



Open Compute Project : une opportunité pour l'industrie du numérique en France et en Europe ?



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Outline

- ✓ IRT/SystemX Introduction
- ✓ OCP Disruption
- ✓ Going Deeper into OCP
- ✓ Implementing OCP in France
- ✓ Expanding OCP in Europe

OCP DISRUPTION

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OCP Initiative: a Community Spirit

*“Coming **together** is a **beginning**.
Keeping **together** is **progress**.
Working **together** is a **success**.”*

Henry Ford

Initiative started by Facebook (with Intel & Goldman Sachs contribution) in April 2011

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Standard Business Model: the **OEM** is driving the industry



OCP Business Model: the **Customer** is driving the industry



N.B. Both models will co-exist in Hardware domain
(the same way Linux vs. Windows or OpenStack vs. VMware, Android vs. iOS... in Software domain)

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Cost Reduction

- ✓ 1.2 billions US dollars saved by Facebook in 2 years
- ✓ Better energy management
- ✓ Lower raw material needs by removing unnecessary chassis and racks parts
- ✓ Remove compliance with any standard to focus on innovation and cost reduction (EMI, CE and FCC are handled locally at each datacenter)
- ✓ Design solution from ground using COTS, rather than adapt a data center with standard products.

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✓ Facebook Servers solution vs Dell

- 30% lowest cost on power conversion chain as power inverter doesn't need AC back conversion
- Lower raw material cost, and CPU cost. Use so-dimms for smaller footprint
- Total material gain on a 1 CPU / 4 GB / 1 TB storage drive evaluated to 21% (acquisition)

✓ Microsoft Servers vs OEM

- 40% cost savings
- 15% power efficiency (doesn't use Facebook power inverter)
- 50% improvement in deployment and service times

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Benefits of Implementing OCP in France

✓ Provide sovereign, competitive hardware solutions to French leading Cloud, Web services providers, Equipment Manufacturers, Large companies, Administration...

- Complement the sovereignty achieved by the bet on Open Source Software (from Cloudwatt perspective)

✓ Put the French hardware IT industry into a new business model and reinstall it as a dynamic industry

✓ Work within a world-wide community to accelerate innovation

✓ Promote "OCP-Stack" approach

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✓ **Frank Frankovsky:**

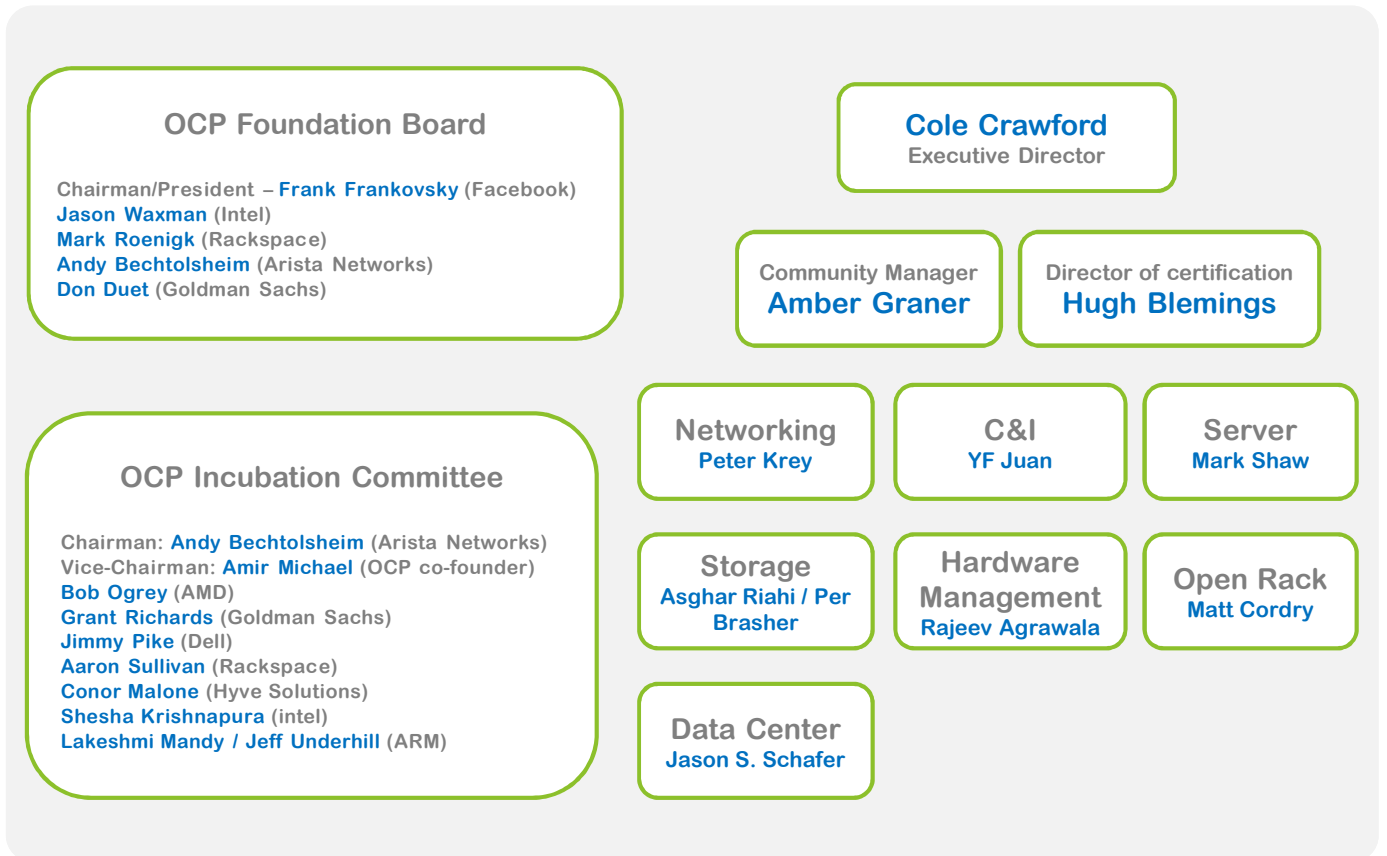
- "I recently left Facebook to pursue a new OCP-related startup opportunity, and will remain on the board as an independent. The board has also voted to retain me as the president and chairman of the foundation"

✓ **New Business Model for innovation in hardware**

- Innovation in hardware is now back through a new business model and create great opportunities for startups. Battery Ventures, Austin ventures, and The Valley Fund understood the opportunity by creating the OpenIncubate initiative to support Seed fundings required to make emerge hardware startups

