

An overview of CERN openlab

Bob Jones
head of CERN openlab



PARTNERS



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SIEMENS

CONTRIBUTOR



CERN openlab in a nutshell

- A science – industry partnership to drive R&D and innovation with over a decade of success
- Evaluate state-of-the-art technologies in a challenging environment and improve them
- Test in a research environment today what will be used in many business sectors tomorrow
- Train next generation of engineers/employees
- Disseminate results and outreach to new audiences



PARTNERS

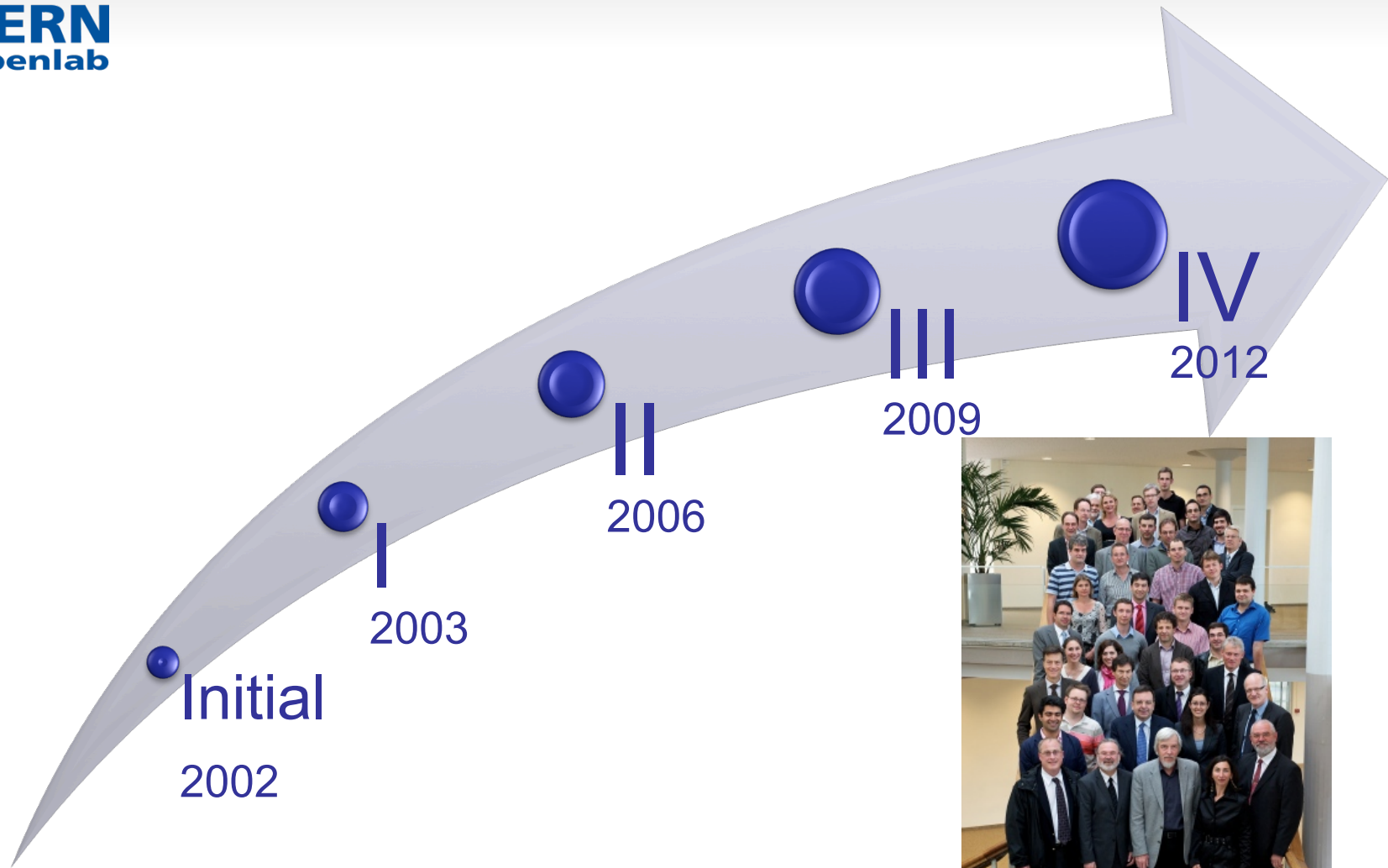


CONTRIBUTOR (2012)

