



Outline

- Introduction
- Canadian computing resources and networks
- Computing contributions to current HEP experiments
- Canadian participation in ATLAS
- HEP Grid in Canada
- Summary



Introduction

- Canadian researchers are involved in HEP experiments at Fermilab (CDF and D0), SLAC (BaBar) and CERN (ATLAS, OPAL)
- TRIUMF Laboratory (Vancouver) has an ISAC (isotope separator and accelerator) and also provides support for HEP experiments.
 - TRIUMF has fabricated accelerator components for the LHC
- SNO (Sudbury Neutrino Observatory) and SNOLAB
- Canada is active in T2K and the ILC



Resources

- Canada has a large number of mid-sized facilities
 - Most are shared with other sciences but a few are dedicated to HEP
 - Shared:

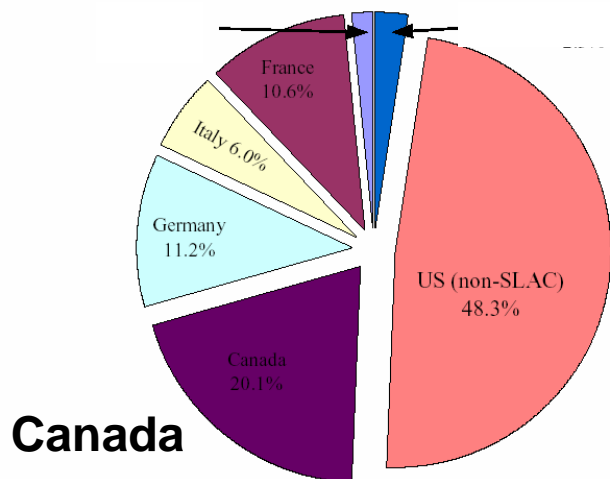
• WestGrid	1600 CPU's	40 TB disk	250 TB tape capacity
• Victoria	350 CPU's	90 TB disk	450 TB tape capacity
 - HEP:

• Toronto	500 CPU's	20 TB disk	
• Alberta	200 CPU's	20 TB disk	
• McGill	150 CPU's		
- These resources have been used for ATLAS, BaBar, CDF and D0.



BaBar Simulation Production

SP6 production by Country

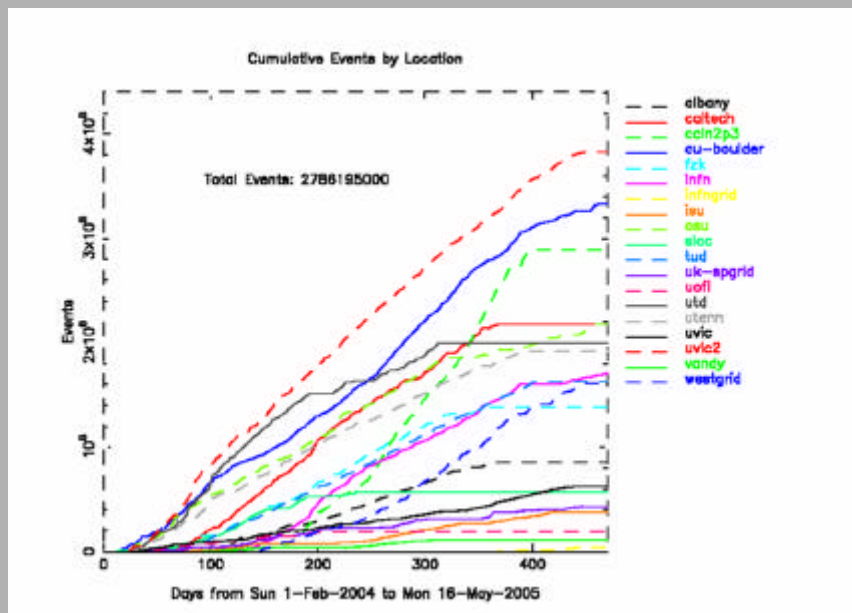


Canada

Canada producing 20% of the BaBar simulation

Single largest site is Victoria.
Production is also running at WestGrid.

