ORV3 Development Update

Steven Moore, Project Manager, Rittal
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## ORV3 vs ORV2 Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Open Rack V2</th>
<th>Open Rack V3</th>
</tr>
</thead>
<tbody>
<tr>
<td>48V Support</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Power Shelves in any rack slot</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Single power zone</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Tool-less rack rails</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>RU Gear support</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Gear Qty. Supported OU/RU</td>
<td>40OU/None</td>
<td>44OU/48RU</td>
</tr>
<tr>
<td>Provide modular rack cabling solution option</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Support for optional rear cable backplane</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Movable Horizontal Frame support</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Max. IT gear weight</td>
<td>1400kg</td>
<td>1600kg</td>
</tr>
<tr>
<td>Cooling Manifold Support</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>HEX Door Support</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
# Rack Testing

- ASTM, Facebook and Rittal tests

## Rack & Power

<table>
<thead>
<tr>
<th>Tests</th>
<th>Configuration</th>
<th>Test Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Random Vibration Transportation test</td>
<td>2 Hz to 8 Hz @ 0.002g rms, @ 1.0 g peak. 3 Hz to 15 Hz @ 0.002g rms, 8 Hz to 80 Hz @ 0.004g rms, 80 Hz to 200 Hz @ 0.0008g rms. Overall level 0.52/3gms, test duration 00 minutes per axis, 180 minutes complete test</td>
<td>Simulation of rack during transit</td>
</tr>
<tr>
<td>2. Transport Test (Vehicle Vibration)</td>
<td>6&quot; drop x 4 edges (ASTM D4019 sect. 10.1.3.1)</td>
<td></td>
</tr>
<tr>
<td>3. HLT handling Rotational Edge drops</td>
<td>6&quot; drop x 4 edges (ASTM D4019 sect. 10.1.3.1)</td>
<td></td>
</tr>
<tr>
<td>4. HLT handling Rotational Flat drops</td>
<td>All 4 sides at 1,000 lbs (ASTM D4019 sect. 10.1.3.1)</td>
<td></td>
</tr>
<tr>
<td>5. Side Impact</td>
<td>17 degrees before tip, front attack (ASTM D6179 sect. 10.3)</td>
<td></td>
</tr>
<tr>
<td>6. Loaded Vibration test on shock pallet.</td>
<td>ASTM D1561-15 EC-3, 100 minutes over 3 axis, over high medium low levels. X-axis, Y-axis 40 minutes low level; 15 minutes medium level; 5 minutes high level. Z-axis, Y-axis 40 minutes low level; 15 minutes medium level; 5 minutes high level.</td>
<td></td>
</tr>
<tr>
<td>Deploying Rack, Dynamic tests</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Rolling test</td>
<td>Raised rack over all 4 feet for 3 cycles</td>
<td></td>
</tr>
<tr>
<td>8. Gap test</td>
<td>208mm @ 2 KMps (3 feet gap traversed 45 (Reduces gap to this distance)</td>
<td></td>
</tr>
<tr>
<td>9. Rolling test</td>
<td>200mm @ 2 KMps (3 feet gap traversed 45 (Replaces Test 10)</td>
<td></td>
</tr>
<tr>
<td>10. End Cap test</td>
<td>Ramp drop traversed 45</td>
<td></td>
</tr>
<tr>
<td>11. Rolling test</td>
<td>50mm @ 2 KMps</td>
<td></td>
</tr>
<tr>
<td>12. UL Tilt Test</td>
<td>UL 62368 Sect 6.4.2.2 (replacing 60950 Sect. 4.1) Stabilizing test &amp; OFF</td>
<td></td>
</tr>
<tr>
<td>13. UL Tilt Test with Stabilizers</td>
<td>UL 62368 Sect 6.4.2.2 (replacing 60950 Sect. 4.1) Stabilizing test &amp; OFF</td>
<td></td>
</tr>
<tr>
<td>14. CR Shell Loading</td>
<td>Dynamic loading at 321 g/mm. Over 25mm of leading edge dropped from 38m</td>
<td></td>
</tr>
<tr>
<td>15. CR Shell Loading</td>
<td>Static loading 350Nps/mm over 25mm of leading edge</td>
<td></td>
</tr>
<tr>
<td>Mechanical (Additional)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Motor Torque M12</td>
<td>Failure Torque</td>
<td></td>
</tr>
<tr>
<td>17. Motor Torque M8</td>
<td>Failure Torque</td>
<td></td>
</tr>
<tr>
<td>18. Bushing upper screwing - Canopy / Bushing</td>
<td>Failure Torque</td>
<td></td>
</tr>
<tr>
<td>19. Flap (pull out) force</td>
<td>Force to pull “drop out” shelf from rack. Torque 80.0 Nm, Power Shelf &amp; Power Shelf</td>
<td></td>
</tr>
<tr>
<td>Electrical tests</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. Resistance testing of Busbar cage</td>
<td>To UL 5047.1 - Pedestal Enclosure Rowling Test, Test with all 4x Fasteners and ONLY lowest fasteners</td>
<td></td>
</tr>
</tbody>
</table>
Initial Test Developments

- Front vertical update (front impact failure)
Initial Test Developments

- Cable manager update (front impact failure)
Initial Test Developments

- Middle beam update (brace failure)
Initial Test Developments

- Castor update (testing failure)
Rack Frame Improvements

- Levelling foot update (vertical change)
Rack Frame Improvements

- Manifold interface updates (Canopy & base tray)
Cooling Interface FEA

Supplier 1 analysis
- Displacements in system
- Scaled to show shape.
Cooling Interface FEA

Supplier 2 analysis
- Displacements in system
- Scaled to show shape.

OPEN POSSIBILITIES.
Air Flow Management

- Front and rear sealing strips
Air Flow Management

- Hot aisle containment baffles
Brace Beam Development

- Moveable centre brace (+-4 OU)
Brace Beam Development

Displacement - Rack Depth along Datum A

-1.6
-1.4
-1.2
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0
500
1000
1500
2000

Single Beam - Standard Position
No Beam - 1414kg load
No Beam - 1265kg load
No Beam - 1004.67kg load
No Beam - 818.62kg load
Recent Test Results

- Front impact test - Passed
- Castor test - Passed
- Middle beam test - Passed
- Shock & vibe test - Passed
- Transport test - Passed
- Levelling foot test - Minor failure (retest required)
Call to Action

• Where to find additional information (URL links)

Project Wiki with latest specification: https://www.opencompute.org/wiki/Open_Rack/SpecsAndDesigns
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Networking  SI (Strategic Initiatives)
OSF  TAP
R&P (Rack & Power)  T&E (Telco & Edge)
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