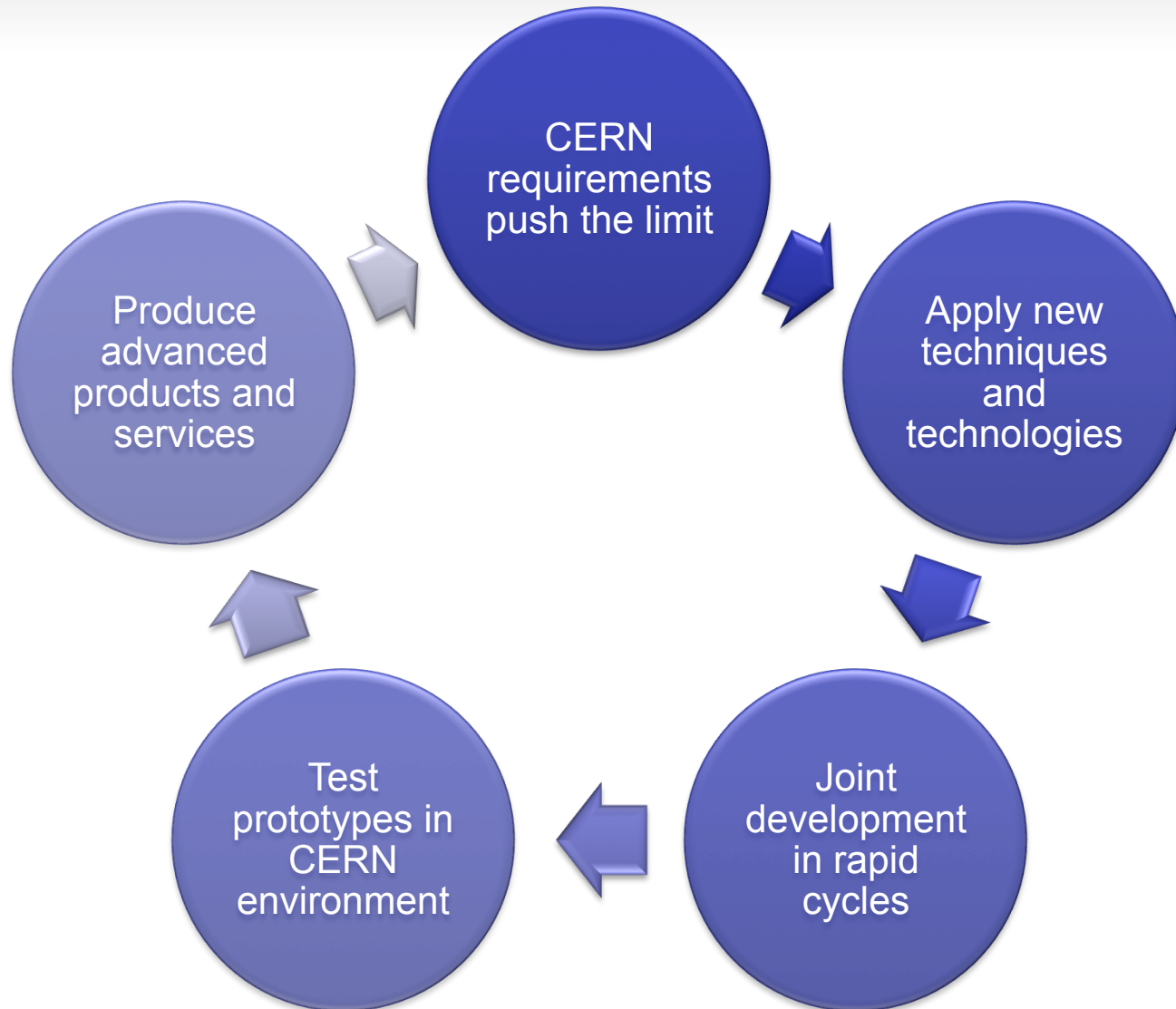


Past involvement:
Enterasys Networks,
IBM, Voltaire,
F-secure, Stonesoft,

The history of openlab



CERN openlab 10th birthday celebration on 3 May 2011

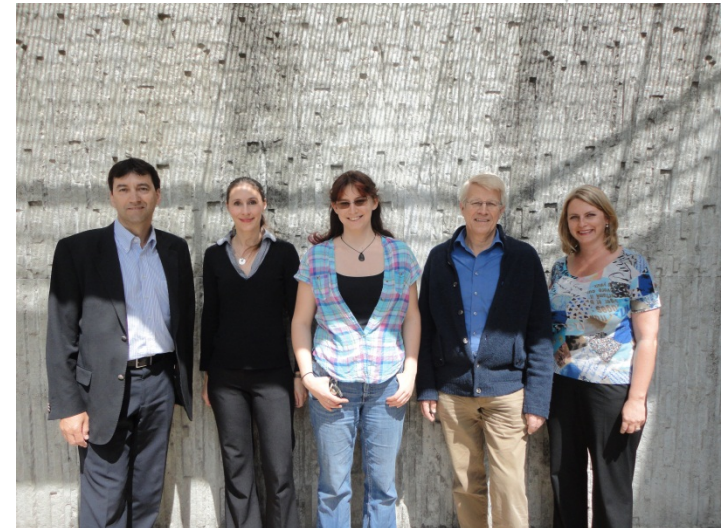


A public-private partnership between the research community and industry

- **From Partners / Contributors**
 - Mix of
 - in cash for hiring young personnel
 - in kind for carrying out R&D activities



- From Partners
- From CERN
 - Technical environment
 - Technical manpower
 - Technical supervision
 - Management resources
 - Communication resources



