Project Lead
1.2. Open Rack Busbar Interface Spec
1.2.1. Contributor stated FB and not Rittal? SM: FIXED 7/25

2. **Advanced Cooling Solutions**
2.1. End condition for the workstreams: End up as a guideline or a spec
2.2. Work will be organized around logical workstreams
2.2.1. Cold Pate stream
2.2.2. Immersion stream
2.3. Requirements to include in the specification:
2.3.1. Establish data center boundaries such as fluid flow rates, Temperature change, temperature ranges, pipe sizes
2.3.2. Regulatory, environmental, safety requirements
2.3.3. pumping water into data center
2.3.4. Hot swappable capable
2.3.5. Seismic
2.3.6. Transportation
2.3.7. Weights limits

3. **Open Rack Preferred Power SKUs Discussion**
3.1. Logical power SKUs defined around breakers
3.2. Limitations between 12V vs. 48V
3.2.1. 48V makes most sense for power over 14kW
3.3. Interoperability requirements for shelf specific specifications
3.3.1. A/C input connector
3.3.2. Brownout considerations
3.3.3. Power Quality?
3.3.4. A/C redundancy?
3.3.5. A/B inputs
3.4. Preferred Power SKU Levels for non-immersion
3.4.1. 6 or 8 kW
3.4.1.1. Is there enough demand at this level to recommend this level?
3.4.2. 14kW - 208V - 3 phase - 40A - (12V or 48V) - single Busbar
3.4.3. 20kW - 48V -3 busbar
3.4.4. 35kW - 240V - 3 phase - 100A 48V - 1 busbar
3.5. Preferred Power SKU Levels for Immersion only
3.5.1. does this need to be a separate list?
3.6. Add topic to future calls as agenda item

# AUG 2018 >>>>>>

**Agenda:**
9:05 start
5 min Intro - Steve Mills and OCP Foundation
25 min Indicator specification - Michael Haken - Facebook

25 min - Open Rail - Mitac
10 min - 36 OpenU motivation - Craig White - Nokia
25 min - Open Rack Preferred Power SKUs - discussion led by Steve Mills

Michael Haken presented the Indicator Spec and there were no issues.
Alex Chou presented EISA Open Rail specification
Open Rail was presented by Alex with no issues noted.
Craig White presented 36U rack more detail will be presented at regional summit
Robert Bunger offered a chart with breaker levels to help with sizing Power levels for Power SKUs

Drop of breaker
8kW
13.2kW
26kW
50kW
Break points in bus bar?

Courtesy of Robert Bunger:

| | A | B | C | D | E |
|---|---|---|---|---|---|
| 1 | **Final Distribution Voltage** | **Final Distribution Circuit** | **Peak Incoming Power (kw)** | **Notes** | |
| 2 | 208/120 | 1Ø 20A | 1.9 | | |
| 3 | 208/120 | 2Ø 20A | 3.3 | Not recommended for data center deployments. Low peak limites flexibility and 1/2 phase circuits complicate phase balancing. | |
| 4 | 400/230 | 1Ø 16A | 3.6 | | |
| 5 | 208/120 | 1Ø 40A | 3.8 | | |
| 6 | 208/120 | 3Ø 20A | 5.7 | Ok for low density: <6 kW average with very limited peak | |
| 7 | 208/120 | 2Ø 40A | 6.6 | | |
| 8 | 400/230 | 1Ø 32A | 7.3 | | |
| 9 | 400/230 | 3Ø 16A | 11.0 | OK for low to medium density ~< 12kW, with moderate peak | |
| 10 | 208/120 | 3Ø 40A | 11.5 | | |
| 11 | 480/277 | 3Ø 20A | 13.2 | | Works well with 48VDC and 3mm x 50 |
| 12 | 208/120 | 3Ø 50A | 14.4 | | |
| 13 | 208/120 | 3Ø 60A | 17.2 | | |
| 14 | 400/230 | 3Ø 32A | 22.0 | OK for low to high density <20kW with high peak | |
| 15 | 480/277 | 3Ø 40A | 26.5 | | |
| 16 | 480/277 | 3Ø 50A | 33.0 | | |
| 17 | | | | | |
| 18 | | | | | |
| 19 | **Notes:** | | | | |
| 20 | as you get above 3 x 50mm bar stock, you get to custom extrusions | | | | |
| 21 | | | | | |

Facebook 11, 14
Olympus
HPC:
GOOGLE:
Co-lo 22kw
Penguin 26 kW

Brief discussion on preferred power levels. In order to progress we need to get some input from other projects.
AI: STEVE M contact Penguin user groups via OCP projects

## SEP 2018 >>>>>>

**Agenda:**

5 min Welcome
15 min Nokia - Craig White - “Edge Submission”  -skipped since no Craig
45 min Preferred Power SKUs Discussion - Steve Mills and Caleb Lusk

## OCT 2018 >>>>>>  Cancelled due to Regional Summit

## NOV 2018 >>>>>>

**Agenda:**
5 min welcome
10 min Busbar Test specification discussion - Rittal - Samuel Brumhard

Team feels that creating a spec to cover electrical qual of busbars
Rittal will discuss internally and consider championing this test spec

15 min Nokia - Craig White - “Edge Submission”

## DEC 2018 >>>>>>

5 min  Welcome
5 min  OCP Open Rack Specification Rev2.1 - Steve Mills - Facebook
20min  Interop Spec update - Harry Soin - Artesyn
20min  Open Specification for an OCP Power Shelf AC Input Connector - William Stewart - Harting

105C max
480VDC should be MAX
Forces:
- Wire pull forces
- Insertion forces
- Removal forces

Steve M will push out all 3 specs to the wiki after he receives from Will and Harry.

Interop:
http://files.opencompute.org/oc/public.php?service=files&t=94b11317a1fc11ae70e77c4cb10ddcb7
AC Connector:
http://files.opencompute.org/oc/public.php?service=files&t=4807e1cf30b2a8da04f1ce69d1fd4b69
DONE DEC12

SteveM will import the connector spec into Google docs so everybody can edit.