



OPEN
Compute Project



OCP U.S. SUMMIT 2017

Santa Clara, CA



EXEC. TRACK: PRES. Delta Group Open IT Infrastructure Solutions

Victor Cheng
Vice President
Delta Electronics

OPEN HARDWARE.

OPEN SOFTWARE.

OPEN FUTURE.





Overview

Founded: 1971

World's No. 1 in:

- Switching Power Supplies since 2002
- DC Brushless Fans since 2006

Leading in:

- Telecom Power Systems
- Industrial Automation
- Passive and Magnetic Components
- Networking Products
- Visual Displays
- Datacenter Infrastructure
- Renewable Energy Solutions



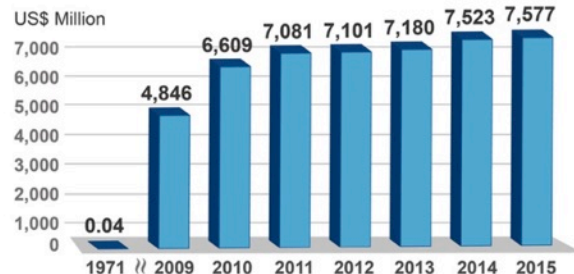
Bruce Cheng
Founder and Honorary Chairman



Yancey Hai
Chairman

Worldwide Revenues

CAGR: 31.8%





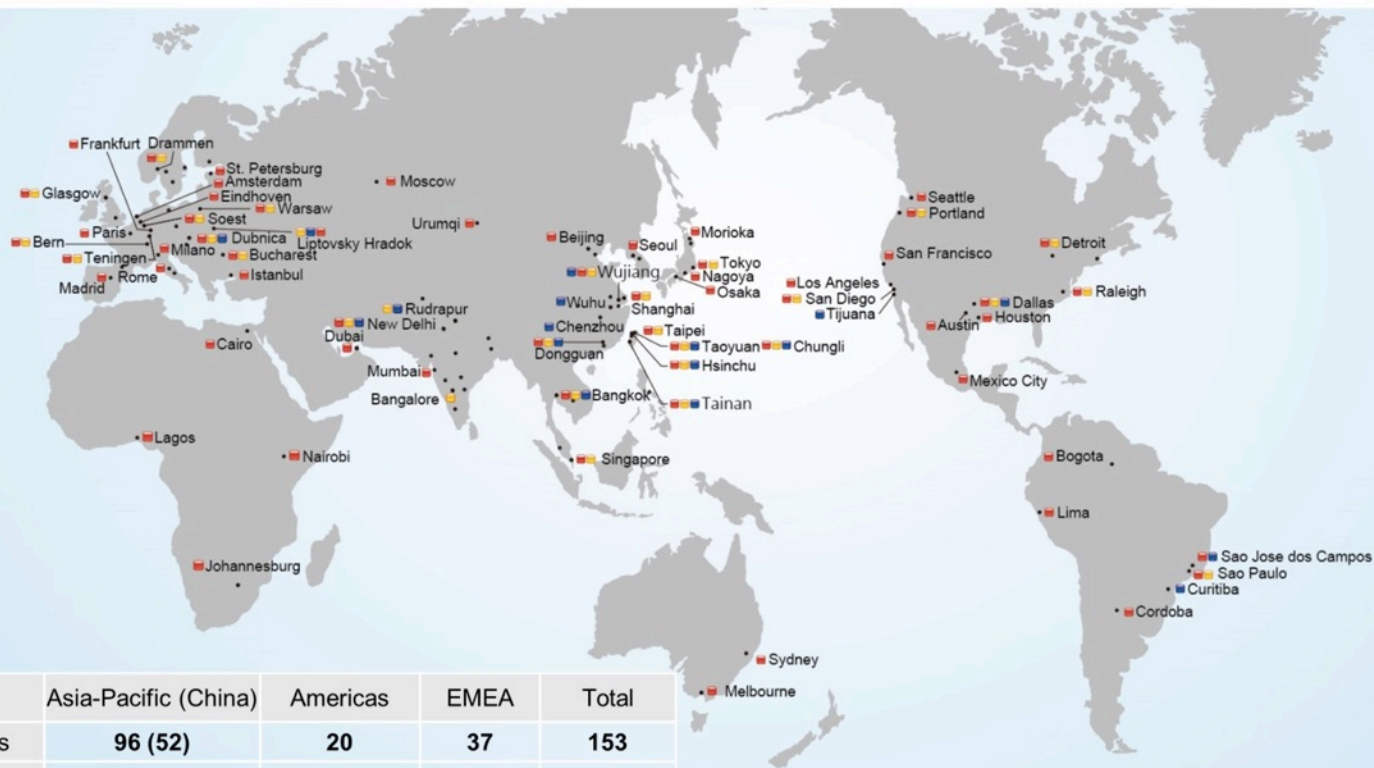
Corporate Mission

To provide innovative, clean and energy-efficient solutions for a better tomorrow

Delta's high-efficient products enabled electricity savings of **17.3** billion kWh from 2010 to 2015, resulting in lower carbon emissions by **9.2** million tons.