GOING DEEPER INTO OCP

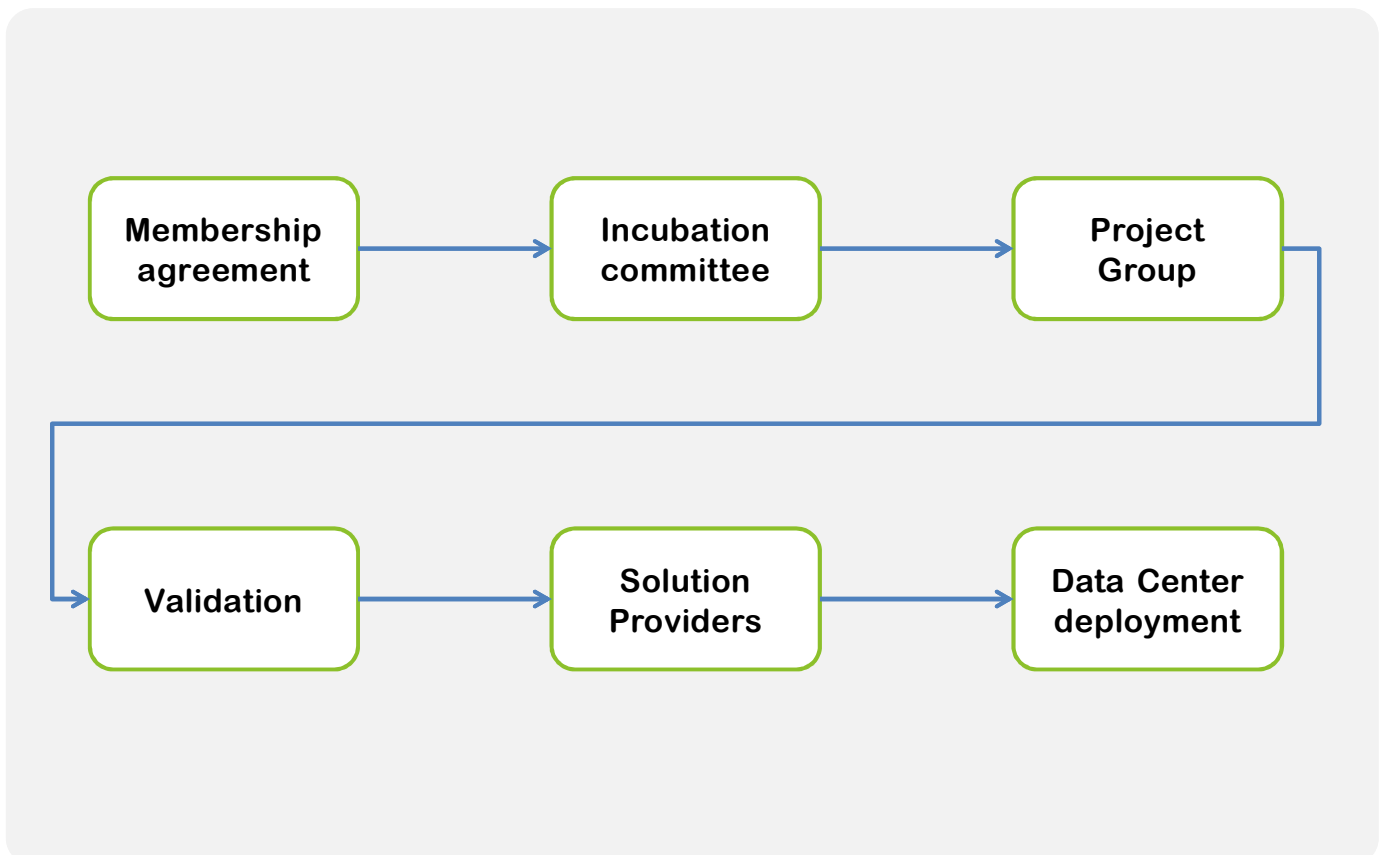
OCP Organization



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OCP Project Workflow



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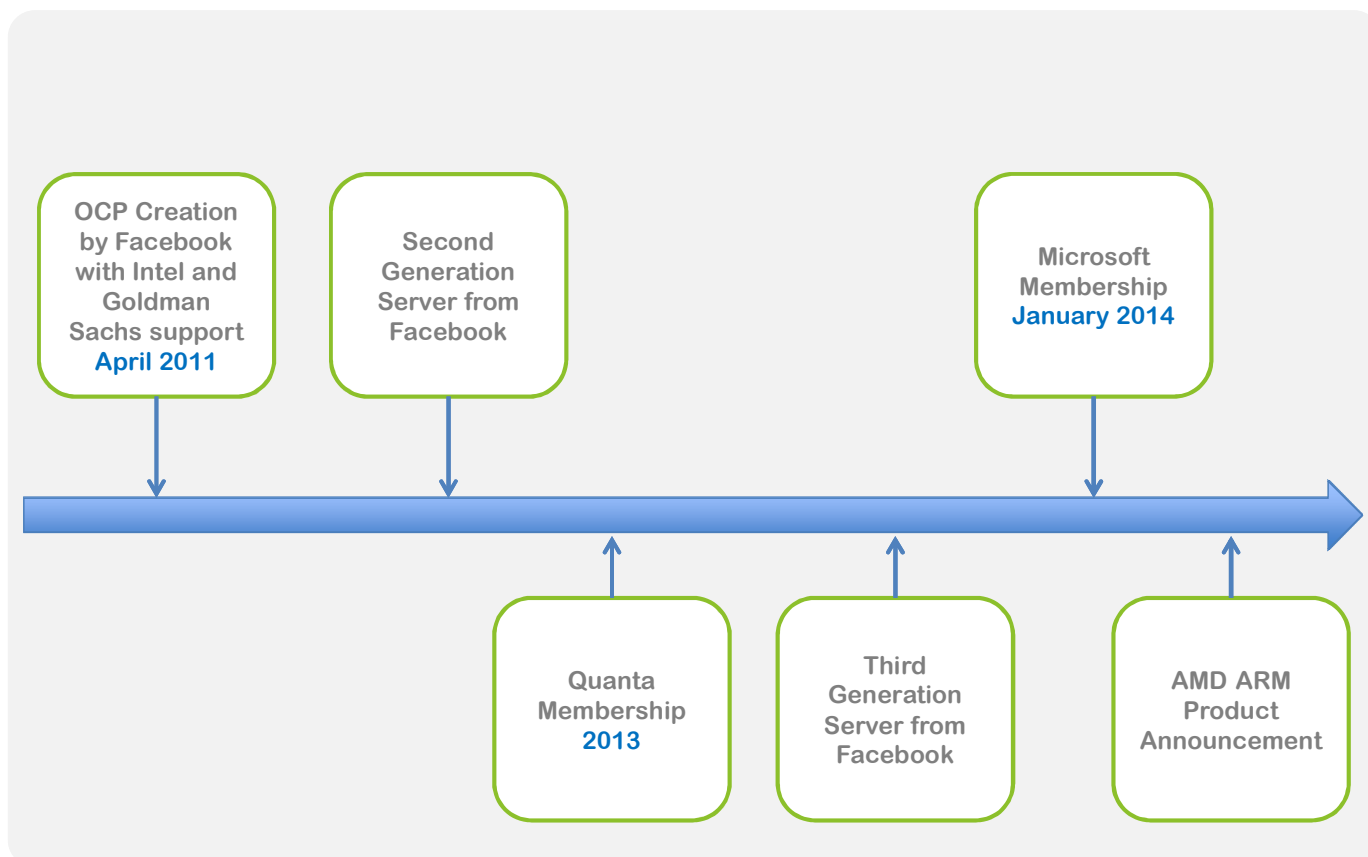
OCP Membership