CERN-hosted **workshops** on advanced topics

Joint events with industry members

On-site **lectures** for summer students

Technical **seminars** from CERN staff or invited guests

Contributions to the

CERN School of Computing

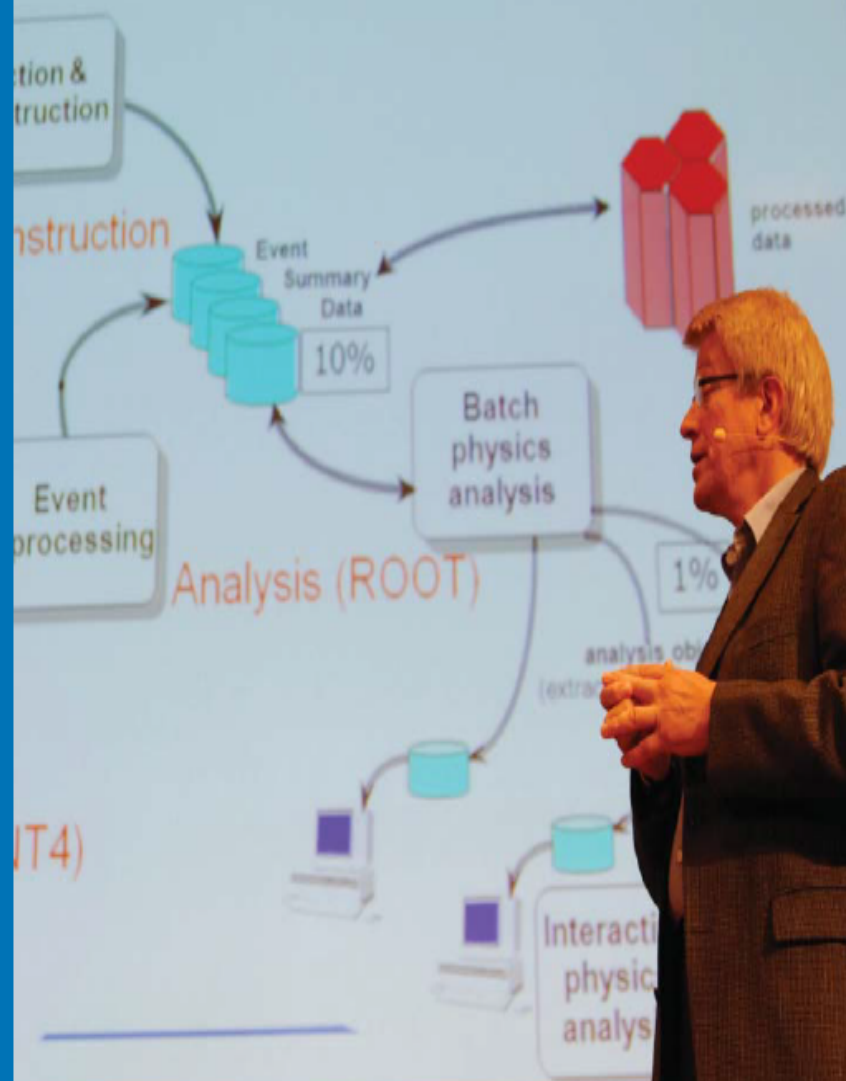
Publication of

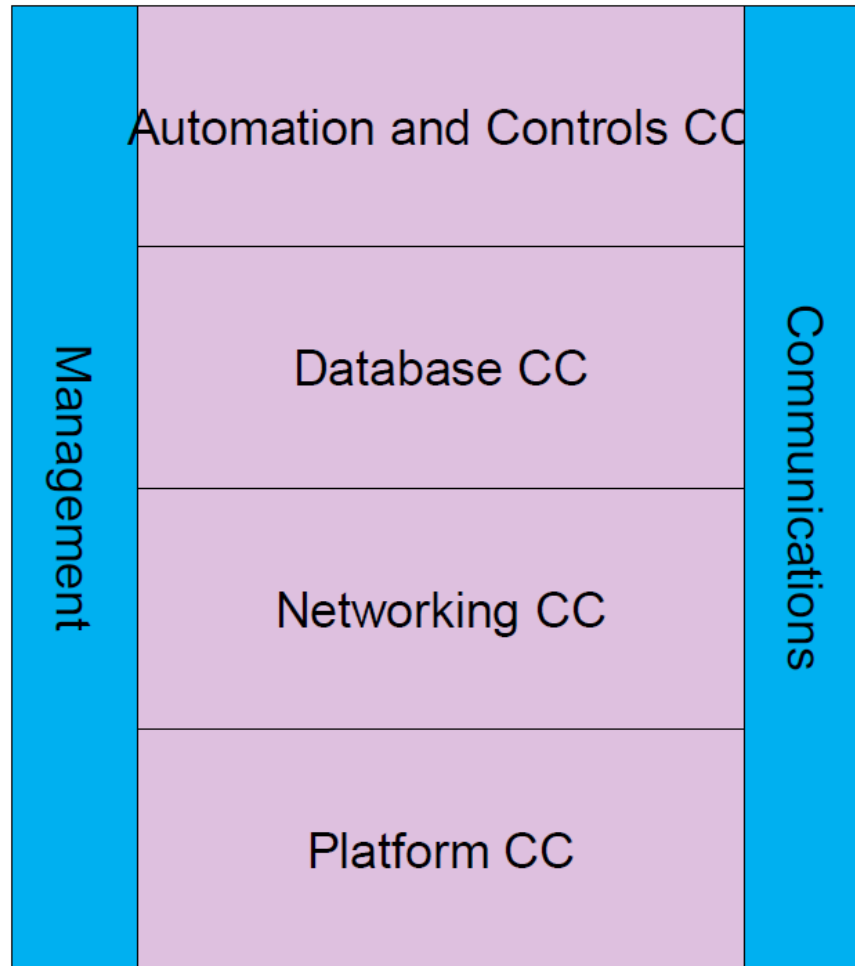