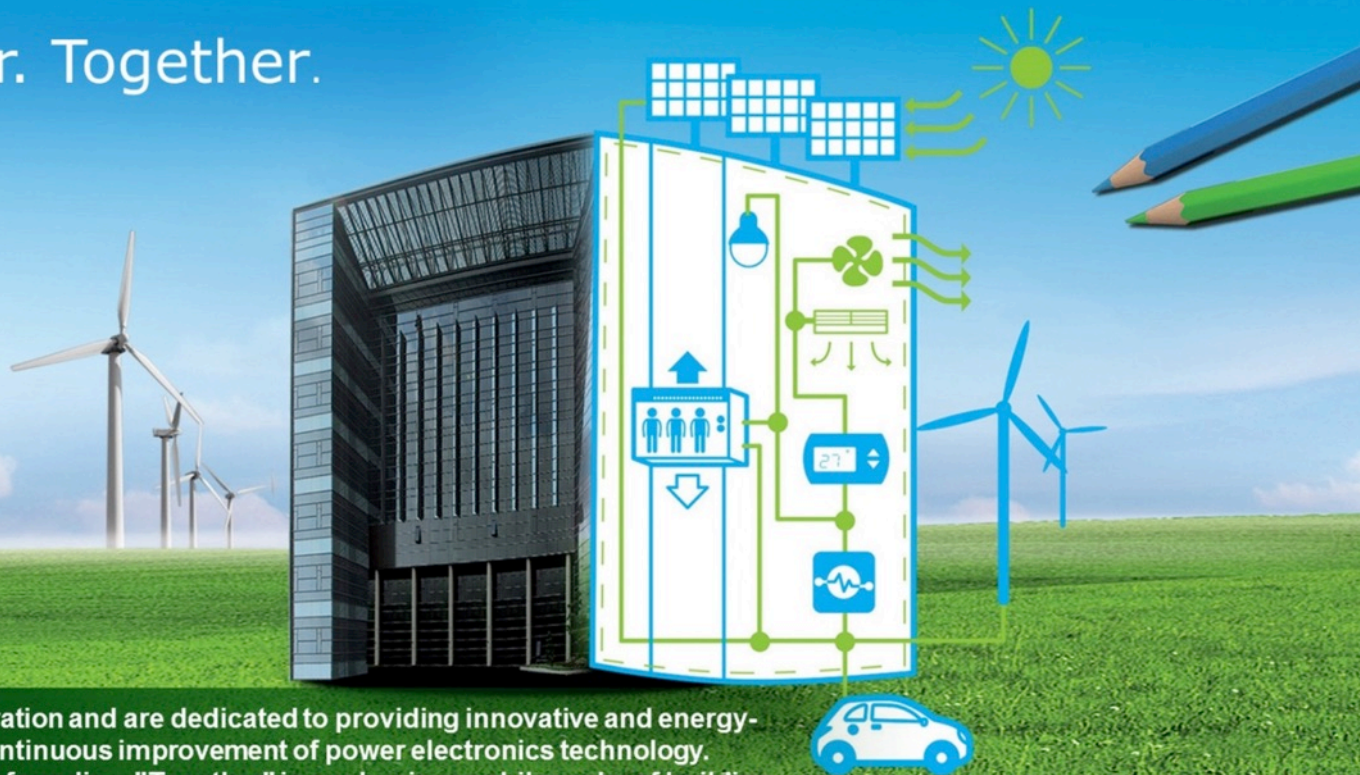


Delta's Solar Energy System Covers the 2009 World Games Stadium



	Asia-Pacific (China)	Americas	EMEA	Total
■ Sales Offices	96 (52)	20	37	153
■ Plant Sites	34 (22)	4	2	40
■ R&D Centers	43 (23)	7	11	61

Smarter. Greener. Together.



We believe in technology and collaboration and are dedicated to providing innovative and energy-efficient solutions. "Smarter" is the continuous improvement of power electronics technology. "Greener" is Delta's mission since our founding. "Together" is our business philosophy of building long-term cooperation with our customers and partners.