Facilities are also used for the local data analysis of BaBar data





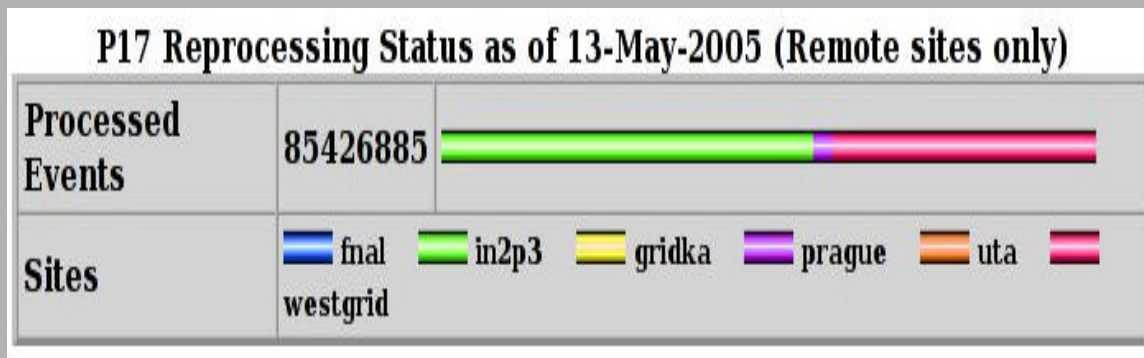
CDF

- CDF uses clusters at Toronto, Alberta, and WestGrid for generation, simulation, and reconstruction (Toronto produces 80%)
- Greater than 90% of official CDF large-scale off-site Monte Carlo event production is done using Canadian computing resources
- Events are moved to FNAL via 1G lightpaths



D0 Experiment

- D0 uses WestGrid for simulation and reconstruction
 - WestGrid/FNAL/CANARIE set up a new dedicated 1G lightpath
 - 35TB of raw data was staged to WestGrid
 - SAMGrid used to run jobs at WestGrid-UBC/TRIUMF, data migrates seamlessly between sites. Output moves back to FNAL over lightpath.



