PROJECT



DESIGN AND PERFORMANCE OF THE SIMOP1 DESIGNAND PLATFORM FOR

OFFLINE COMPUTING ON ATLAS Distributed ATLAS TDAQ SysAdmins Computing Group THE ATLAS TDAQ FARM Group S. BALLESTRERO ATLAS TDAQ > S.M. BATRANEANU

ATLAS Point1

NetAdmins ⇒ CERN, SWITZERLAND → F. BRASOLIN ► → University of Johannesburg, South Africa → C. Contescu ► Group → University of California, Irvine, USA →A. DI GIROLAMO ► → ISTITUTO NAZIONALE DI FISICA NUCLEARE SEZIONE DI BOLOGNA, ITALY POLYTECHNIC UNIVERSITY OF BUCHAREST, ROMANIA M.E. Pozo Astigarraga 🛏 ⁺→ CERN IT-SDC-OL

→ University of Washington Department of Physics, USA

RHIC & ATLAS ► → A. ZAYTSEV → BROOKHAVEN NATIONAL LABORATORY (BNL), USA

Computing Facility (RACF)

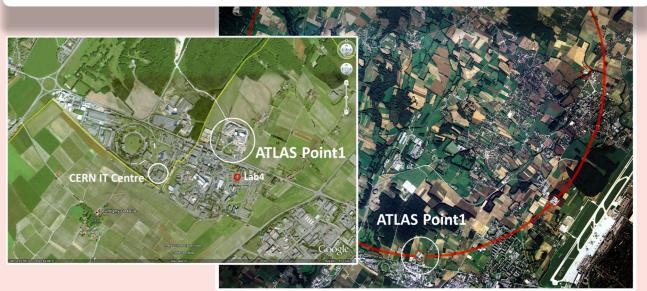
90% of them are fully occupied

by TDAQ &

ATLAS sub-detectors equipment

Project Timeline (2013) Layout ACR SDX1 A 2 floors, 120 racks in total, 90% of them are fully occupied by TDAQ equipment 0.7 MW of power consumption now, 1.5 MW of cooling capacity USA 15 3 floors, 220 racks in total, **Production Run 4**





Planned ATLAS TDAQ **Technical Run Planned LHC Point1 ◄** Cooling & UPS **Interventions** Planned ATLAS TDAQ **Technical Run ◄** *Planned* LHC Point1 **UPS** Interventions

Planned Sim@P1

LHC Point1 Cooling & UPS Interventions

Threshold of 1M successfully completed ATLAS MC production jobs is crossed by the CERN-P1 site (according to Panda)

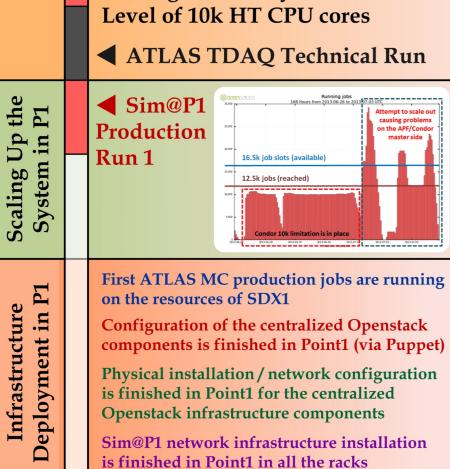
⋖ Sim@P1 Production Run 3

◀ ATLAS TDAQ Technical Run

17.1k single core jobs slots under CERN-P1 site for the first time

⋖ Sim@P1 Production Run 2

Solving Scalability Issues on the



The same HammerCloud tests are repeated with locally deployed CVMFS / Frontier cache instances

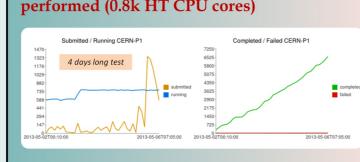
The largest HammerCloud scalability test performed (0.8k HT CPU cores)

Concep

Period

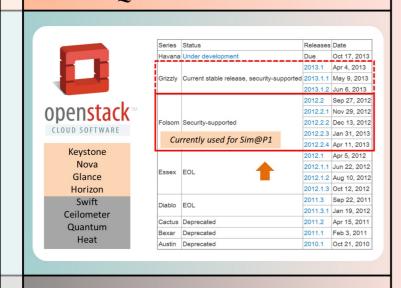
Pro

the



First HammerCloud scalability test finished (360 HT CPU cores combines) First CernVM instances running in Lab4 under Openstack control (Folsom release)

