ALICE Operations in South Africa

S. Murray[1][2]

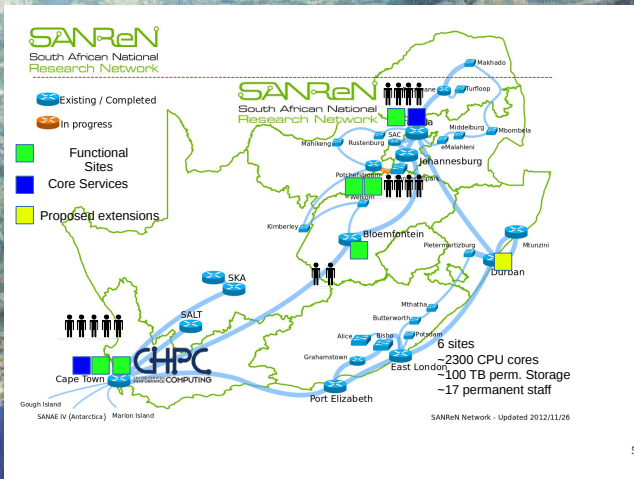[1]Department of Physics
University of Cape Town

[2]Electronics and IT Department
iThemba LABS

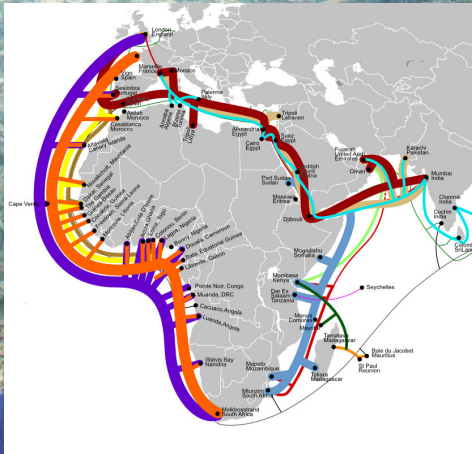ALICE Tier 1/2 Workshop, 2014

Outline

1. **Grid Status in RSA**
   - SAGrid 2.0
   - ALICE operations

2. **Going Forward (plans?)**

3. **iThemba LABS**

Current resources

Network Connectivity

Fix problems learned and move forward

- HPC = big machine for supercomputing/MPI
- Grid = lots of little machines doing HEP

This is highly unproductive.
So lets use the right tool for the right job.

Going forward

- Attempt to make it easier to do things.
- South African CA, in beta.
- Federated identity, shibboleth.
- Science Gateway (liferay)
- nagios monitoring
- AfricaArabia ROC, MOU with EGI to be signed

Going forward 2

- devops via github, sagridops for auto deployment, ansible.
- https://github.com/SAGridOps/ansible-for-grid
- https://github.com/AAROC/ansible-for-grid
- with simply ssh can install all infrastructure.
- central experts configure and test all.
- Selfservice application porting, Jenkins
- Software via CVMFS

Center for High Performance Computing

Resources :

- Tsessebe cluster : 384 Xeon, 2304 Nehalem, 1152 Westemere (SUN), 2880 Westmere (Dell), 256 Sparc, 480TB storage
- iQudu cluster : explanation on next slide.
- GPU cluster : 22 Nvidia Tesla C1060 and C2070

Current

- IBM E1350 cluster
- 160 nodes, 4cores per node, HEPSPEC06=5.8
- Memoray : 4GB per core.
- Storage : 94TB gpfs (died ibm refused to maintain)
- Storage v2 : 100TB storage nfs mounted xrootd (EMC)
- Interconnect : Infini band, 1G ethernet

Delivered computing 2013

Delivered computing 2013

Averaged over the year 264 cores
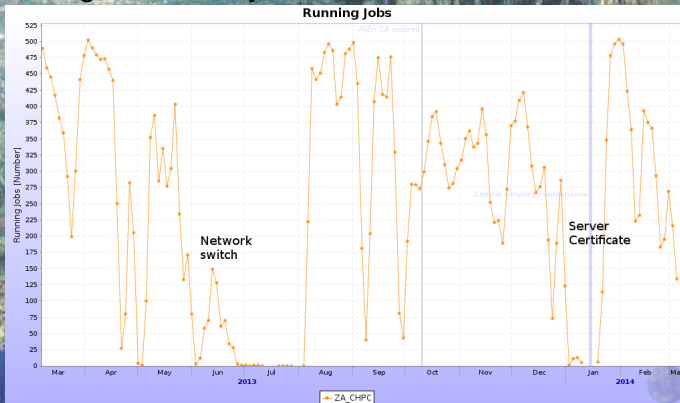
Completed Jobs 2013