IN2P3 and WestGrid largest offsite production sites for D0

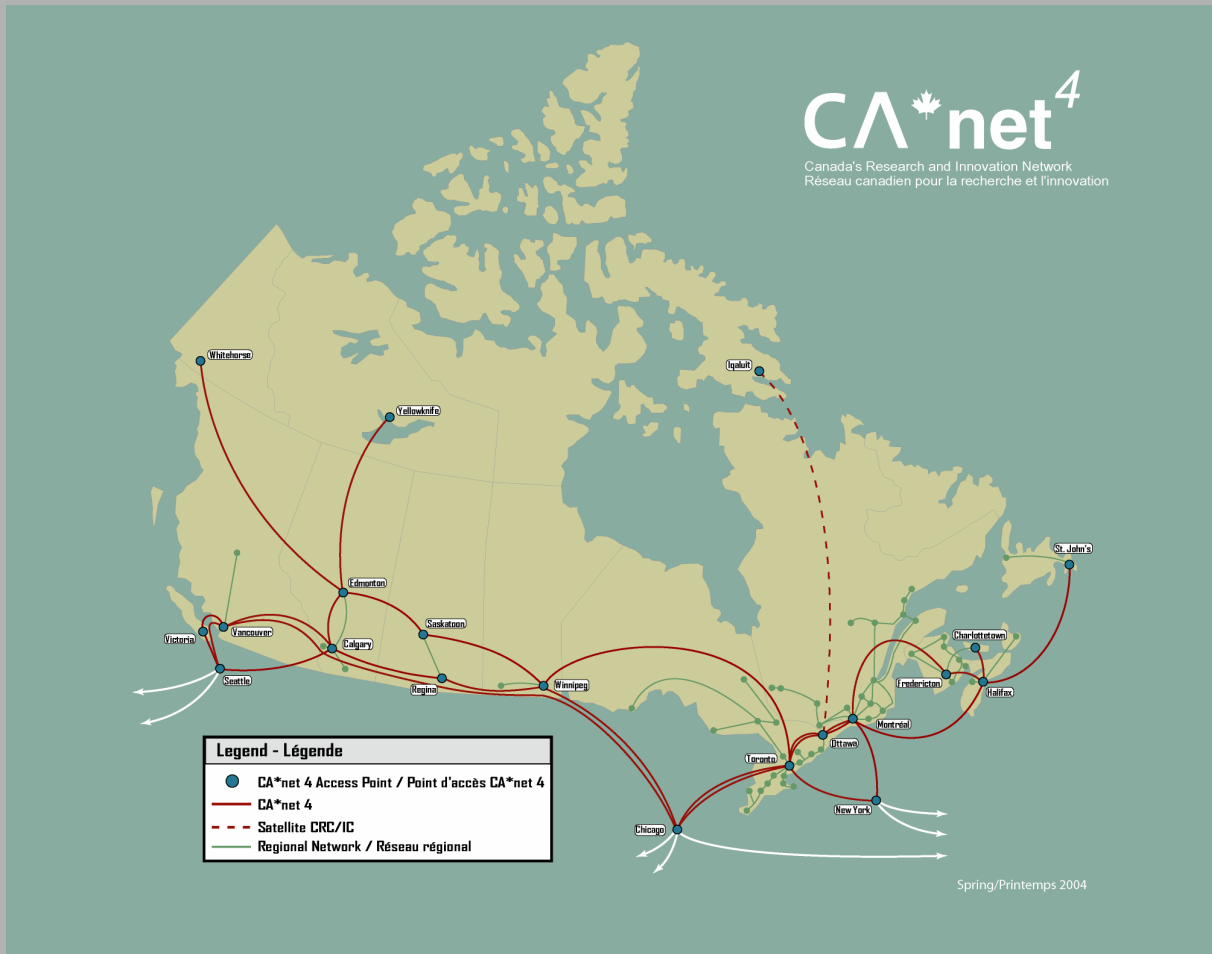


Canadian Network

- Excellent links across Canada and abroad (CANARIE)
- Most university HEP groups have at least 1 G link to CANARIE
- High speed (10 G) tests in Canada and to CERN
- Lightpaths between HEP sites and laboratories
- Working on 10 G link to CERN



CANARIE Network



CANARIE (Bill St Arnaud)

Federally funded to provide research network across Canada and abroad

User Controlled light paths (UCLP)

CANARIE adding 2 more fibres 2005

HEP

High speed tests in 2003/2004

LCG Service Challenge 2005