Building a Prototype in TDAQ Test Lab4

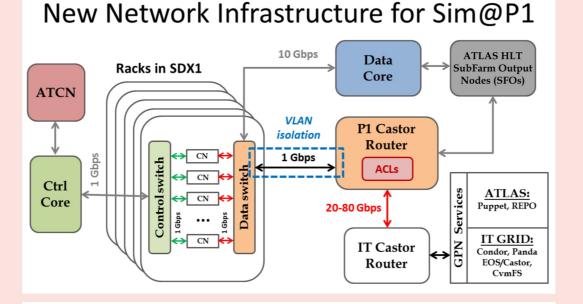


No Sim@P1 Activities Yet

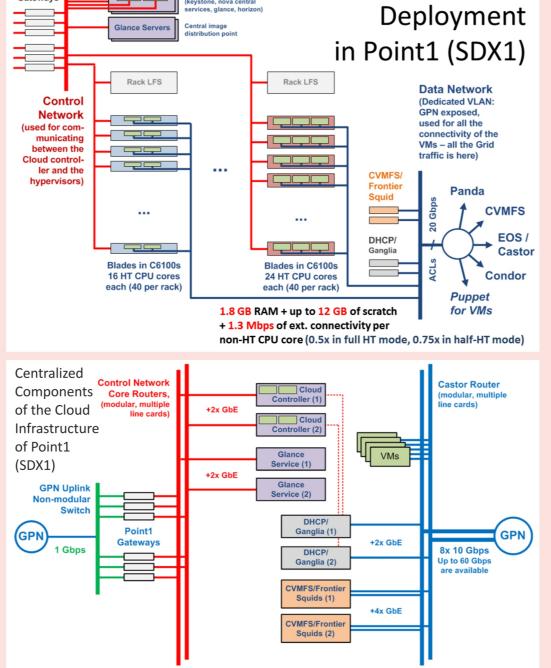
Sim@P1 Architecture

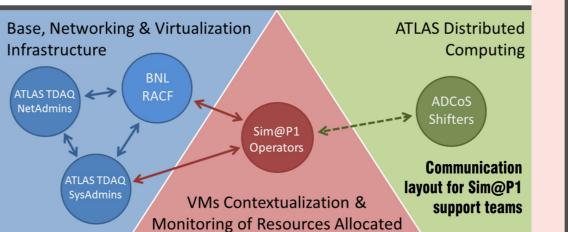
1.3 MW of power consumption now, 2.5 MW of cooling capacity

Compute nodes				
#	Туре	CPU Cores: non-HT / HT	Memory	Local disk
341	Dell PE 1950	8 / 8 (*)	16 GB	80 GB
320	Dell PE 6100	8 / 16	24 GB	250 GB
832	Dell PE 6100	12 / 24	24 GB	250 GB
1493	Total	15272 / 27816	33 TB	315 TB



Full Scale





Summary on Sim@P1 Production Runs 1-3

Entering the Production Sim@P1 Run 3 Summary for the Production Sim@P1 Run 2 Following the ATLAS Technical Run of August 2013 June-August 2013

Highest spikes of traffic correspond to the simultane start of large bulks of jobs RAM usage levels specific for SIMUL jobs (75% out of 1.4 GB RAM/jobs slot in case of low ensity VM placement) RAM usage levels specific for EVGEN jobs (30% out of 1.4 GB RAM/jobs slot in case of low

Functionality and scalability tests of the Cloud infrastructure with the testbed in ATLAS TDAQ Test Lab4 are finished successfully in Feb-Apr 2013. CERN-P1 Site is established and operational since Mar 2013. Deployment of the physical server and networking infrastructure required for the full scale deployment in Point1 was finished in

The full scale deployment of the Openstack infrastructure in Point1 was completed in June 2013: · 17.1k jobs slots are available at +0.7k may become available in

reserved by TDAQ. The Sim@P1 operator team has been established and now provided with the necessary tools and access Semi-automatic tools for control-

the near future.

ling of large scale groups of VMs within the Point1 Openstack infrastructure are developed and fully exposed to ATLAS TDAQ Sys-Admins since Aug 2013. Three consequent production Sim@P1 runs were carried out over

ATLAS MC jobs completed success-

• More than 43 billion CPU-seconds were delivered to WLCG by the CERN-P1 site, • More than 7 weeks of aggregated operational time with the full scale The residual jobs error rate is

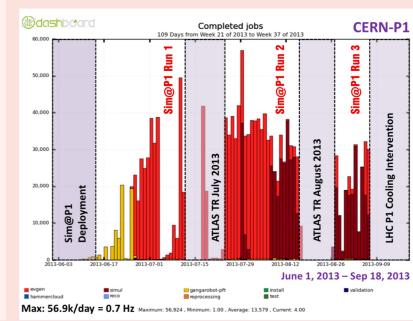
demonstrated by CERN-P1 site operations is staying on the level of • 22% (failed jobs count wise) / 8% (integral CPU time wise) overall inefficiency due to opportunistic nature of the resource More than 17.1k HT CPU cores are available under CERN-P1 which

is making the CERN-P1 the TOP-1 WLCG site during the periods of · There is a potential to increase it above the level of 20k HT CPU cores with the multicore jobs (concept is verified by the HammerCloud

We are looking forward to additional 4-5 weeks of Sim@P1 operations before the end of 2013 and continuing to operate Sim@P1 infrathe period of Jun-Sep 2013 with more possibly beyond the period of LHC

Aug 27, 2013 RAM usage level for the SIMUL jobs

CERN-P1 CERN-P1 8.5 TB/day = 0.8 Gbps 3.8 TB/day = 0.4 Gbps



than 1.4 million EVGEN and SIMUL Long Shutdown 1 (LS1). ***dashb**card CERN-P1 CERN-P1 CERN-P1 Overall 55% of time was Sim@P1