Business Categories



Power Electronics

- Embedded Power Supplies
- Mobile Power Supplies
- Industrial and Medical Power Supplies
- Fans and Thermal Management
- Electronic Components for ICT Equipment



Energy Management

- Industrial Automation
- Telecom Power Systems
- UPS & Datacenter Infrastructure
- Automotive Electronics & EV Charging
- Renewable Energy
- Energy Storage Systems



Smart Green Life

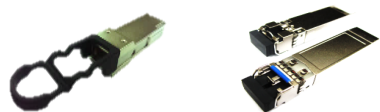
- Networking Systems
- Display & Visualization
- LED Lighting
- Healthcare Devices
- **Innervie**
- **vivitek**

Delta IT Infrastructure Solutions

Network



Switch



Optical Transceiver Module



Active Optical Cables

Power & Cooling



UPS



HVDC PS



Shelf Power / BBU



PDC



Room & Row Cooling



PDU



Open Rack



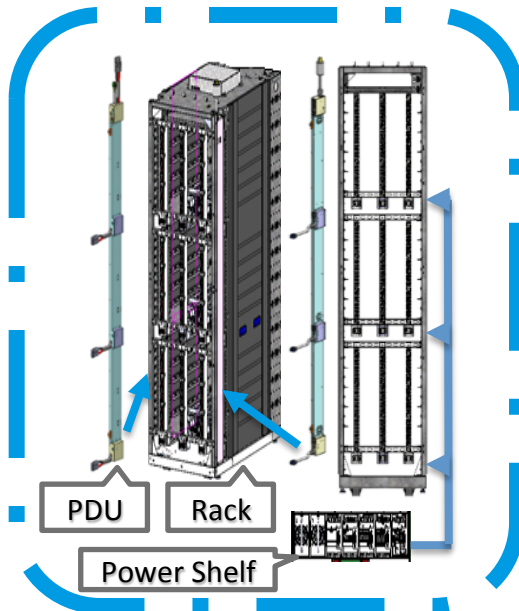
DCIM



Goals

- Introduced by Facebook in 2011
- Collaborate among tech leaders
- Redefine data center with:
 1. Efficiency
 2. Flexibility
 3. Costs

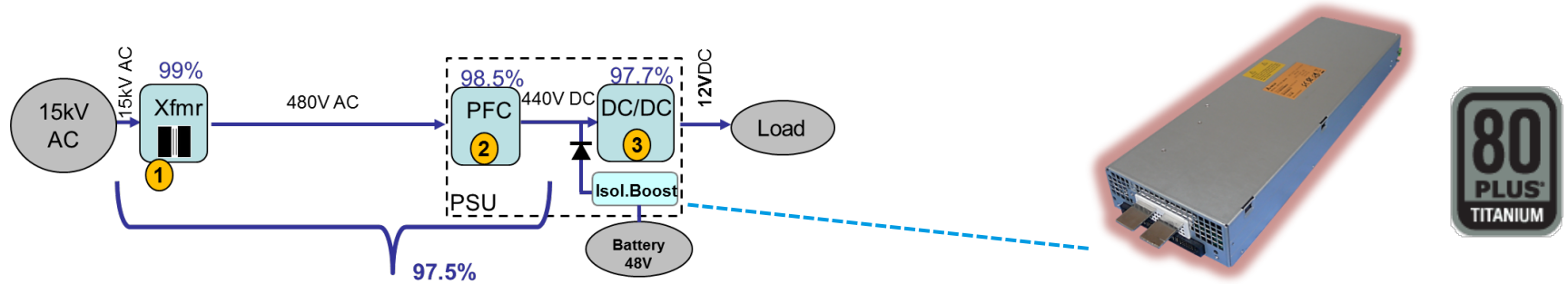
Delta Solutions



Partners

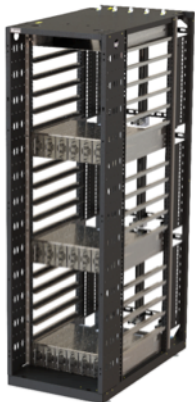


Data Center Power Supply Trends



- Concept Trend for **large Data Center Customers : Simplified Architecture**: No UPS in AC Line, but Distributed Batteries to **increase entire Data Center Efficiency**
- Requires special PSUs with highest Efficiency (Titanium +)
- **High Voltage DC Systems (400Vdc)** under Discussion for future Data Centers: Central large PFCs & local small DC/DCs - will come?
- Also: **Google** joined **Open Compute Project** & **propagates 48Vdc Distribution system** as new standard