technical papers and posters

Keynote presentations

at leading global events

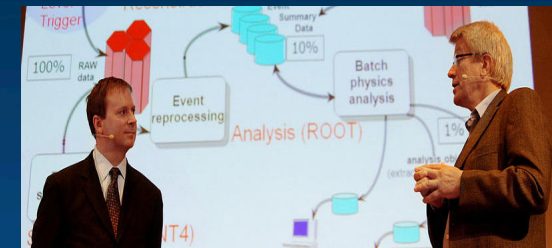
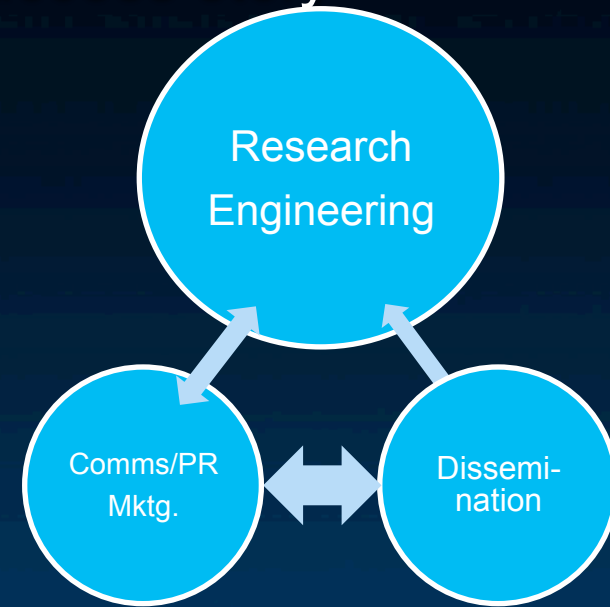
Data Handling and Computation for Physics Analysis





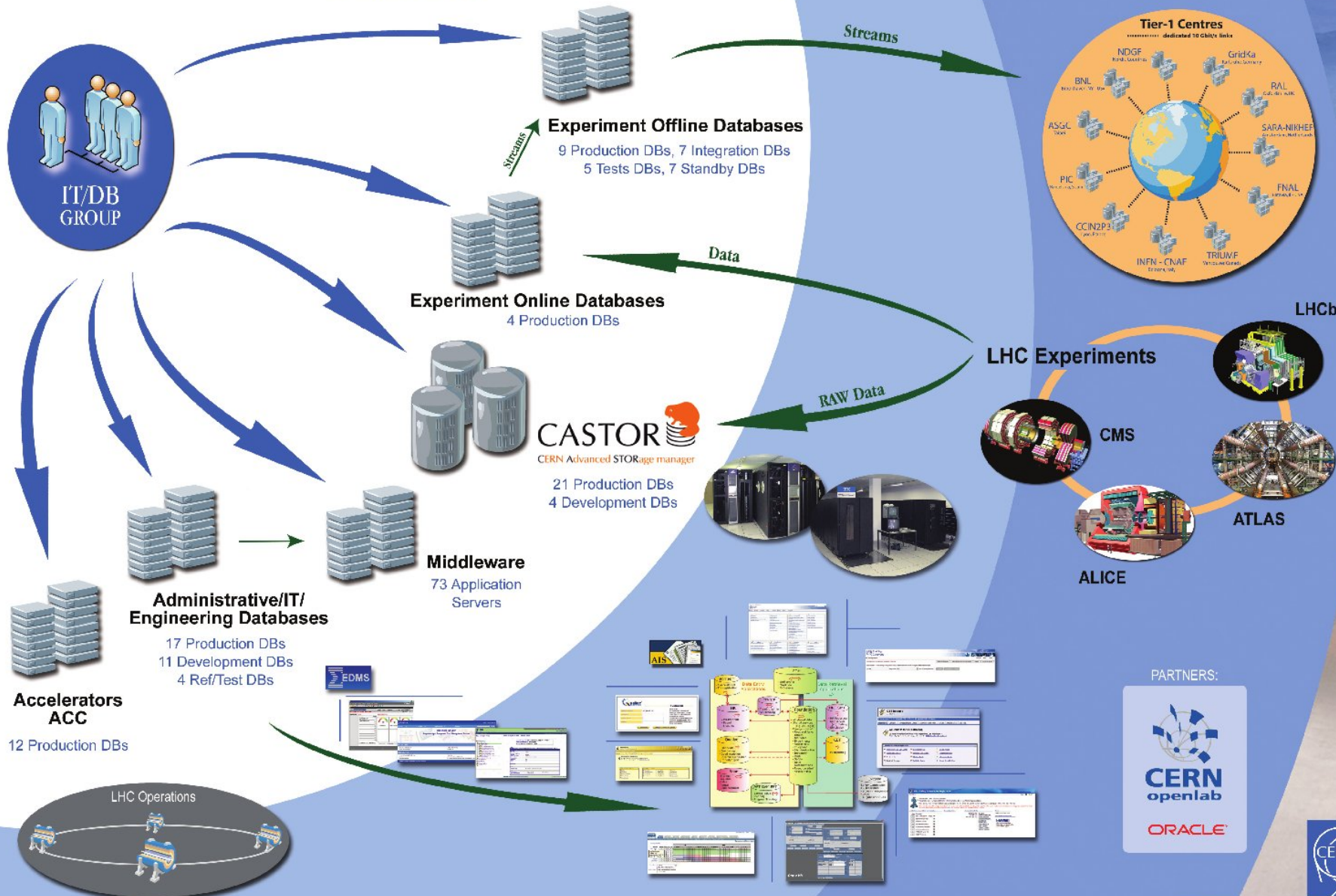
CERN openlab – III a great success story