	Free/Community	Silver	Gold	Gold	Gold	Platinum
Contribution	Intellectual time (project contribution), No financial contribution or IP (Specs/Designs)	financial Contribution (Only)	Financial Contribution (Only)	Intellectual time (project contribution) and IP (Specs/Designs) (No financial Contribution)	Financial Contribution and Intellectual time (project contribution) and IP (Specs/Designs)	Financial Contribution and Intellectual time (project contribution) and IP (Specs/Designs)
Thresholds	Intellectual time (project contribution) only	\$60K and you get the following	\$100K and you get the following	3120 hours of Intellectual time (project contribution) + 2IP (Specs/Designs) and No financial Contribution	\$50K + 2080 hours of intellectual time + 1 IP Contribution	\$40K + 3120 hours of Intellectual time (Project contribution) + 1 IP (Specs/Designs)
Voting for IC Members	NO	NO	YES	YES	YES	YES
Discount on Summit Sponsorship	NO	10% OFF	15% OFF	15% OFF	15% OFF	20% OFF
Discount on Summit Training	NO	10% OFF	15% OFF	15% OFF	15% OFF	20% OFF
Eligible to Become a Solution Provider	NO	NO	YES + additional \$50K	YES + additional \$50K	YES + additional \$50K	YES + additional \$30K
Discounts off submissions for the OCP Certification Program	NO	NO	NO	15% OFF	15% OFF	20% OFF

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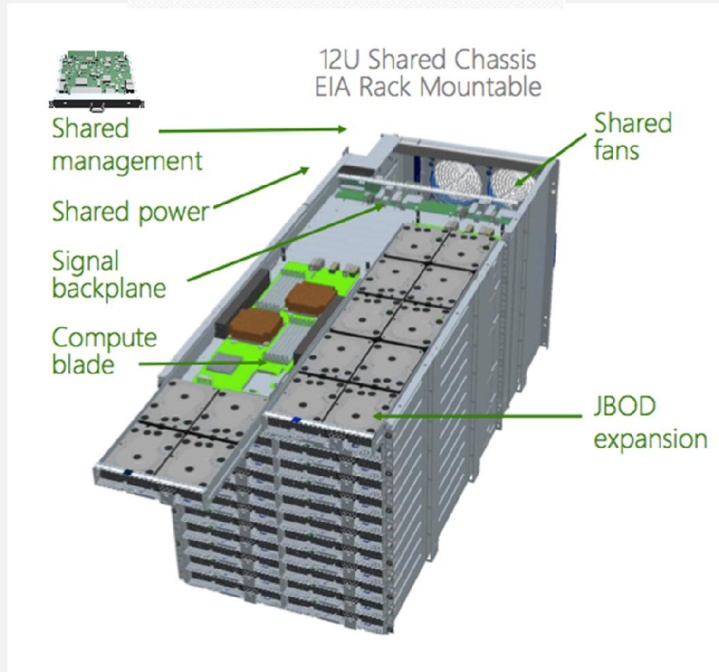
OCP Development Status



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Current contributions (MS)

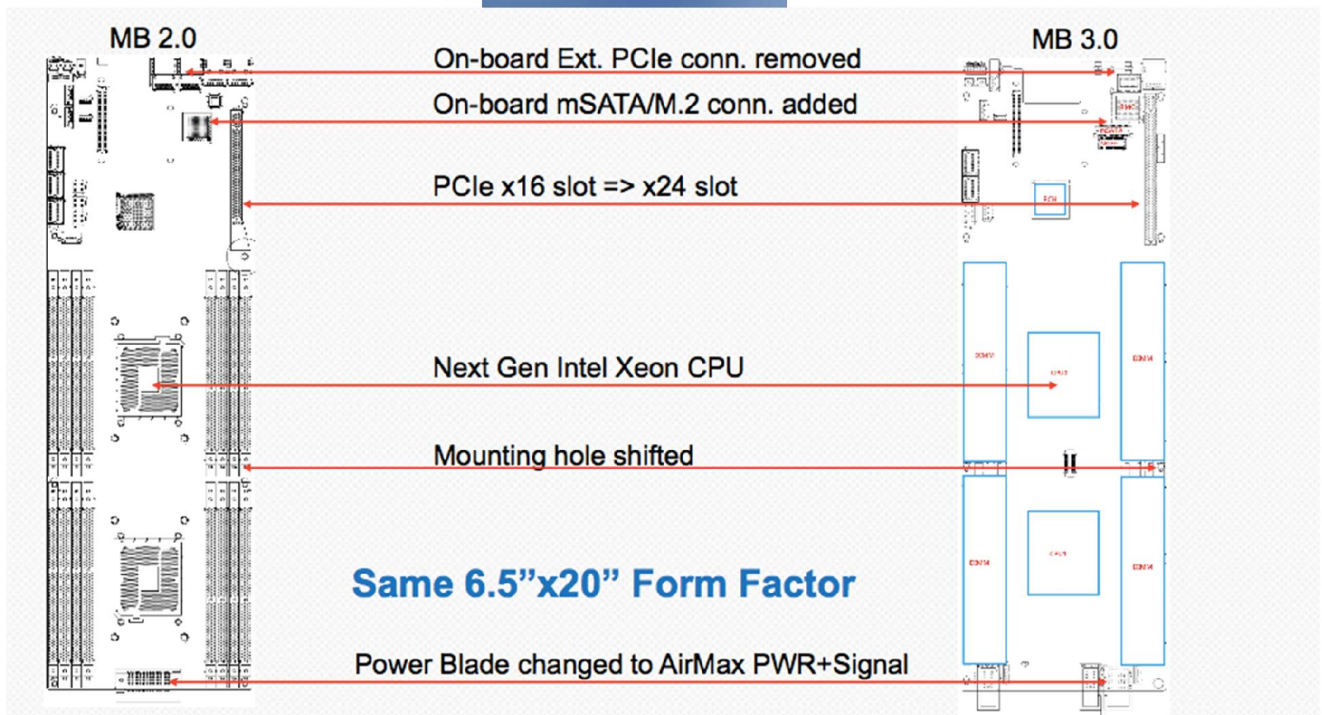


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Current contributions (FB)

facebook



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Datacenter Facts

- ✓ Best in class datacenter in France is exposing a 1.3 to 1.8 PUE
- ✓ 10MW total power -> 7.68 available for computers. 1.4 M€ more expensive than Facebook datacenter per year (80 € per MW/h)
- ✓ industry standard servers (Dell/HP/Netapp/Cisco) have a lot of useless hardware (more raw material, high end microprocessors etc ..)
- ✓ Building construction cost 100M€