Total for the year : 155k

CHPC Data transfers

Direction	max	average	total
in	100.7 MB/s	0.258 MB/s	7.72 TB
out	211.8 MB/s	1.047 MB/s	31.27 TB

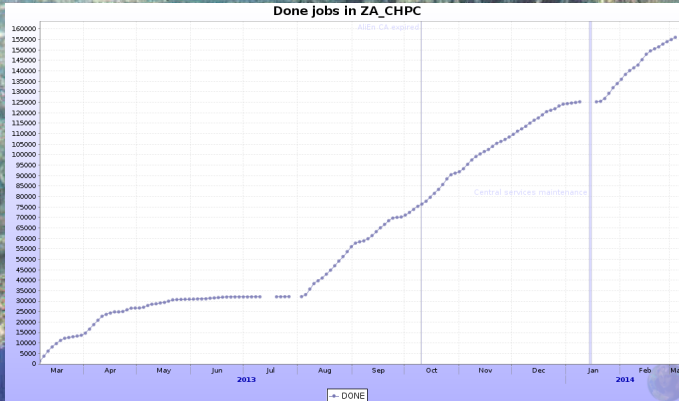# CHPC bandwidth tests

No.	ID	Site	Speed (Mbps)	Hops	RTT (ms)	Streams
1.	1766855	iThemba	536.90	5	2.17	1
2.	1768632	GRIF_IPNO	176.17	17	252.02	1
3.	1765081	NIPNE	159.39	28	258.87	1
4.	1769525	JINR	142.61	18	293.16	1
5.	1774475	ORNL	134.22			1
6.	1766842	IHEP	117.45	18	321.67	1
7.	1766615	LBL	117.45			1
8.	1765988	DCSC_KU	108.95	15	232.02	1
9.	1765749	CERN-SHA2	100.47	20	235.60	1
10.	1766410	CERN-CREAM	92.28	20	235.62	1
11.	1765902	Legnaro	92.28			1
12.	1768959	Oxford	92.28			1
13.	1767736	Subatech	92.28	20	234.39	1
14.	1768229	Madrid	83.56			1
15.	1767954	ISS_LCG	67.11	28	300.93	1
16.	1765422	SPbSU	67.11	20	256.82	1
17.	1768416	UNAM	67.11	18	441.91	1
18.	1766270	SaoPaulo	67.05	19	480.23	1
19.	1755393	SNIC	66.85	20	256.57	1
20.	1766223	Bari	58.72	21	262.97	1
21.	1765138	Kosice	58.72			1
22.	1768169	LLNL	58.72	21	388.87	1
23.	1768980	NIKHEF	50.33	16	247.35	1
24.	1765048	Torino	50.33			1
25.	1765557	UNAM_T1	50.33	22	392.62	1
26.	1766921	Yerevan	50.23	16	332.84	1
27.	1768228	Birmingham	41.95	18	256.63	1
28.	1768522	CSC	41.95			1
29.	1766626	Grenoble	41.95	20	235.53	1
30.	1766361	KFKI	41.95	19	236.10	1
31.	1766018	TACC	41.95	22	370.56	1
32.	1767793	Clermont	33.56	19	255.34	1
33.	1768590	FZK	25.47	19	257.19	1