- High competence, great research/engineering
- Further improvements of CERN Datacenter and LHC Grid
- System/platform evaluation : early evaluation of latest IA platforms e.g. SNB-EP , Intel Many Integrated Core Architecture, Intel Network NetEffect and 10GBE
- Software evaluation and developments
 - Performance optimization and monitoring. Great feedback for existing and new SW tools.
- Dissemination
 - Seminars, conference , teaching, POCs
 - Openlab workshops , Intel SSG workshops , ISEF
- Marketing - PR/Comm
 - Testimonial, Quotes, Technical white papers, joint PR/ Mkt events -> great overall visibility.



OPENLAB IV - key areas for Intel/ CERN

Topic	Goals
Platform evaluation: Benchmarking and optimization	Test and optimize for new Intel HW & SW Intel Xeon Processor and Intel MIC Architecture, publish tech papers, case study
Multithreading and Many core scalability	Threaded codes in HEP area, refine methods and parallelization, feedback on Intel SW tools for Intel MIC Architecture.
Exascale-range computing	SW tools and new programming model, data intensive
Cloud computing	Reference Architecture, Evaluation, Learn from LHC grid environment; Cloud Industry Initiatives (ODCA and others), e.g. Authentication as key topic
Power and DC, computing efficiency	Power Optimization , DCM Technology – remote DC management, Power Efficiency on every level.
Security	Technology evaluation



PARTNERS:



openlab III (2009-2011)



- Fellows: 4
- Summer Students: 6
- Publications: 37
- Presentations: 41
- Reference Activities: over 15
- Product enhancements: on 8 product lines
- Inter-partner collaborations: 2

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DATABASE 10^g

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ENTERPRISE MANAGER 10^g

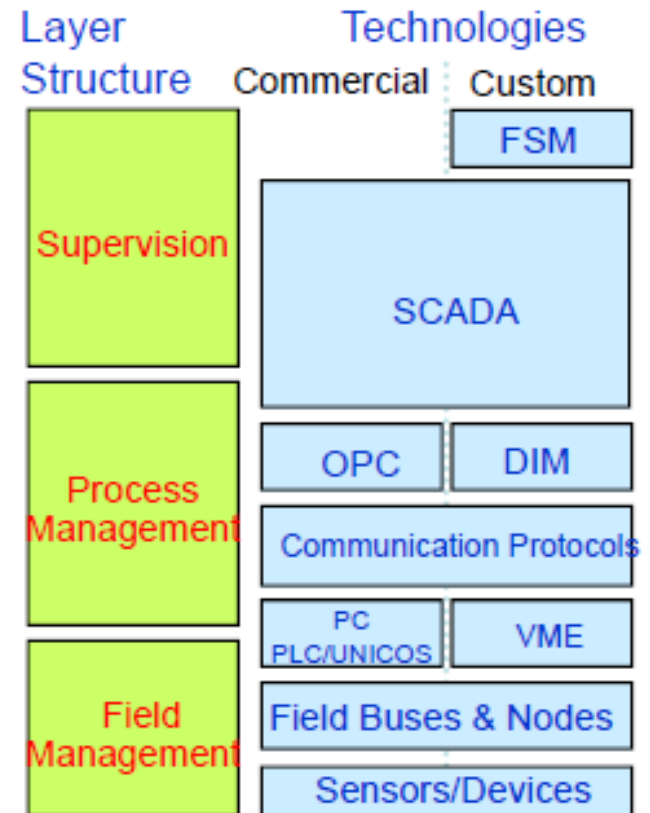
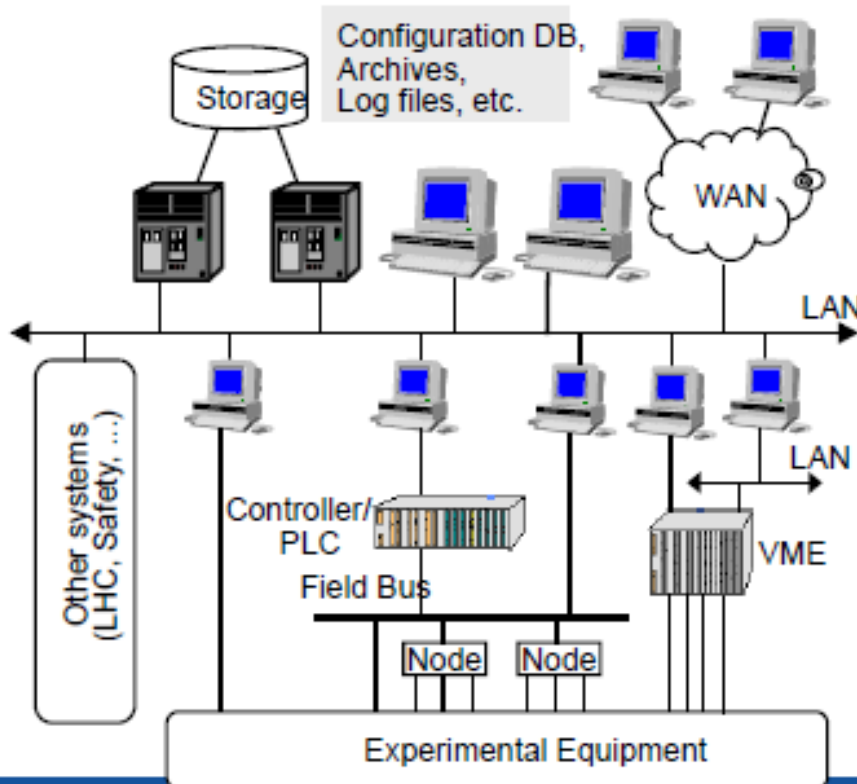
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VM