- ✓ Facebook OCP Prineville Datacenter is exposing a 1.05 PUE (https://www.facebook.com/PrinevilleDataCenter/app_399244020173259)
- ✓ Facebook OCP server cost is about 30% cheaper than any other servers available on the market.
- ✓ Maintenance cost is about 45% cheaper than any other datacenter solution due to hardware architecture
- ✓ Building construction cost about 65 M€

30%

30%

45%

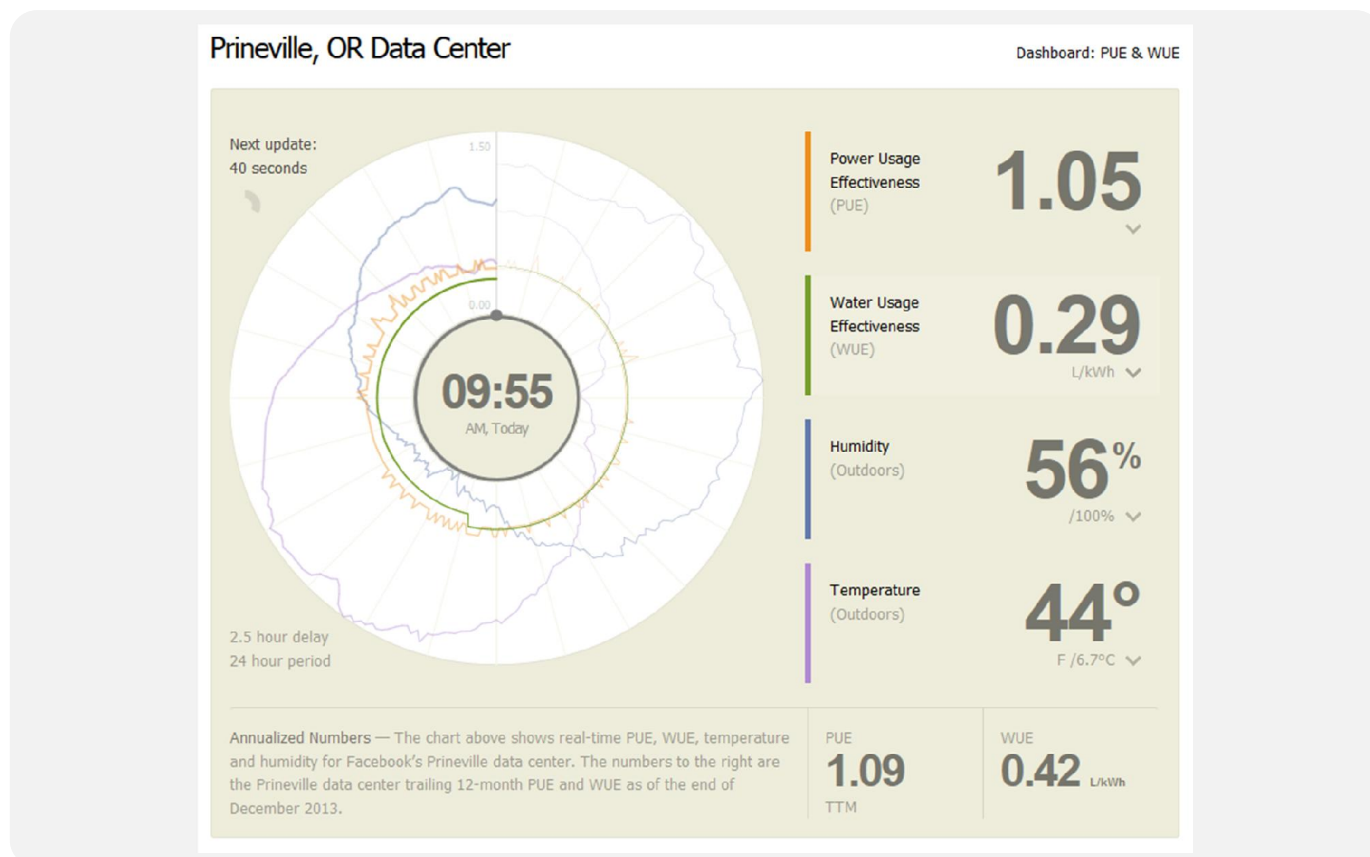
35%

Power Usage Effectiveness (PUE) is the ratio between the power really used for the server and the power waste for cooling and maintaining the datacenter operational

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Facebook Prineville Datacenter



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1U Server Board

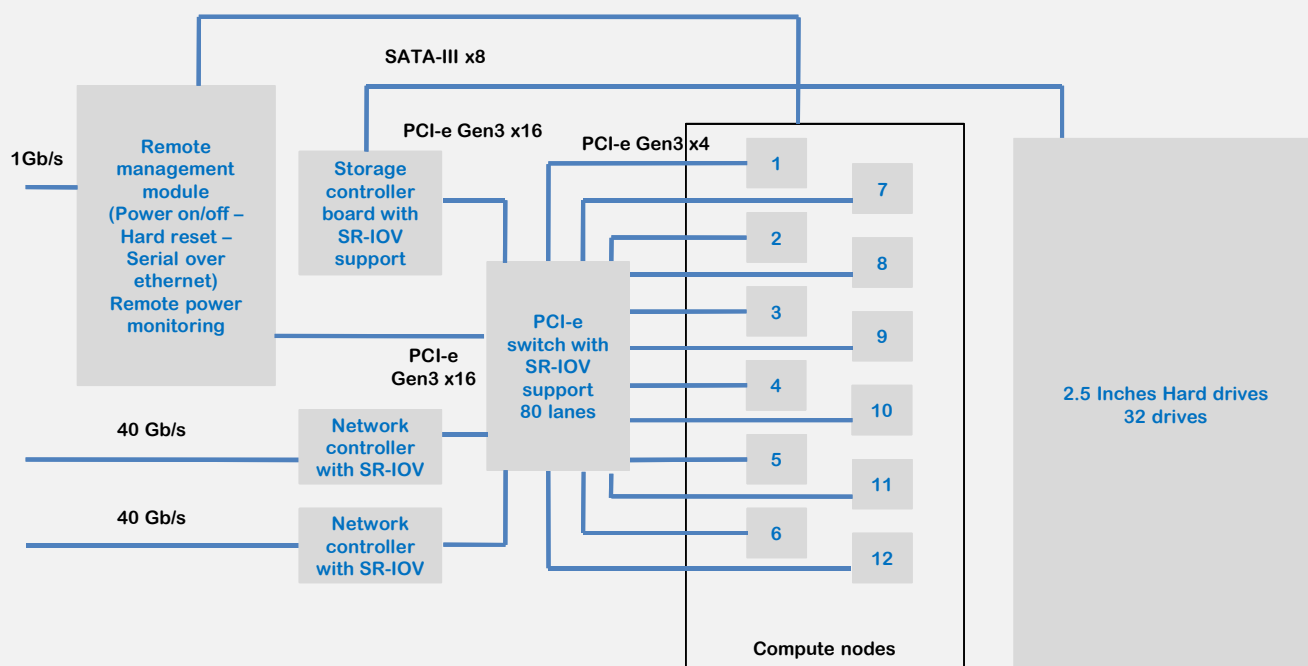
- ✓ Leverage Microsoft Blade approved chassis
- ✓ Redesign the Management board with ARM-based CPU and use the same REST protocol
 - Support security with SSL remote access
 - No TPM
- ✓ Use a single blade per U rather than 2 blades
 - Requires some mechanical adaptation
- ✓ Use Datacenter as a PCB concept
- ✓ Use PCI-e as a Fabric leveraging PLX switch technology with SR-IOV support
- ✓ Use Industry standard processor used in high volume product (laptop) with ECC
 - AMD BaldEagle quad core Kaveri based chip