Lightpaths to Fermilab



International network link

- HEPNET/Canada is responsible for the link between Canada and CERN as well as some internal links (eg. SNO)
- USLIC Consortium
 - Includes HEPNET/Canada, US, CERN and a number of international organizations
 - Provided a high speed link for HEP and commodity traffic between CERN and Chicago (Starlight)
 - Current contract ends August 31, 2005
- LHC Regional Centres must provide 10G dedicated links to CERN
 - HEPNET/Canada is working with CANARIE to provide a solution for HEP in Canada

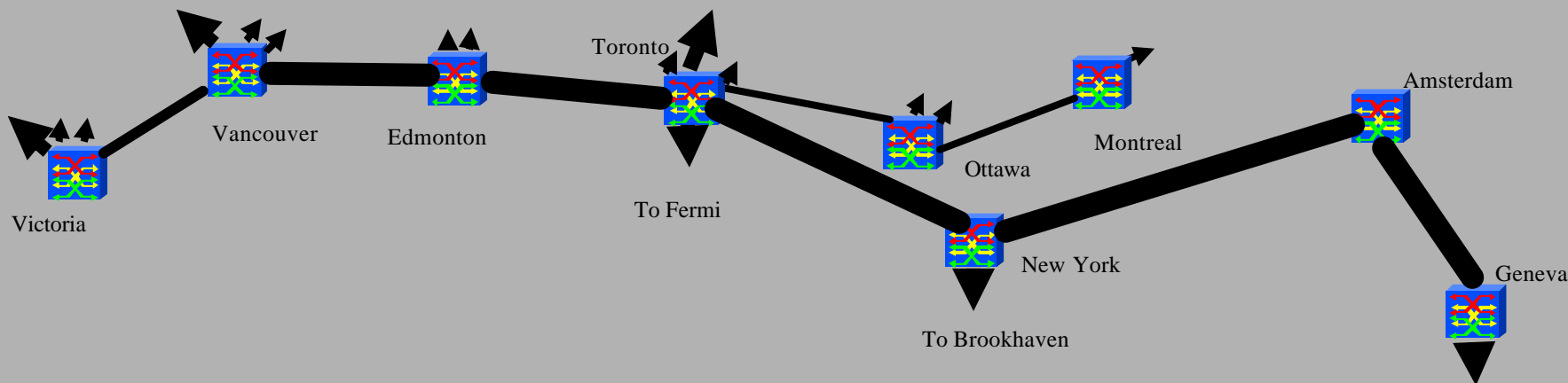
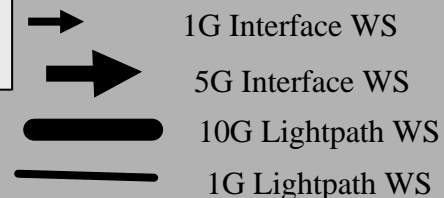


