

CANARIE

Participative Science

Bill St. Arnaud

CANARIE Inc – www.canarie.ca

Bill.st.arnaud@canarie.ca





How Participative web will transform science and research

- > **Web 2.0 tools, mashups and SOA are transforming all walks of life from business to military**
 - Business 2.0 or Enterprise 2.0
 - Battlefield 2.0
 - Telco 2.0
 - Etc
- > **These same tools and architectures, developed by ICT industry, have the potential to significantly change how we do science and research**
- > **More importantly it will allow greater participation by the public and students into the scientific process**
 - Citizen Science
 - Faster transfer of knowledge from academia to industry



Democratization of science

- > **Increasingly as scientific data is digitized it will be accessible not only to scientists, but also to the greater public**
- > **Greater public can examine data and run their own models**
 - Significant impact on policy makers in variety of fields from global warming to cancer studies, etc
- > **Many private citizens, students and others are building mashups to link together scientific data sets and workflows**
 - Intel “Mashup for the Masses”
- > **In the past large data sets and computation was restricted to academia “big science” and those who could afford HPC computers**
 - Large scale modeling can be done with low cost computational services from Amazon etc



Key elements of participative web for eScience

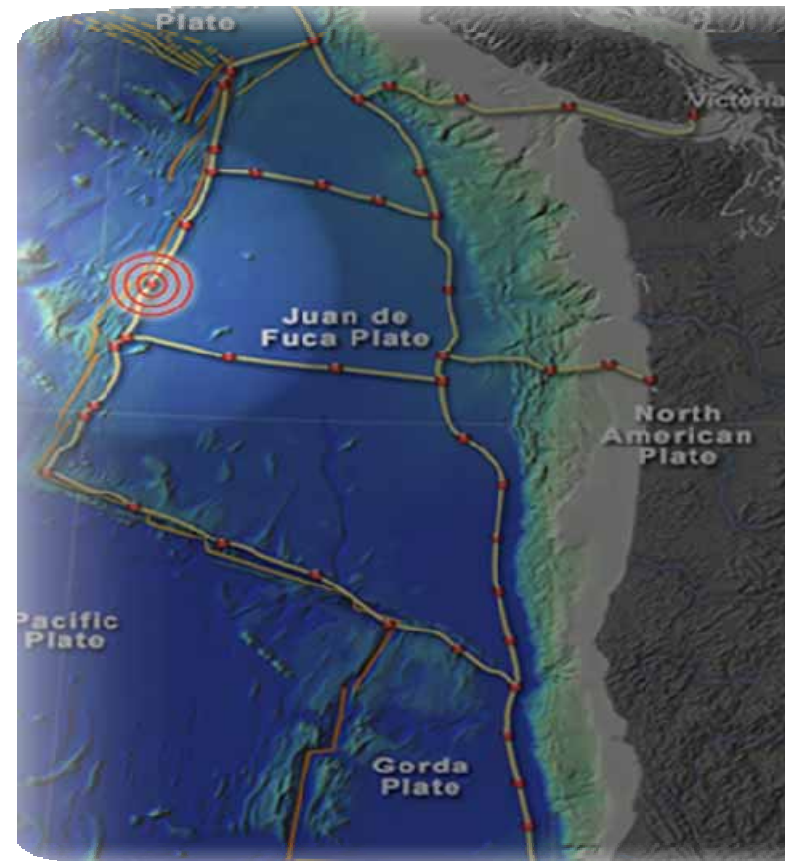
- > **Distributed databases, instruments and computational facilities**
 - Extensive virtualization
- > **Peer-to-peer and user empowered organization and linkage of databases, instruments and computation through mashups and workflows**
- > **Ad hoc “virtual organizations” or communities of interest built around collections of databases with common tool sets for mashups and workflows**
 - Eg Bio-informatics community grid built around SOA and mashup tools from Amazon, Intel and Microsoft



Project Neptune Virtual “Aquarium” – schools across Canada



Researchers and students can retrieve data
from instruments
Researchers and students will be able to
control certain instruments



Source: Tony Hey Microsoft

CANARIE

NETWORKS > COLLABORATION > RESULTS > RÉSEAUX > COLLABORATION > RÉSULTATS

Canada Forest Grid

Large distributed grid – will be soon open to the public

Monitor health of Canada's forests

Measure how effective forests are at absorbing CO₂

<http://www.saforah.org>



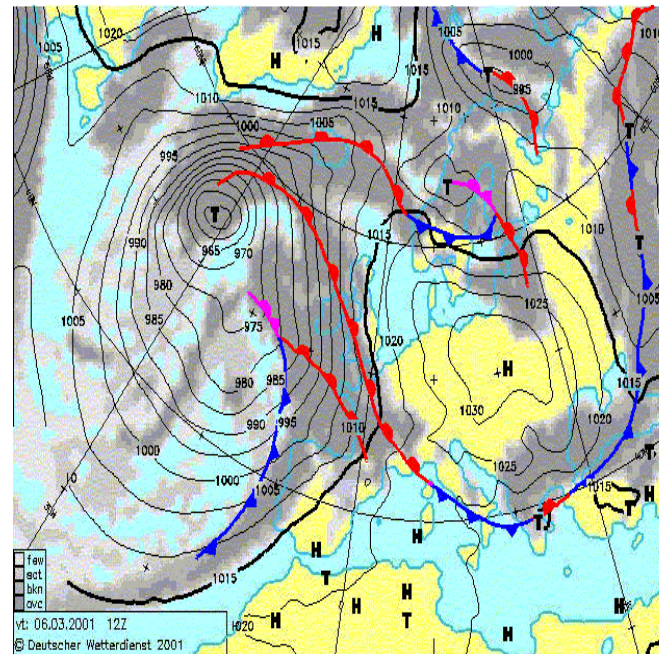
ALTA Cosmic Ray eScience

- >The ALTA project is a collaborative scientific research project involving the [University of Alberta Center for Subatomic Research](#) and over 50 high schools across Canada in the area of cosmic ray detection.
- >Teachers and students actively contribute to the physics research while learning about an exciting area of modern science.
- >Distributed computing at schools will be required to analyze data from sensors in near real time
- >Will allow researchers to gain a deeper understanding of the deepest reaches of space and time



Meteorological eScience

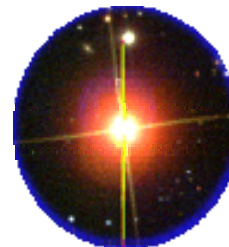
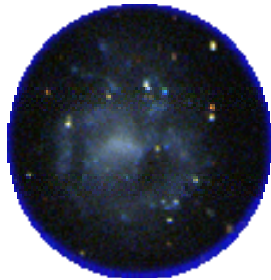
- > The European Meteo GRID work package will develop adaptations to an existing weather-prediction code for on-demand localized weather prediction and thus be the first step towards a weather prediction portal.
- > Schools and communities using local distributed computing resources combined with input from local weather instruments to make a localized forecast down to 1 km grid
- > <http://www.eurogrid.org/workplan.html>



Sloan Digital SkyServer



- > <http://skyserver.sdss.org/en/>
- > Large database of astronomical data and images
- > Available to scientists, students and public
- > XML and Java web services interfaces





Faulkes Telescope

- > Provide UK and Canada schools with access to a research class telescope in Hawaii
- > Provides an exciting resource for teachers to use via the Web
- > To provide a real-time experience of astronomy, through live use of a telescope
- > To allow students to participate in real research programs, mentored by professional astronomers
- > Provides other public interest groups, such as amateurs, access to high quality astronomical data
- > <http://www.faulkes-telescope.com/>