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DaP (Datacenter-as-a-PCB) OCP

- ✓ First generation Compute node based on AMD APU
- ✓ Second generation Compute node based on AMD HeroFalcon ARM

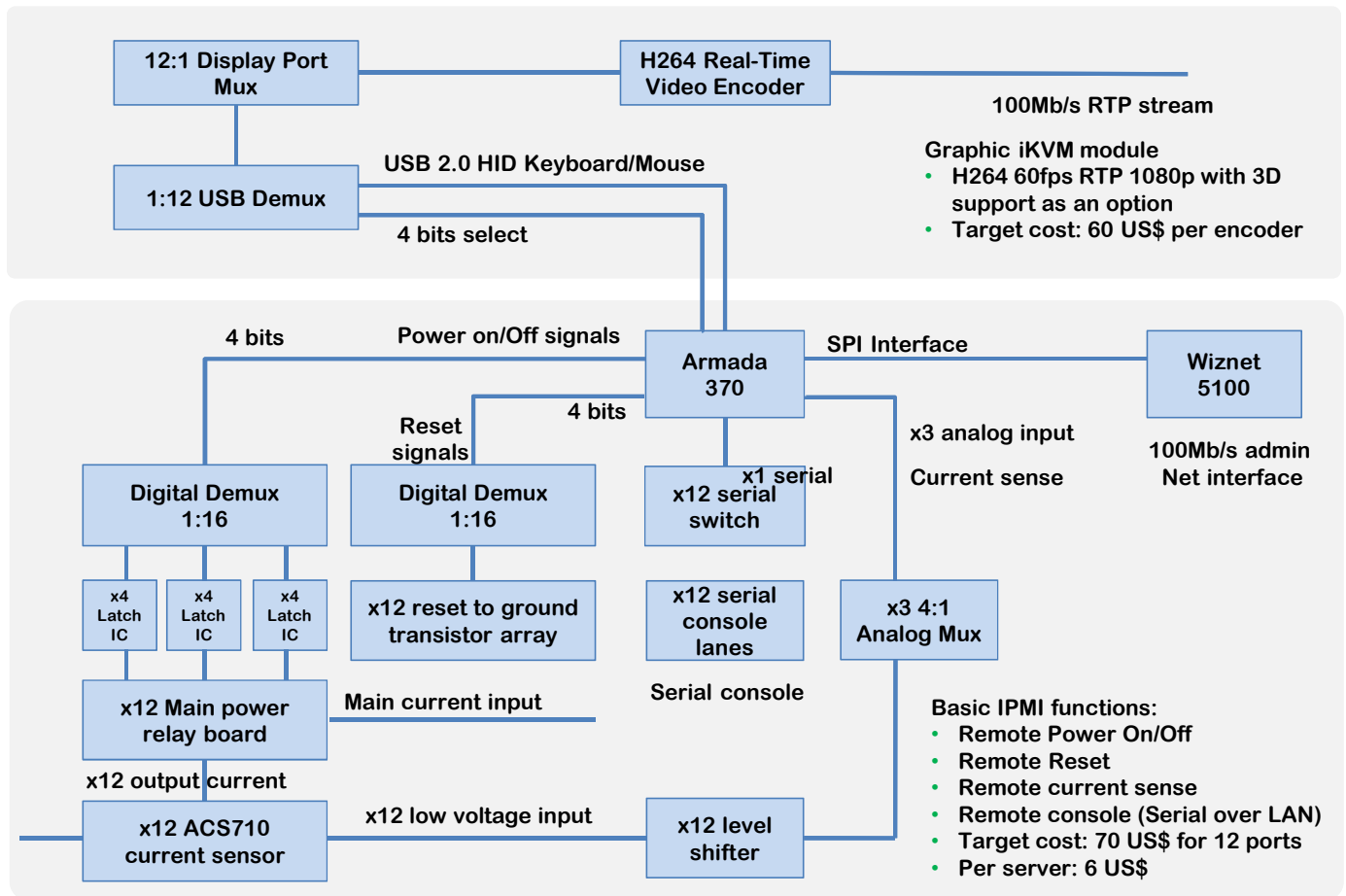


- ✓ 48 cores in 1 U
- ✓ 384 GB ECC main memory
- ✓ 48Gb/s local drive bandwidth
- ✓ 64 TB local storage
- ✓ 32 Gb/s interconnect per node
- ✓ 384Gb/s local fabric
- ✓ 80 Gb/s network output