ORACLE®
FUSION MIDDLEWARE
WEBLOGIC SUITE 11^g

ORACLE®
REAL APPLICATION
CLUSTERS



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Why are we at Openlab ?

Our commitment to Innovation

- CERN Openlab is an innovative IT high-tech lab
- Can help us to investigate and implement new technology
- Going to become another valuable partner in the global R&D-Network

Siemens products ... here at CERN !

- Hundreds of S7 PLCs and PvSS SCADA Systems
- A very large scale application, we can learn from
- An excellent reference system
- We're eager to see LHC be restarted and running

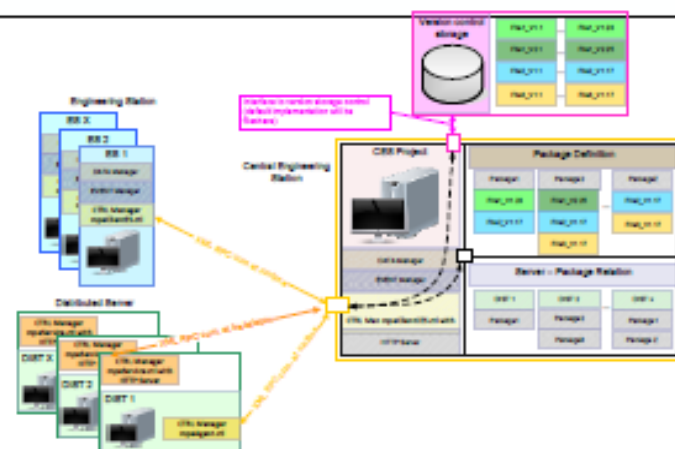
SIMATIC S7



Specific enhancement of WinCC OA for very large environments will be done in Openlab IV

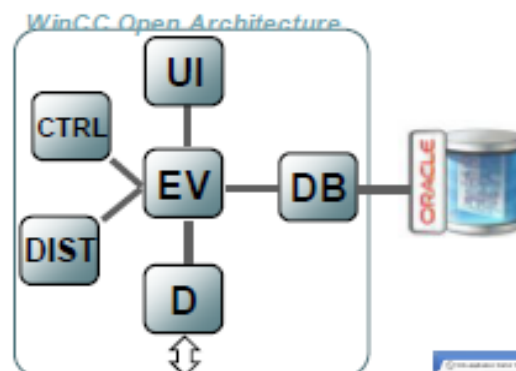
Management of Large Distributed Systems

- Configuration
- Monitoring
- Fault detection



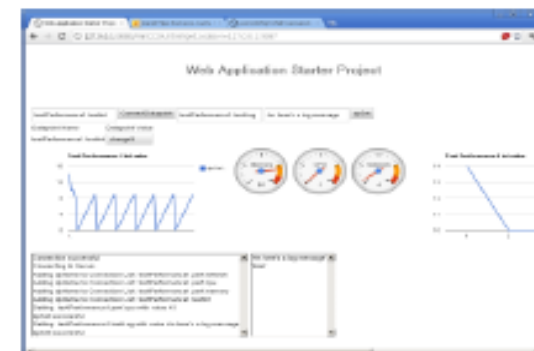
Logging Service

- Phase III continuation
- Siemens/ETM next generation SCADA
- Synergy with Oracle