Delta Open Rack Family



Single AC I/P V1
open rack
12.5V/ 12.5KW



Dual AC Input
V1 open rack
12.5V/ 14KW



Dual AC Input
V1 open rack
12.5V/ 28KW



Dual AC Input
V1 open rack
12.5V/ 15KW



Dual AC I/P
V2 open rack
12.5V/ 12.5KW



Single AC Input
V2 open rack
48V/ 33KW



Delta Data Center Power Solution



AC / HVDC Inputs
12.5V/ 12KW
Power Shelf



Three phase 30A ATS



Dual AC inputs
12.5V/ 14KW
Power Shelf



Single AC inputs
48V/ 33KW Power Shelf

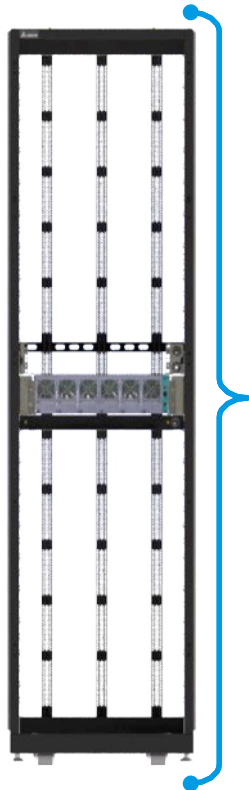


48V/ 33KW BBU



150KW HVDC
Power Cabinet

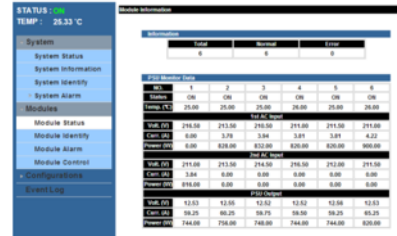
Smart Rack and Rack Management



AC line information, PSU status,
output power, event log, etc.



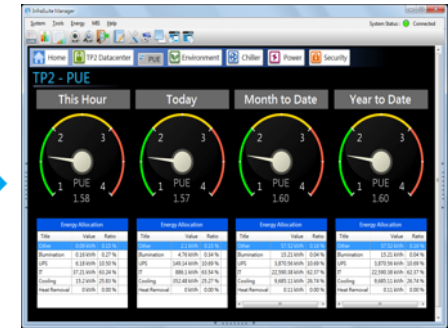
Temp & Humidity Sensor,
Smoke Sensor,
Water Leak Sensor,
Air Flow Sensor, etc.



Internet/Web Page

Name/OID	Value	Type
rncSiteName.0	Site Name	OctetString
rncSiteLocation.0	Site Location	OctetString
rncSystemName.0	System Name	OctetString
rncSystemLocation.0	System Location	OctetString
rncSystemDescription.0	System Description	OctetString
rncModelNum.0	MN_DEMO_06	OctetString
rncSerialNum.0	SN_DEMO_06	OctetString
rncFactoryDate.0	2013-12	OctetString
rncHardwareRev.0	HW 1.0 A	OctetString
rncSoftwareRev.0	rnc_X1.00B01	OctetString
rncReleaseNum.0	100	Integer
rncDate Time.0	2014-01-09 13:53:53	OctetString
rncTemperatureUnit.0	c (0)	Integer