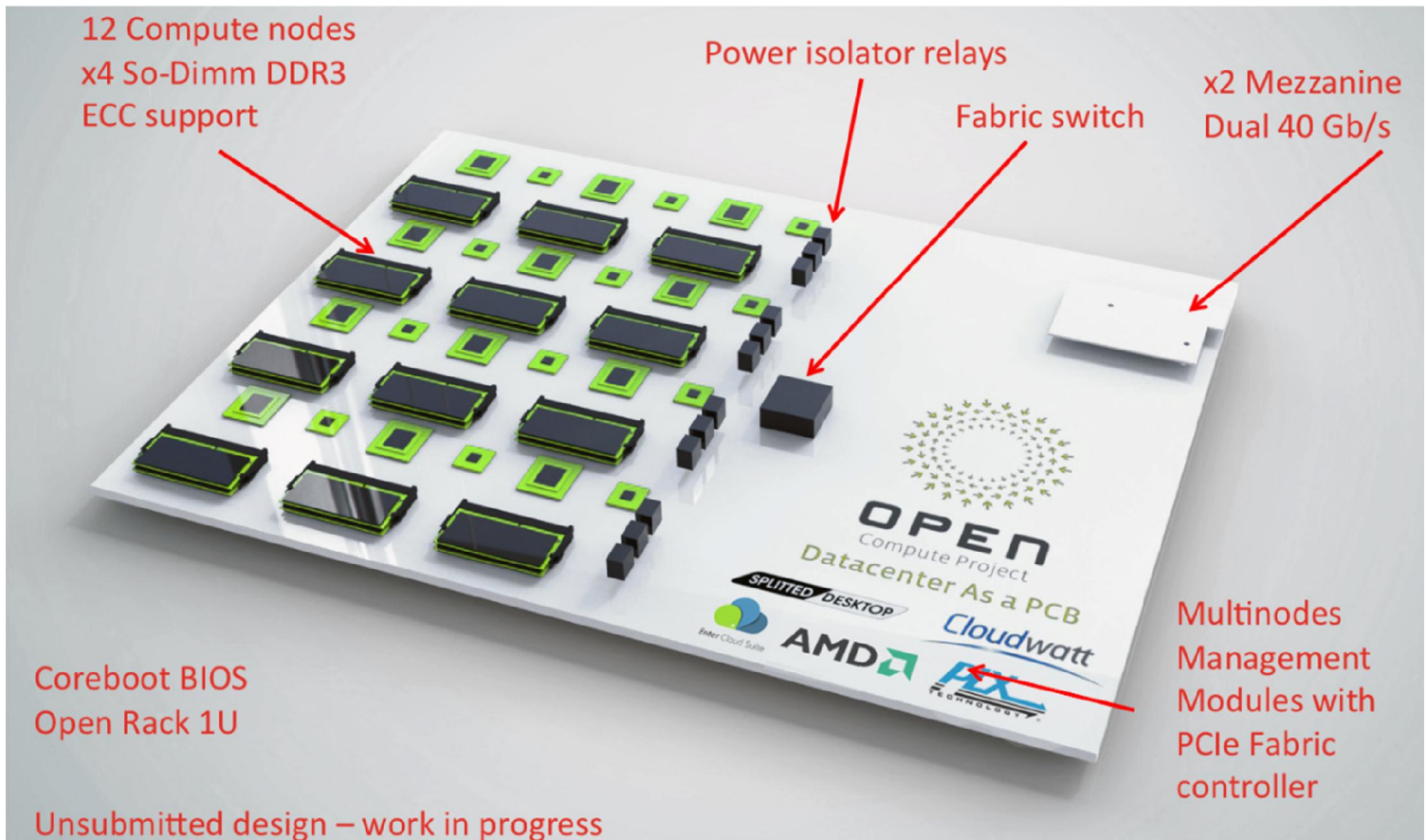
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Remote Management Module



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Unsubmitted design – work in progress

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Estimated Production Cost in High Volume (without storage)

All Cost in \$US	Price	Quantities per board	Total
Management Module (without iKVM)	70	1	70
Compute module			
1 CPU Quad Core 3 GHz 2MB L2	110	12	1320
16 GB Main memory	200	12	2400
Compute board and "accessories" (like SB)	70	12	840
PCI-e Switch	400	1	400
40 Gb/s NIC	300	2	600
Storage HSA with SR-IOV	300	1	300
PCB	400	1	400
Mechanical	200	1	200
Total			6530
Per Server (\$US)			544
Total Power (Watts) full load			720
Per server (Watts) full load			60

40 % cost saving against OEM (Dell or HP) architecture

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IMPLEMENTING OCP IN FRANCE

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- ✓ **Create a core group based on SMB and a University Campus**
 - SDS / Cloudwatt / Paris-Saclay Campus

- ✓ **Quickly expand to leading French IT companies**
 - Cloud Service & Hosting Providers: Numergy, OVH...
 - Telecom: Orange, SFR...
 - Defense / French Administration : Thales, DISIC...
 - Banks / Insurance: BNP, AXA...
 - Equipment Manufacturers: Alcatel, Bull...
 - ...

- ✓ **Join each OCP working group**

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SDS & Cloudwatt Considered Contributions

- ✓ **SDS contribution**
 - **Server design contribution**
 - Power management
 - Remote management
 - Cooling
 - Datacenter as a PCB
 - Chip design
 - WW recognition as a design house

- ✓ **Cloudwatt contribution**
 - Infrastructure testing and qualification
 - OpenStack adaptation
 - State of the art Datacenter

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✓ Certification Center

- Currently performed in Asia and North America where certification process is different than in Europe

✓ A Research Team attached to the certification center

✓ Norms Adaptation and Insurance companies positioning

- Who is supporting responsibility in case of major system failure ?
- Need to be discussed with insurance companies. France has leading ones in Europe.
- e.g. OCP servers might be unprotected from short cut and dangerous if not handled by trained field engineers from a maintenance perspective
- This is going against the idea to use less raw material and having a greener footprint. Can we consider computer as special machine and save energy ?

✓ OCP is about hardware, but hardware without software is nothing

- How do we leverage software stack ?
- Which standard to adopt (OpenStack) ?
- Might be a strong opportunity to leverage on European dynamism in software development.

✓ Political support. Nothing happen in Europe without political support.

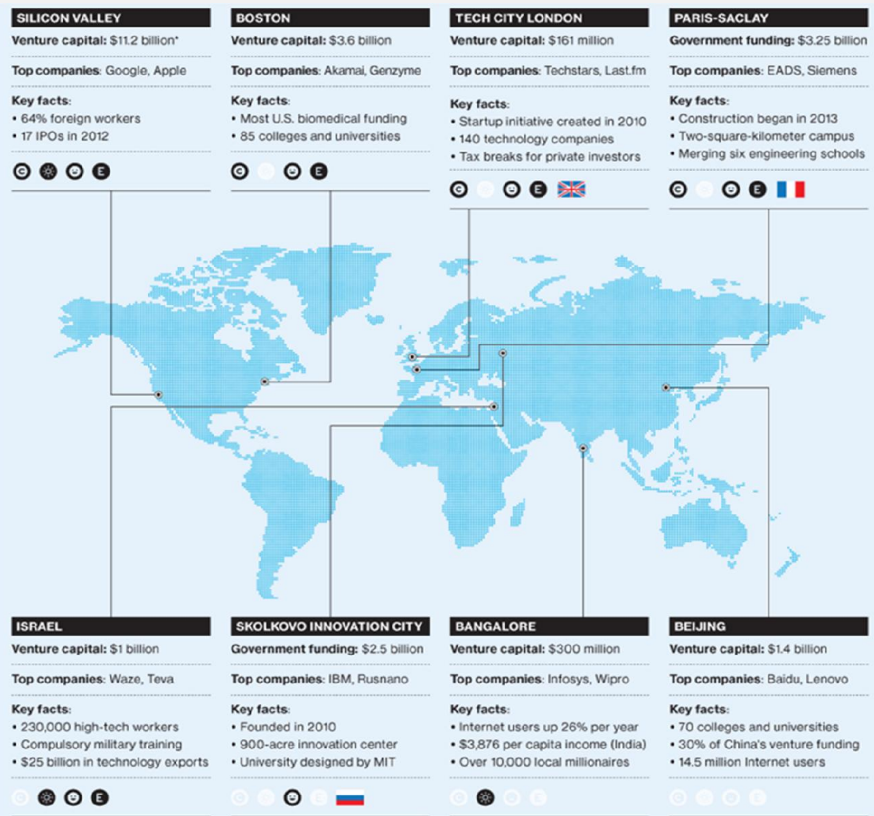
- French Government (CDC, CGI, BPI) might be supporting the idea to have an open initiative driving hardware development in Europe