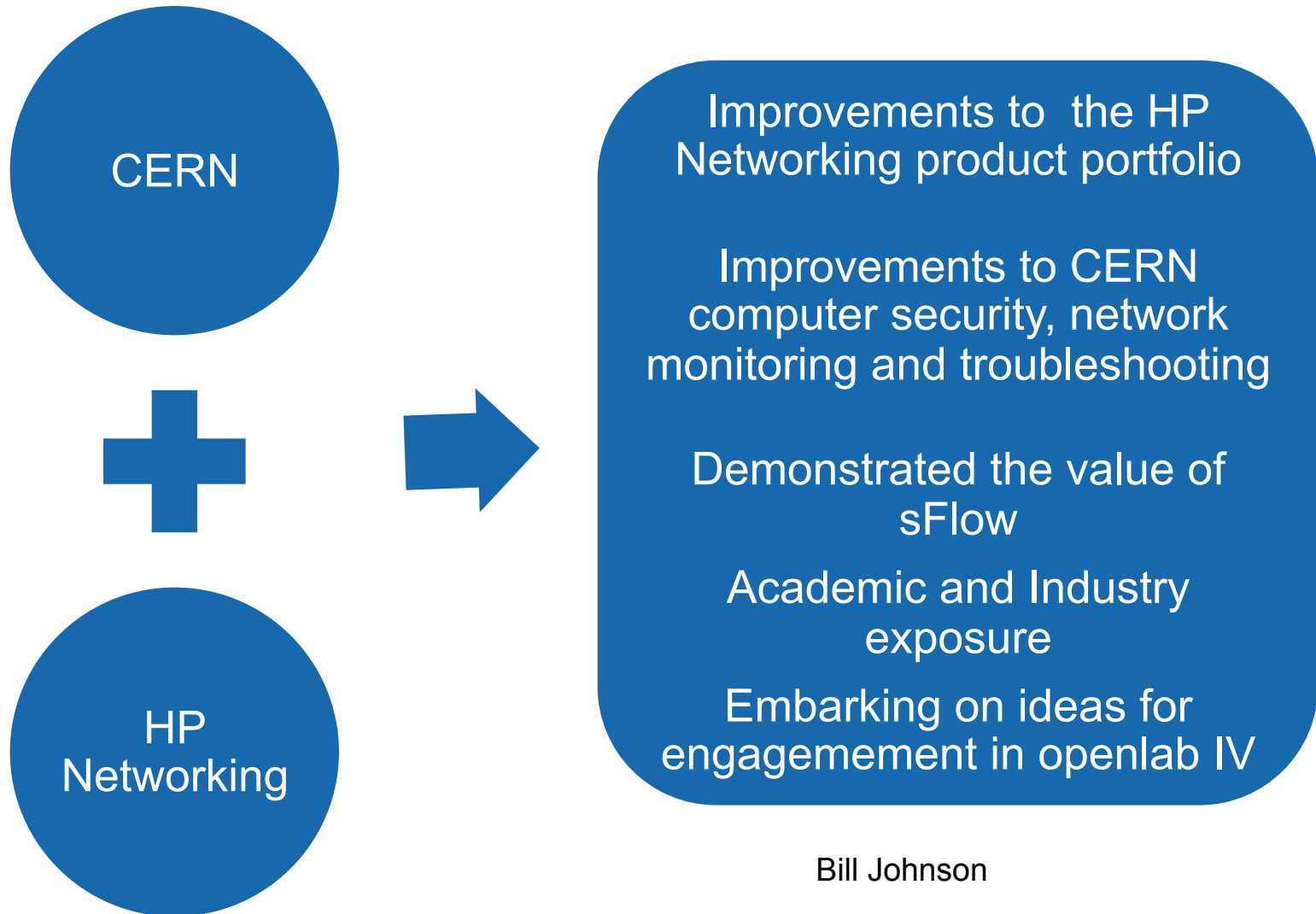


Remote Control

- Validation of WinCC OA Ultrathin Client



CERN/HP – A Successful Collaboration



Bill Johnson

Sr. Director HPN Research and Development

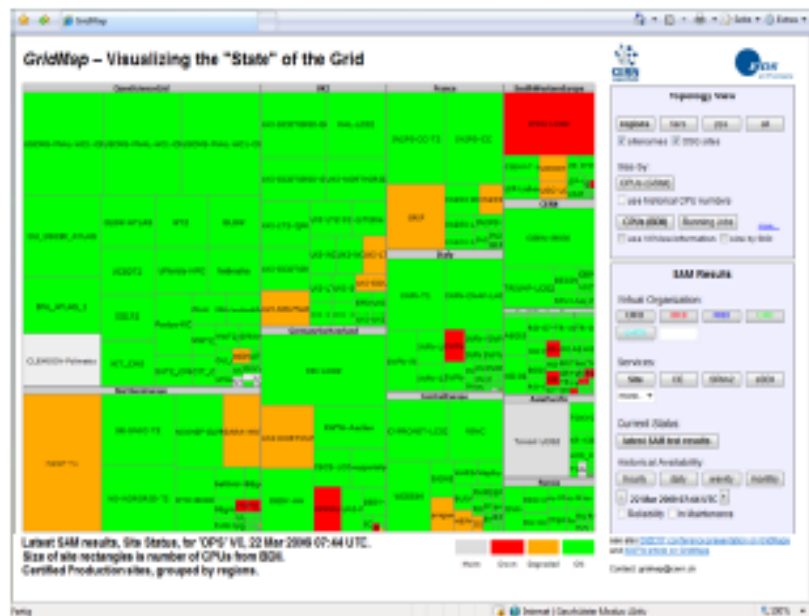


GridMap

- Interactive new monitoring visualization of the Grid
 - Introduced at EGEE'07 (Oct'07), v2 in Feb'08, v3 in Mar'09
 - Visual correlation of *importance* and *availability status*
 - Top-level live management views of EGEE and WLCG grids
 - Integrated with OSG sites