SNMP/ MIB file

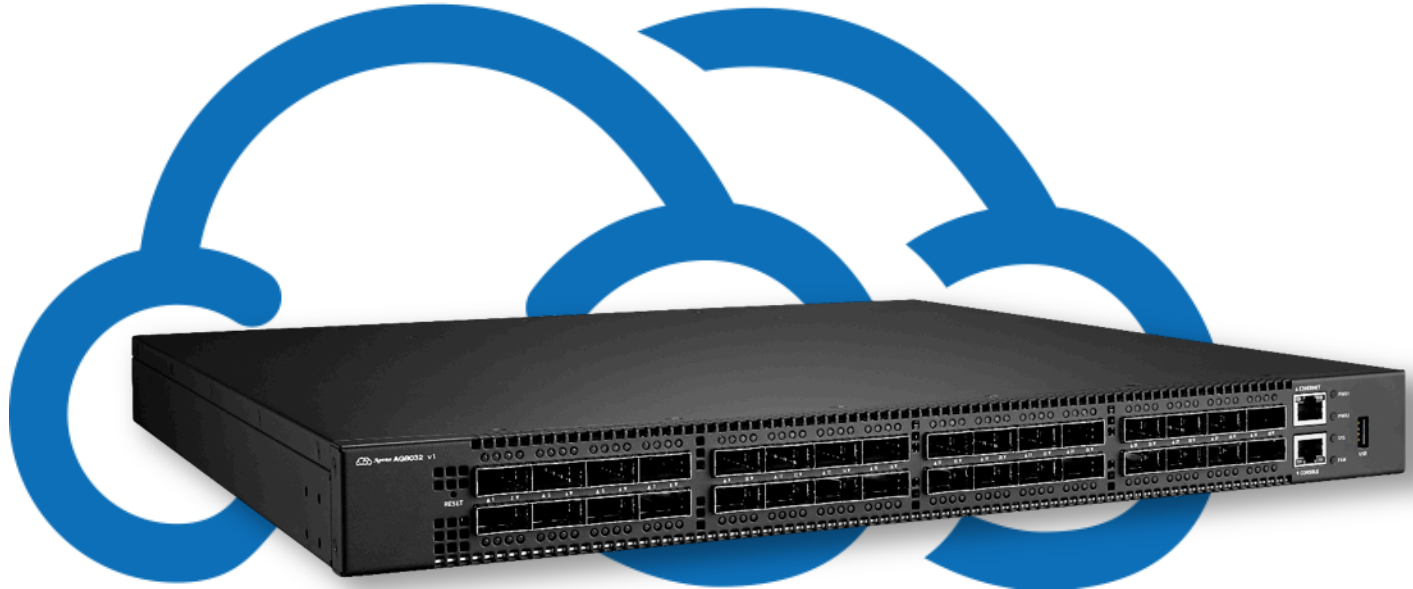


Real-time PUE &
Power Usage

Rack Level

Data Center Level

Agema: A Delta Line for Open Networking Products



Disaggregation Model

Choice of Server Tools
& Applications



BROADVIEW™



Choice of SDN Controller



OPEN
DAYLIGHT



Choice of Third Party NOS

OFPDA

Enterprise



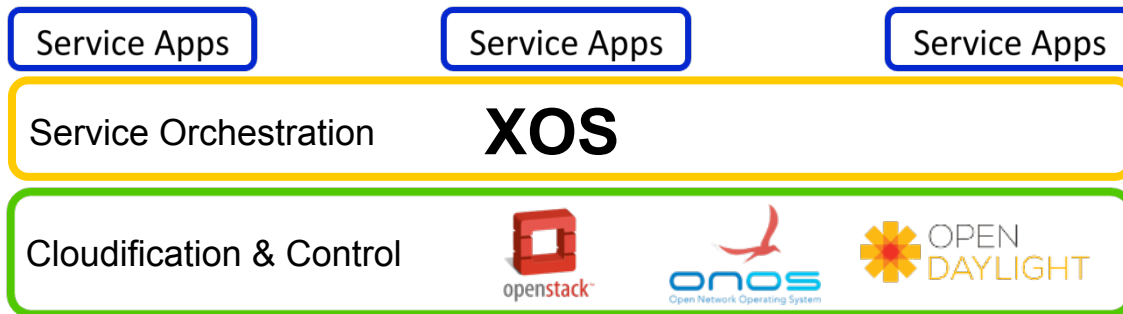
Data Center



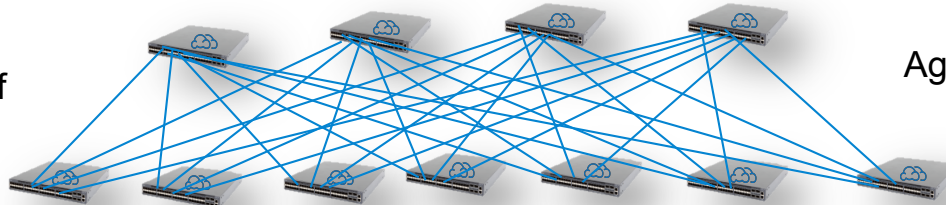
Service Provider



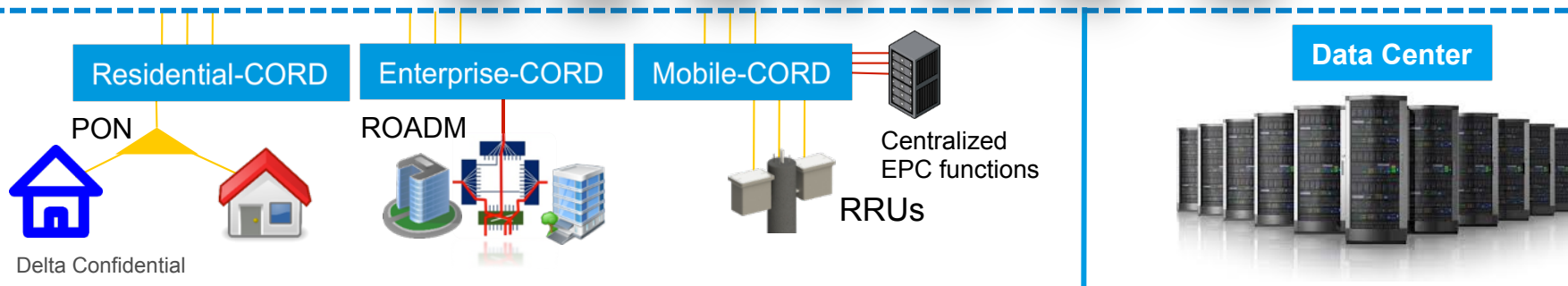
Agema Product Portfolio



10/25/40/100GbE Spine/Leaf



Agema Product Portfolio



White Box Open Networking Portfolio

1 GbE to 10 GbE



Enterprise

1/10/25/40/100GbE



AC/DC

Data Center

10/25/100GbE

Deep Buffer



AC/DC

Service Provider

Data Center Interconnection with Delta's Products

Active Optical Cable



Spine/Edge



Spine



Leaf



Server and Storage

Fiber Optical Transceiver





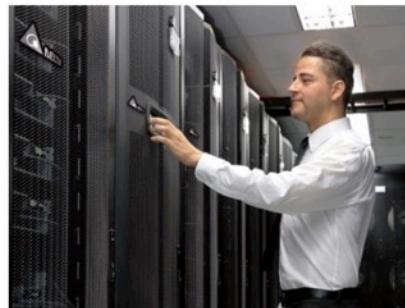
Delta: Your Green Solutions Partner



Industrial Automation



Building Automation



Data Center



Telecom Energy



Renewable Energy



Display and Monitoring



EV Charging

Smarter. Greener. Together.