WORLD INNOVATION CLUSTERS

BY THE MIT TECHNOLOGY REVIEW

- STRONG IP PROTECTION
- GOOD WEATHER
- LIBERAL IMMIGRATION LAWS
- ENTREPRENEURIAL CULTURE
- FLAG = GOVERNMENT CLUSTER

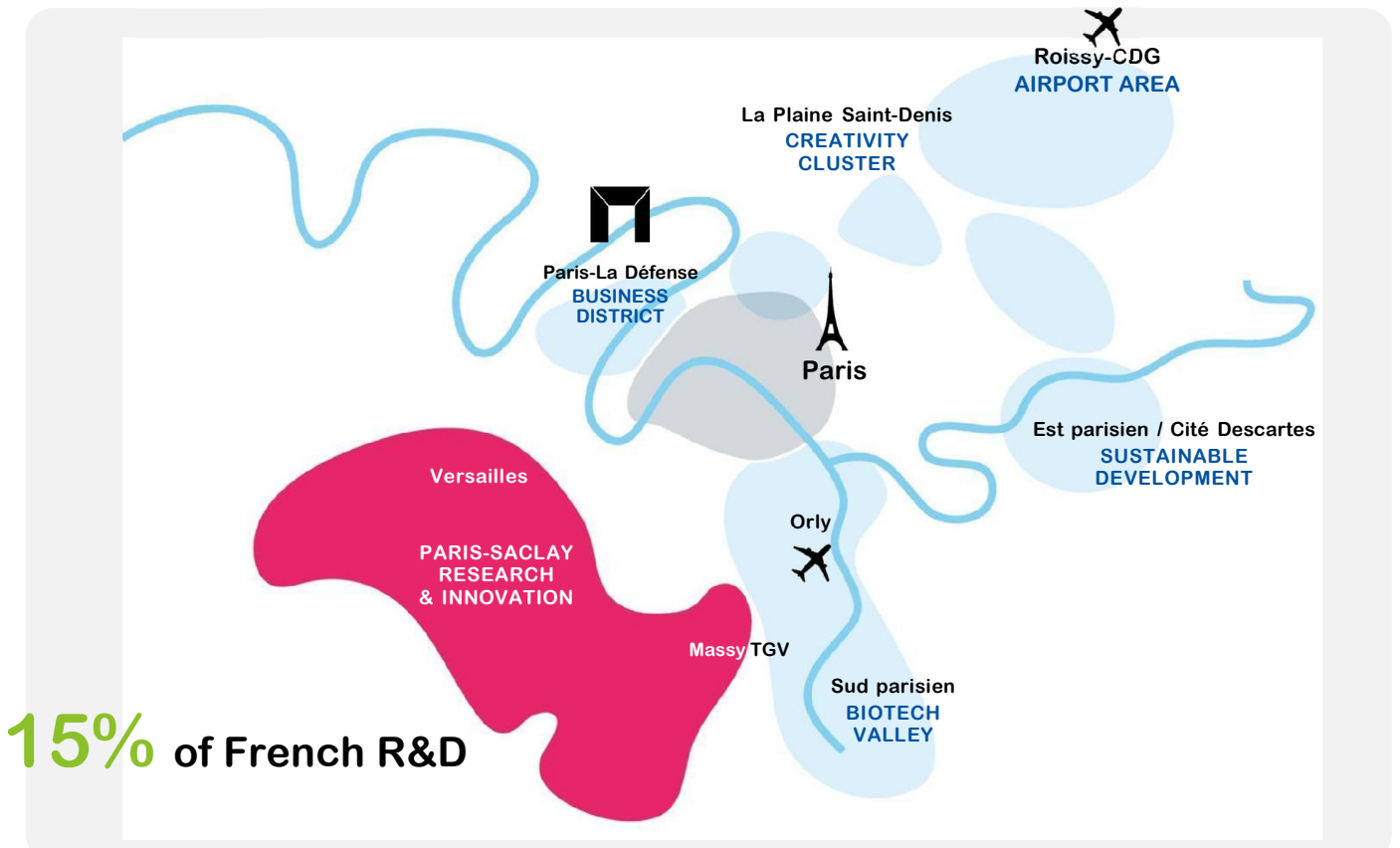
Source : MIT Technology Review, July 2013