No.	ID	Site	Speed (Mbps)	Hops	RTT (ms)	Streams
1.	1768514	iThemba	720.74	4	1.95	1
2.	1769067	NIHAM	260.06	21	288	1
3.	1763945	GRIF_IPNO	209.31			1
4.	1702794	LUNARC	201.34			1
5.	1765729	Kosice	201.14			1
6.	1767091	RRC_KI_T1	201.14			1
7.	1768660	LLNL	184.37	20	385.96	1
8.	1766887	Catania	175.99	18	267.23	1
9.	1767381	TriGrid_Catania	175.82	18	264.67	1
10.	1774420	ORNL	142.33	16	343.30	1
11.	1766337	Grenoble	117.33			1
12.	1767336	SARA	117.33	15	214.82	1
13.	1769094	Bratislava	108.95	16	255.61	1
14.	1768435	Subatech	108.95	18	265.47	1
15.	1765484	DCSC_KU	108.84	16	232	1
16.	1765917	CERN-CREAM	100.67	20	235.56	1
17.	1765537	GRIF_IRFU	100.67	16	227.60	1
18.	1767590	Oxford	100.67	17	223.16	1
19.	1765662	CSC	100.57	14	242.60	1
20.	1769303	Cagliari	100.47	17	287.77	1
21.	1765406	NIPNE	92.19	21	260.95	1
22.	1769233	Poznan	92.19			1
23.	1767683	IHEP	83.89	17	264.26	1
24.	1768334	CERN-CVMFS	83.81	20	266.64	1
25.	1764712	ISS_LCG	83.72	22	267.73	1
26.	1766086	Kolkata-CREAM	75.35	18	422.41	1
27.	1767816	ISS	67.05	22	266.23	1
28.	1767826	CERN-SHA2	66.98	20	235.63	1
29.	1767494	Madrid	66.98			1
30.	1769264	Prague	58.61	18	255.23	1
31.	1768485	JINR	50.28	17	262.07	1
32.	1768855	SaoPaulo	50.28	19	491.50	1
33.	1768596	Bari	50.23	19	260.16	1

And then there was a tender

Cern ALICE: ALICE is the acronym for A Large Ion Collider Experiment, one of the largest experiments in the world devoted to research in the physics of matter at an infinitely small scale. Hosted at CERN, the European Laboratory for Nuclear Research, this project involves an international collaboration of more than 1200 physicists, engineers and technicians, including around 200 graduate students, from 132 physics institutes in 36 countries across the world

And then there was a tender ATLAS

Cern ATLAS: ATLAS is a particle physics experiment at the Large Hadron Collider at CERN that is searching for new discoveries in the head-on collisions of protons of extraordinarily high energy. ATLAS will learn about the basic forces that have shaped our Universe since the beginning of time and that will determine its fate. Among the possible unknowns are extra dimensions of space, unification of fundamental forces, and evidence for dark matter candidates in the Universe

New hardware

- 1200 cores ALICE/ATLAS (no threading) 1GE
- SAGrid 800 cores QDR infiniband
- 800TB xrootd, 2xMD3260 Dell + 2 disk shelves (60x4TB)
- 100TB lustre

Nobody seems to get xrootd.
Segregated to LHC and SAGrid.

Node details

- Dell C8220 blades
- 2xE5-2695v2 12 core cpu (48 threads)
- 96GB Mem
- 2x800GB SSD, 1.6TB local storage.

Hardware to arrive before end of this month.

Man power

- 1 fte at CHPC (really 0.1)
- me
- bruce

This will (have) change. The 1 fte is now officially a 0.5 fte and is offsite.

- HLT Front end processors coming to Cape Town, 560 cores, currently in P2 store room, awaiting a letter.
- UCT cluster 64 cores, on site at iThemba LABS hlt testing.
- 60TB xrootd (off netapp) more storage on order this month c:120TB ceph (budget dependent)
- CE and vobox configured, only vobox is live.

HLT for Offline

- Its my service task.
- Work just started. **very** small replica cluster in Cape Town, exactly same config for offline perspective.
- reduces time at CERN.
- HLT Development cluster coming up, no power at p2 this week, or in May.

Thank you

Thank you for my first visit to Japan.

SKA

A Network Centric View of the SKA

Receptors/sensors

~200km, avg.

~15,000 Tb/s aggregate

correlator / data processor

~1000 km

400 Tb/s aggregate

supercomputer

~25,000 km
(Perth to London via USA)
or
~13,000 km
(South Africa to London)

0.1 Tb/s (100 Gb/s) aggregate

from SKA RFI

European distribution point

1 fiber data path per tier 1 data center
.03 Tb/s (30 Gb/s) each

Hypothetical
(based on the
LHC experience)

National tier 1

National tier 1

National tier 1

Universities/astronomy groups