To learn more about Delta, please visit www.deltaww.com
or scan the QR code



English



Traditional
Chinese



Simplified
Chinese



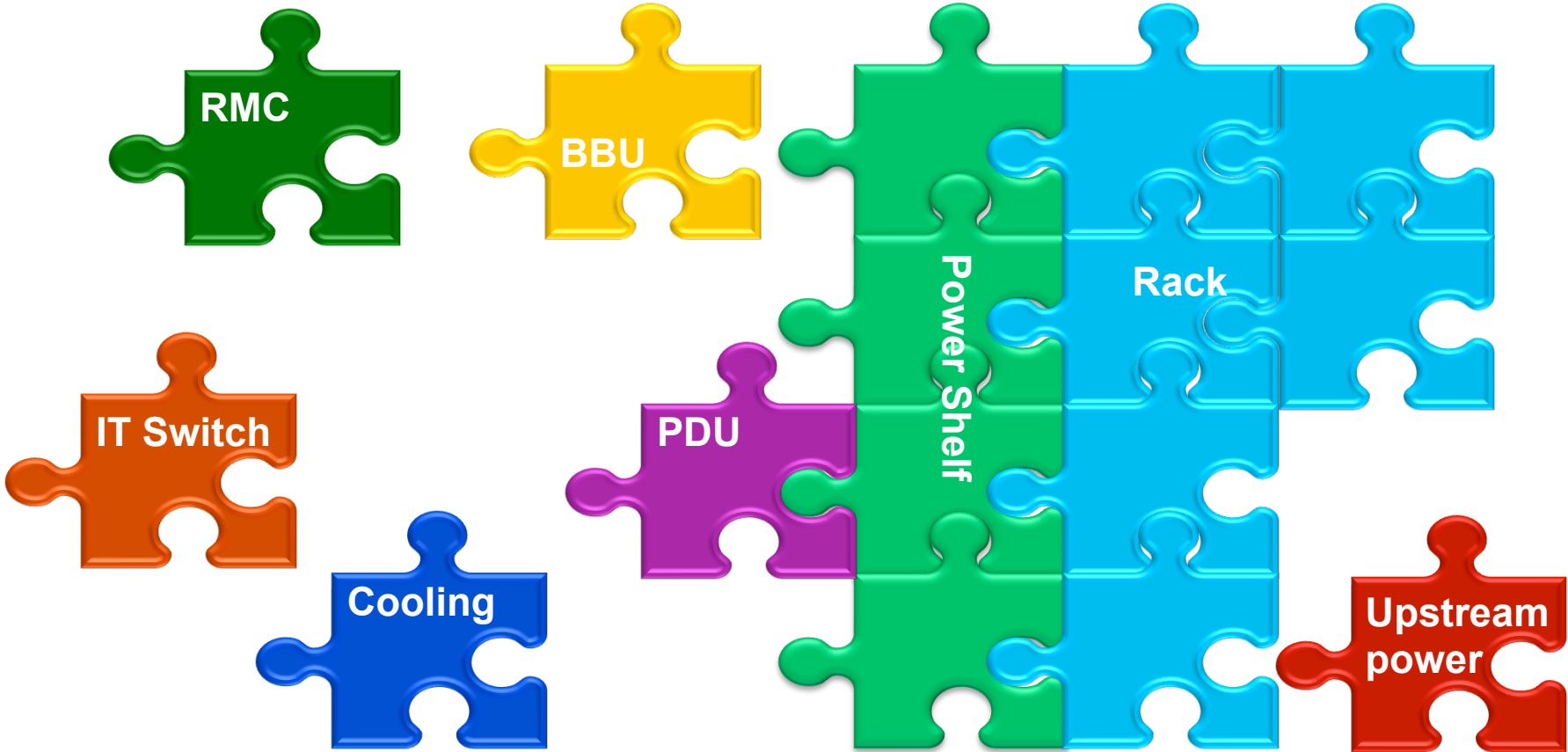


OPEN

Compute Project



Delta OCP Platform Development



Dual AC input 28KW V1 Open Rack



Open rack V1 with 42 OU space

1U Switch Tray

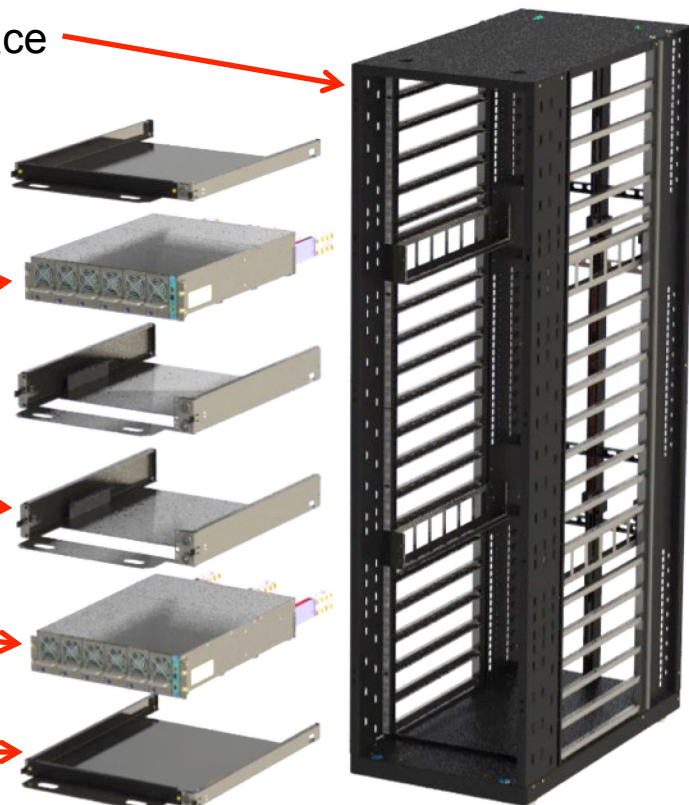
Dual AC 14KW Power shelf

2U Switch Tray

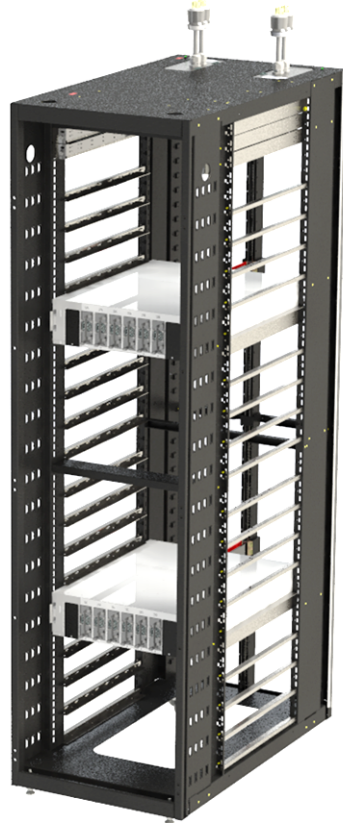
2U Switch tray

Dual AC 14KW Power shelf

1U Switch Tray



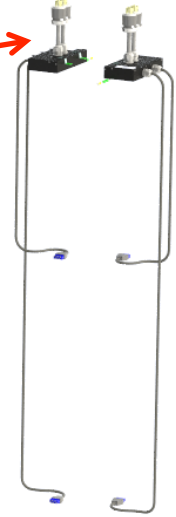
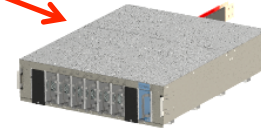
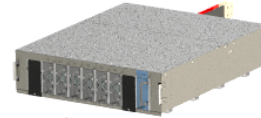
Dual AC input 12.5KW V2 Open Rack