<http://gridmap.cern.ch>

- Used in production by CERN to help manage the Grid
- Technology is reused for other applications at CERN and EDS
- Influential in other communities e.g. D4science project



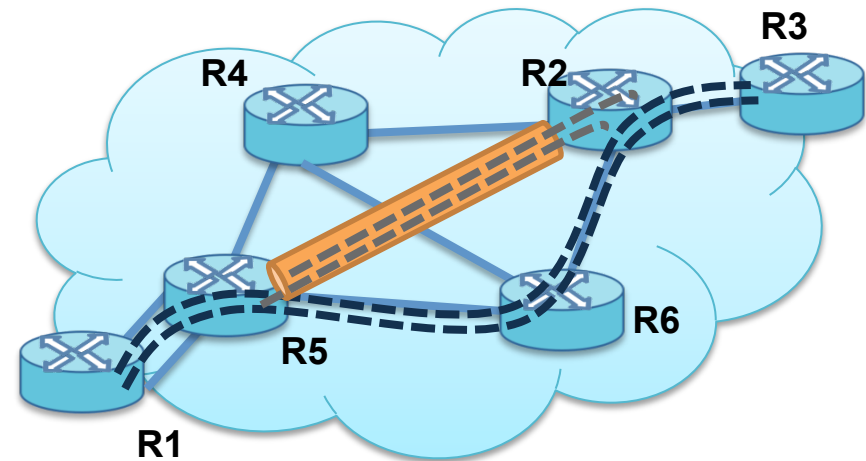
VISION

Virtual Services in Openflow Networks

- 3 year project
- 2 engineers (IT-CS)
 - Dan Savu
 - Stefan Stancu
- HP Networking
- Leverage SDN technology to:
 - Optimize resource utilization
 - Achieve scalability
 - Increased reliability at lower cost
- Innovative research; potential applicability:
 - Efficient multipath load balancing
 - Application-driven traffic orchestration

- Project Objective

- Develop algorithms and prototypes for application-driven traffic orchestration



- The extreme demands from CERN's scientific programme
- The alignment of goals between partners
- Trust
- Young researchers with their talents, expertise and energy
- Efficient and lightweight structure
- Regular checkpoints/reviews
- Outreach/communications

Unique **testing environment** in terms of scale and complexity

Engagement of multi-disciplinary **CERN experts** collaborating on joint projects

Association with the **world's leading innovators** in the IT industry

Dissemination of positive results as success stories to a wide range of audiences via conference presentations, whitepapers, website, etc.

On-site **visits**

Access to CERN **complex IT infrastructure** and engineering experience

- Two categories of Sponsors of the CERN openlab
 - Partner - 3 years engagement
 - Contributor - 1 year engagement
- openlab activity is decoupled from CERN's procurement process
- A separate agreement and an NDA is signed between CERN and each Sponsor

ICE-DIP

Marie Curie proposal submitted in January 2012 to EC and accepted for funding (total 1.25M€ from EC):

ICE-DIP, the Intel-CERN European Doctorate Industrial Program, is an EID scheme hosted by CERN and Intel Labs Europe.

ICE-DIP will engage **5 Early Stage Researchers (ESRs)**.

Each ESR will be hired by CERN for 3 years and will spend 50% of their time at Intel. Academic rigour and training quality is ensured by the **associate partners, National University of Ireland Maynooth and Dublin City University**, where the ESRs will be enrolled in doctorate programmes.

Research themes: usage of many-core processors for data acquisition, future optical interconnect technologies, reconfigurable logic and data acquisition networks.

Focus is the LHC experiments' trigger and data acquisition systems

- A win-win public-private partnership between research and industry
- Proven track record of success for partner companies and CERN
- Excellent future prospects
 - CERN's ambitious scientific programme
 - Greater use of commercial components
 - Engagement of the partners
 - Leveraging EC funding
 - Expanding to work with other research labs (EIROforum)



The screenshot shows the CERN openlab website homepage. At the top is a navigation menu with links: Home, News, Events, About CERN openlab, Competence Centres, Publications, Education, Resources, and Industry Members. Below the menu is a large banner image of a mountain range. The main content area is divided into three columns:

- Upcoming Events:**
 - openlab Major Review Meeting 2**
27/09/2012 - 09:00 to 13:00
The meeting includes updates on the technical progress of ongoing CERN openlab projects, the activities of the various competence centers, and reports on management and communication activities. More details can be found on the Indico page.
- Latest News:**
 - 18 Jul 2012** The openlab platform competence centre team just published a new report on a hybrid OpenMP and MPI parallelization support [read more](#)
 - 4 Jul 2012** The High Energy Physics (HEP) community makes large use of many complex data analysis techniques... [Read more...](#)
 - 4 Jul 2012** CERN experiments observe particle consistent with long-sought Higgs boson
CERN just published a press release to comment the latest preliminary results presented by the... [Read more...](#)
 - 27 Jun 2012** Are we there yet? Higgs boson search update imminent
Pauline Gagnon outlines the process from data-gathering to announcement in her... [Read more...](#)
- Industry Members:**
 - Partners:**
 - hp
 - intel
 - ORACLE
 - SIEMENS
 - Contributors:**
 - HUAWEI

www.cern.ch/openlab