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The Campus



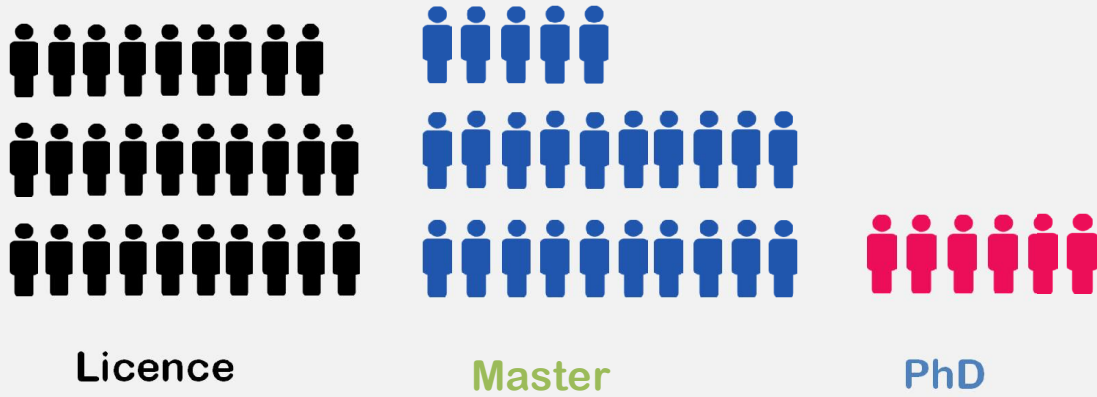
Source : ARD/EPPS

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Human Resources

In 2014, 60 000 students in Science, 15 000 researchers

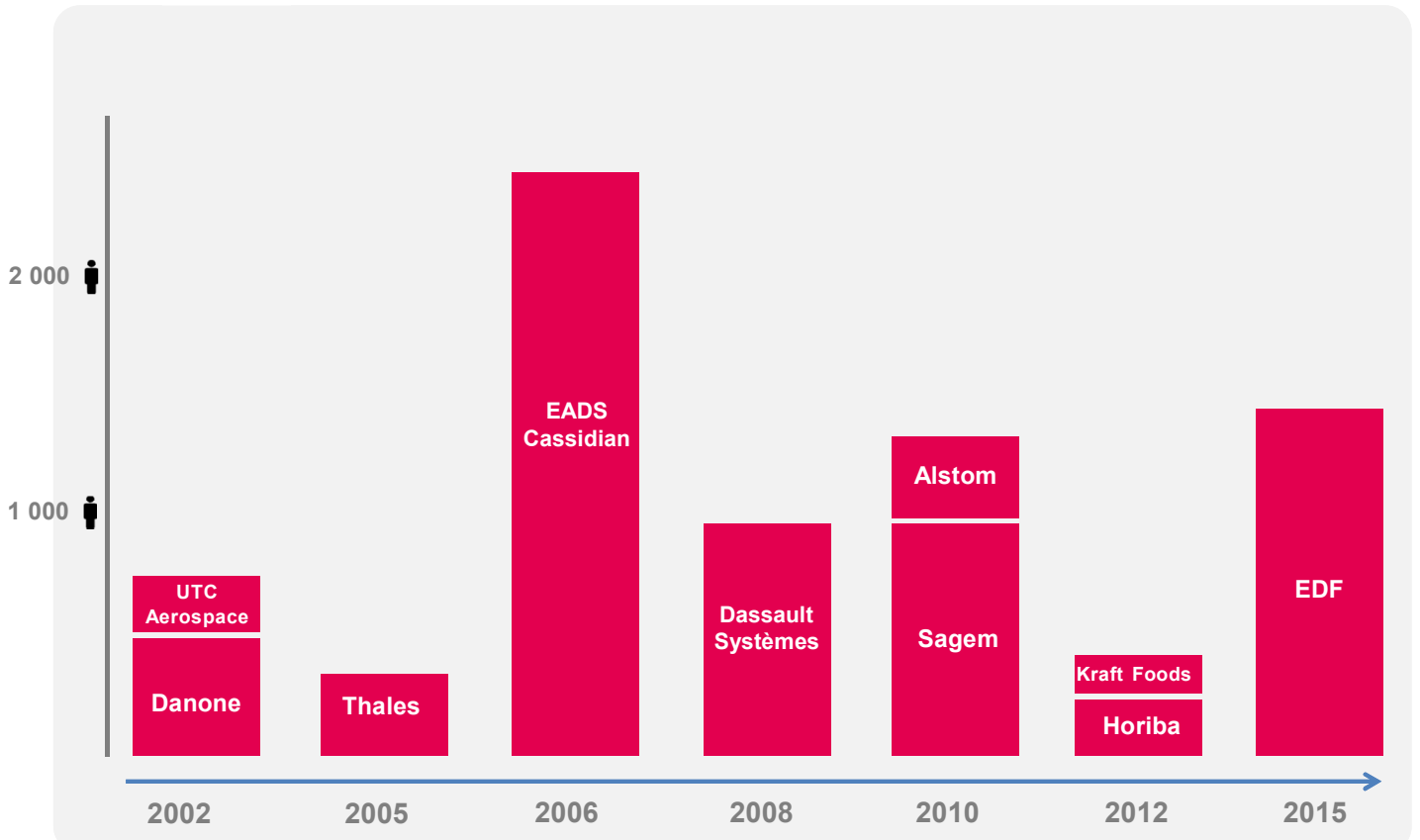


 / 1,000
Source: FCS

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Private R&D centers cluster



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- ✓ **SDS as a design house and solution providers**
 - SDS is currently assembling 15 000 Desktop PC per year to sustain local needs
- ✓ **Clouwatt as an early technology adopter and customer**
- ✓ **Paris-Saclay Campus as a European certification center**
- ✓ **SDS is an active member of OCP**
- ✓ **Paris-Saclay Campus had to secure a yearly budget for the European certification center**
- ✓ **French Government through CDC, BPI or CGI, is supporting the project, and might provide co-investment with VC funding**

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Meetups

- ✓ **Engineering meetings**
- ✓ **Every 2 weeks in Proto 204 (Orsay University campus)**
- ✓ **Focusing on every OCP abstracts**



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- ✓ Come and join the foundation ! It is free
- ✓ Join the monthly call and contribute through the meetups
- ✓ Allocate resources
- ✓ Come to the various engineering workshop
- ✓ Be a project sponsor through
 - ✓ Free support
 - ✓ Team financing
- ✓ Be an early adopter ? An end user ?

EXPANDING OCP IN EUROPE

✓ Expand OCP through European Community

- **Research centers**
 - Paris-Saclay, Cambridge, Frankfurt University, Barcelona Supercomputing center...
- **Electronic partners**
 - ST Micro, ARM, Soitec, Philips, Molex, Global Foundries, Siemens...
- **Telecos**
 - Orange, BT, Telefonica, Alcatel-Lucent...
- **Cloud startups**
 - Cloudwatt, Numergy ...
- **Banks**
 - BNP, Société Générale, Deutsch Bank...
- **Major Internet Services Providers**
 - Dailymotion, ...

✓ The whole European industry might be able to design tomorrow datacenters through a single initiative

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European Market Growth

EMEA: Server Vendor Revenue Estimates, 4Q13 (U.S. Dollars)

Source: Gartner

Company	4Q13	4Q13 Market Share (%)	4Q12	4Q12 Market Share (%)	4Q13-4Q12 Growth (%)
	Revenue		Revenue		
HP	1,227,689,485	34.5	1,257,104,552	32.9	-1.9
IBM	915,632,505	25.7	1,244,617,164	32.7	-26.4
Dell	488,845,100	13.7	467,717,300	12.3	4.5
Fujitsu	252,090,555	7.1	246,676,881	6.5	2.2
Oracle	170,936,564	4.8	162,818,277	4.3	5.0
Others	503,197,846	14.1	429,986,643	11.3	17.0
Total	3,558,392,054	100.0	3,802,920,816	100.0	-6.4

- Strong decline from traditional vendors in market share to the benefit of “Others” category, coming with impact from OCP Facebook datacenter in Sweden and the growth of OCP
- EMEA market is 3.5 B \$US, even with a slight decrease will stay strong and currently dominated by US based companies (except Fujitsu who has a manufacturing plant in Germany)
- Leveraging OCP in Europe might brings back thousands of jobs position in Europe including in manufacturing (assembly), staging (testing and qualification), and production sites (datacenters)

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OCP European summit in Paris November 2014

FCS and EPPS meetings to setup the European certifications center

UTSA, ITRI sync up meetings

Industrial community meetings

Weekly meetups in Paris-Saclay Campus

Taipei Computex OCP engineering workshop

Banks community meetings

IRT System-X and Paris-Saclay campus seminar

Dubai Middle East OCP days

Cloudwatt and cloud operators meetings

UTSA Certification center inauguration and Engineering Workshop

Research community meetings

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Thanks for your attention

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