AC PDU; x 2
for 208VAC 3P input

Open rack V1 with
41 OU space

2 power shelves,
each with 6 PSU
for 6.6 KW (N+N) rating
208/ 230Vac or
240/380Vdc



Single AC input 33KW/48V Open Rack

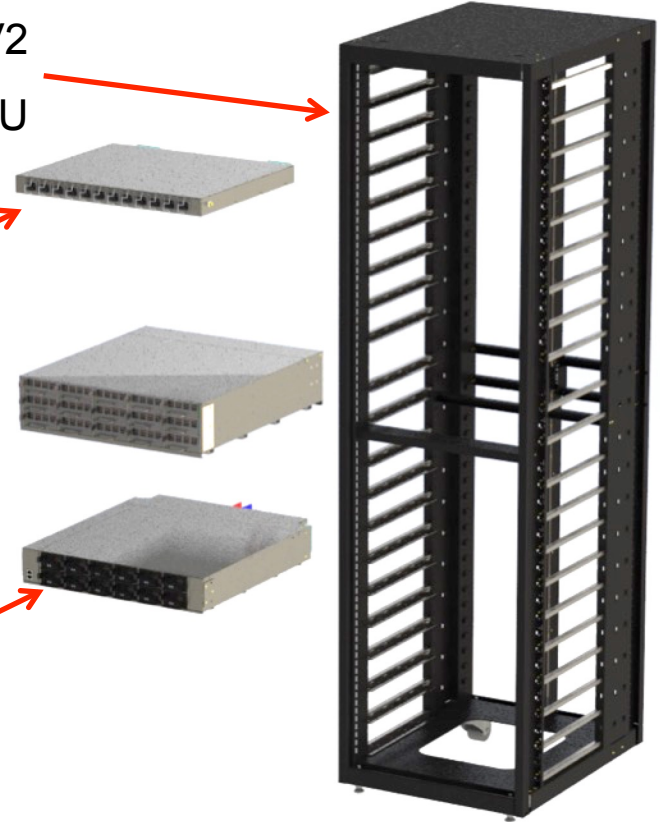


Open rack V2
30" depth / 42 OU

Power Filter Module
(PFM) for AC input

33KW Back up power
Shelf

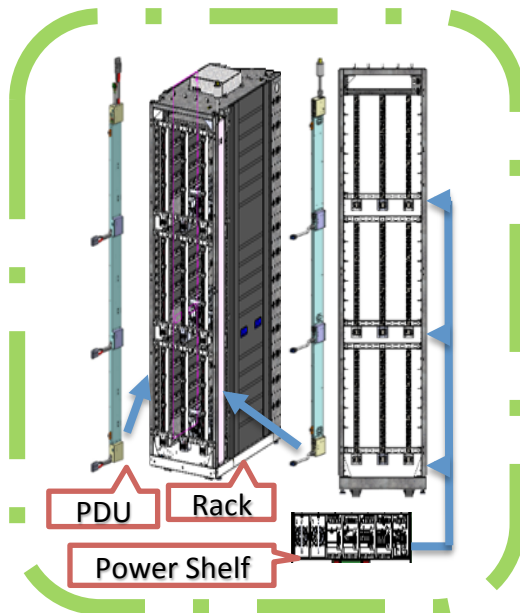
33KW/ 48V Power
shelf



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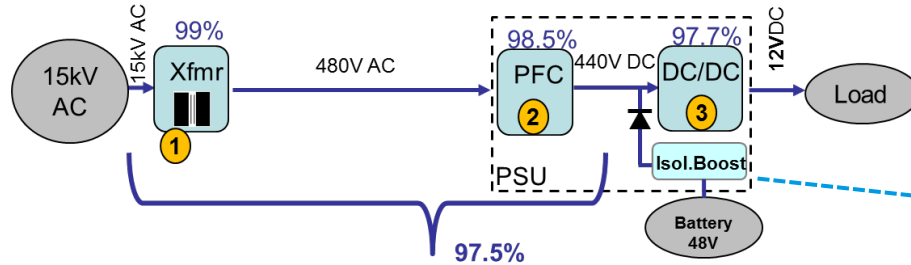
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Victor Cheng
March 08, 2017