Proposed HEP network

Plans for fall 2005:

Set up “articulated private network”
10G across Canada to New York
5G New York-CERN

HEP community will configure lightpaths
(e.g. 5G TRIUMF-CERN for Service Challenges)





ATLAS-Canada

Canada has focused its effort on the ATLAS Experiment

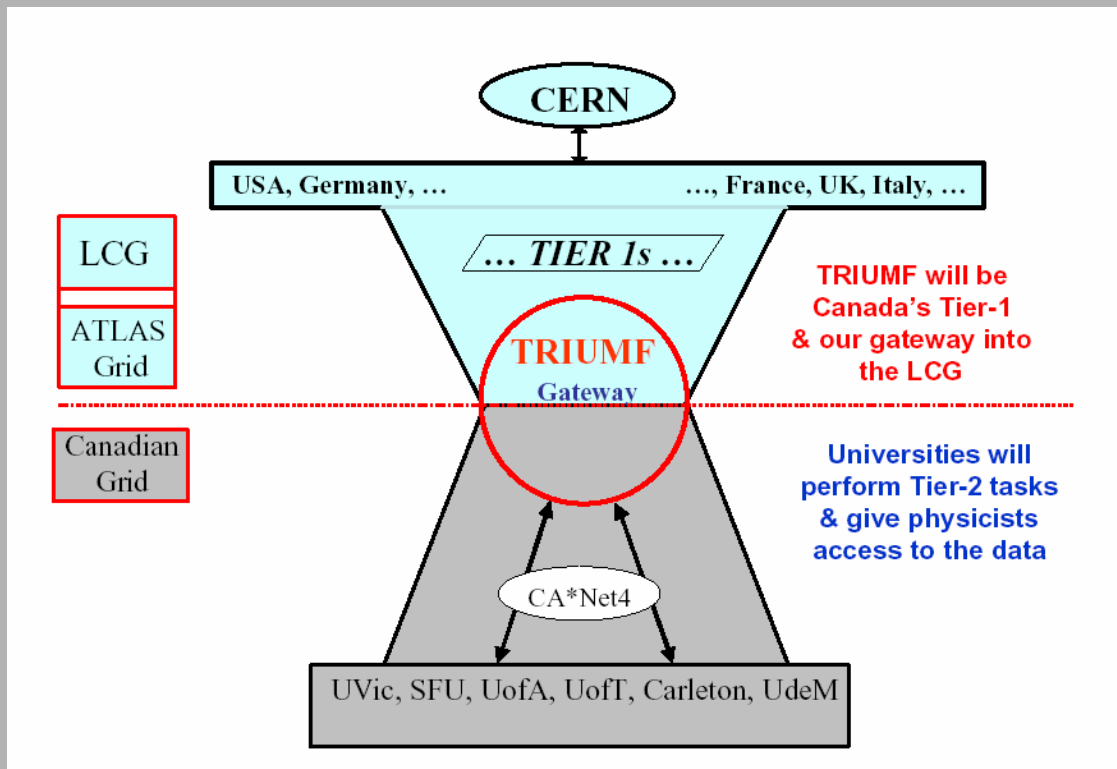


Canadian investment is in excess of \$ 60 Million

operating and detector as well as the TRIUMF contribution to CERN accelerators



ATLAS-Canada computing model



TRIUMF (Vancouver) will be the Canadian Regional Centre

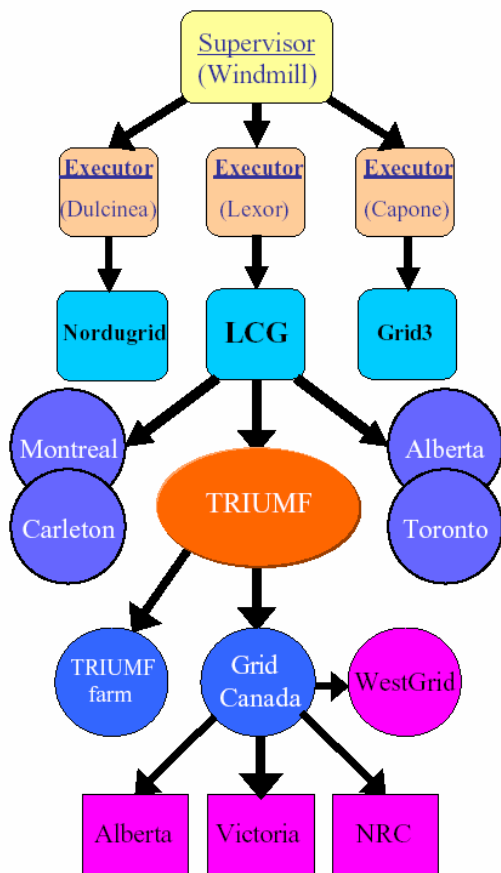
The university sites will provide Tier 2 functionality and data analysis capability.

The TRIUMF Centre will isolate the shared university facilities from the LCG.



Current situation for ATLAS Data Challenges

ATLAS Data Challenge



The TRIUMF centre operates in the LHC Computing GRID (LCG).

Toronto, Carleton, Montreal joined LCG grid directly (initially the only way that worked).

Victoria, Vancouver, Alberta, NRC formed GridX1 and are interfaced to the LCG via TRIUMF.

Often 10% of LCG jobs are running on the dedicated LCG or GridX1 sites

Canada operates a CondorG executor



GridX1

GridX1 currently has 8 clusters:

Alberta, NRC Ottawa, WestGrid, Victoria, Toronto

Total resources >> (2000 CPUs, 100 TB disk, 1000 TB tape)



CondorG grid:

Extension of Condor batch system

Scalable to 1000's of jobs

Intuitive commands for running jobs on remote resources



Monitoring

home monitor publications documentation contact

gridx1logger : condorg

you are here: home » grid monitor » grid x1 condor-g monitoring

Grid Monitor Condor-G Monitoring

Job Status

job id	user id	owner	command	resource	status	run time	time submitted
3879.0	atlas005	Guido Negri	data 'UI= ...'	mercury.uvic.ca	ACTIVE	27:17:01	9 Mar, 08:29
3899.0	atlas005	Guido Negri	data 'UI= ...'	thuner-grid.nic.ualberta.ca	ACTIVE	26:59:56	9 Mar, 09:09
3900.0	atlas005	Guido Negri	data 'UI= ...'	thuner-grid.nic.ualberta.ca	ACTIVE	26:59:56	9 Mar, 09:09
3911.0	atlas005	Guido Negri	data 'UI= ...'	thuner-grid.nic.ualberta.ca	ACTIVE	26:57:56	9 Mar, 09:11
3919.0	atlas005	Guido Negri	data 'UI= ...'	thuner-grid.nic.ualberta.ca	ACTIVE	26:55:22	9 Mar, 09:15
3924.0	atlas005	Guido Negri	data 'UI= ...'	thuner-grid.nic.ualberta.ca	ACTIVE	26:47:27	9 Mar, 09:22
3931.0	atlas005	Guido Negri	data 'UI= ...'	thuner-grid.nic.ualberta.ca	ACTIVE	26:45:20	9 Mar, 09:24
3933.0	atlas005	Guido Negri	data 'UI= ...'	thuner-grid.nic.ualberta.ca	ACTIVE	26:38:28	9 Mar, 09:25
3941.0	atlas005	Guido Negri	data 'UI= ...'	thuner-grid.nic.ualberta.ca	ACTIVE	26:41:28	9 Mar, 09:28
4090.0	atlas005	Guido Negri	data 'UI= ...'	mercury.uvic.ca	ACTIVE	6:35:07	10 Mar, 05:35
4091.0	atlas005	Guido Negri	data 'UI= ...'	thuner-grid.nic.ualberta.ca	ACTIVE	6:33:22	10 Mar, 05:36
4093.0	atlas005	Guido Negri	data 'UI= ...'	hep.westgrid.ca	ACTIVE	6:01:21	10 Mar, 05:37
4094.0	atlas005	Guido Negri	data 'UI= ...'	mercury.uvic.ca	ACTIVE	5:39:24	10 Mar, 06:31
4095.0	atlas005	Guido Negri	data 'UI= ...'	mercury.uvic.ca	ACTIVE	5:30:24	10 Mar, 06:40
4096.0	atlas005	Guido Negri	data 'UI= ...'	thuner-grid.nic.ualberta.ca	ACTIVE	5:28:51	10 Mar, 06:40
4097.0	atlas005	Guido Negri	data 'UI= ...'	hep.westgrid.ca	ACTIVE	5:25:19	10 Mar, 06:40
4100.0	atlas005	Guido Negri	data 'UI= ...'	hep.westgrid.ca	ACTIVE	5:16:46	10 Mar, 06:42
4101.0	atlas005	Guido Negri	data 'UI= ...'	hep.westgrid.ca	ACTIVE	5:16:51	10 Mar, 06:42
4102.0	atlas005	Guido Negri	data 'UI= ...'	hep.westgrid.ca	ACTIVE	5:15:46	10 Mar, 06:42
4104.0	atlas005	Guido Negri	data 'UI= ...'	hep.westgrid.ca	ACTIVE	5:15:51	10 Mar, 06:43
4105.0	atlas005	Guido Negri	data 'UI= ...'	mercury.uvic.ca	ACTIVE	5:04:23	10 Mar, 07:05
4106.0	atlas005	Guido Negri	data 'UI= ...'	thuner-grid.nic.ualberta.ca	ACTIVE	5:03:49	10 Mar, 07:06
4107.0	atlas005	Guido Negri	data 'UI= ...'	hep.westgrid.ca	ACTIVE	5:00:45	10 Mar, 07:06
4108.0	atlas005	Guido Negri	data 'UI= ...'	hep.westgrid.ca	ACTIVE	5:00:45	10 Mar, 07:06
4109.0	atlas005	Guido Negri	data 'UI= ...'	hep.westgrid.ca	ACTIVE	5:00:45	10 Mar, 07:07
4110.0	atlas005	Guido Negri	data 'UI= ...'	hep.westgrid.ca	ACTIVE	5:00:45	10 Mar, 07:07

gridx1 job load

AB-Thor	20:28:23
	0+0
Vic-Mercury	44:47:22
	59+11
WG	24:00:00
	65+33
AB-Thor-grid	19:43:02
	16+2
NRC	00:00:00
	0+0
Total:	140+46

Created on: 2005-03-10
13:33:15

grid monitor

- + Victoria-Muse
- + Alberta-Thor-grid
- + Vancouver-Westgrid
- + NRC-Mercury
- + Alberta-Thor
- + Victoria-Mercury

www.gridx1.ca



ATLAS-Canada computing status

- Participate in Data Challenges
 - Sites dedicated to LCG and GridX1
- Participate in Service Challenges
 - Establishing a high-speed network connection to CERN
- Set up a prototype centre at TRIUMF
- Develop the gateway at TRIUMF
 - Created an interface between LCG and GridX1
 - Developed a CondorG executor for ATLAS DC
- Set up a Canadian Grid
 - GridX1 has being used for ATLAS DC



Summary

- Canada has made significant contributions to computing in BaBar, CDF and D0
- Canada is developing a plan for computing for ATLAS Canada centred on a dedicated facility at TRIUMF that interfaces Canadian Grid resources into the LCG
- Work is continuing in the areas of high-speed networking, data management and grid computing
- Computing in HEP in Victoria, Canada (Sept 2007)