WP3: International Science Grid This Week

Andrew Purcell
iSGTW editor, CERN

- Objectives
- WP3 Overview
- Structure
- A typical issue
- Top stories
- Conference coverage
- Metrics and readership survey
- Future and summary

Objectives

- Produce a weekly electronic newsletter to disseminate information about grid-related projects, as well as other e-infrastructure projects around the world, including:
  - clouds
  - volunteer grids
  - supercomputing
  - networks and data, etc.
- Not just reporting on e-infrastructure, but also the science it underpins.
- Draw from the other e-ScienceTalk products and events for sources of stories and to maximise the impact of the work.

Objectives

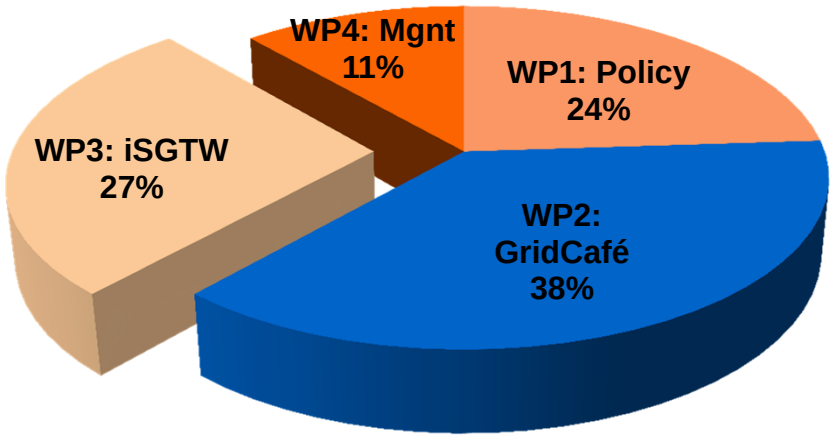

CERN
NSF
GEANT
European Commission
EMI
EMBL
CloudScape
Human Brain Project
CHTC
TACC
ISGC
EGI
XSEDE
NASA
ISC
OSG
PRACE
World Community Grid
Watson
NCSA
SDSC
LBNL
NCAR
EUDAT
iMarine
CERN openlab
Helix Nebula
NERSC
CSIRO
WeNMR
PSC
e-IRG
e-FISCAL
Horizon 2020
CRISP
ERINA+
BioMedBridges
DANTE
ENVRI

WP3 Overview

3 Beneficiaries
52 PMs
1.6 FTEs

Participant no.	Name	Effort (PM)
5	**CERN**	**39**
2	QMUL	8
3	APO	5

e-ScienceTalk Effort Distribution



Task 3.1 Weekly publication
(CERN with QMUL)

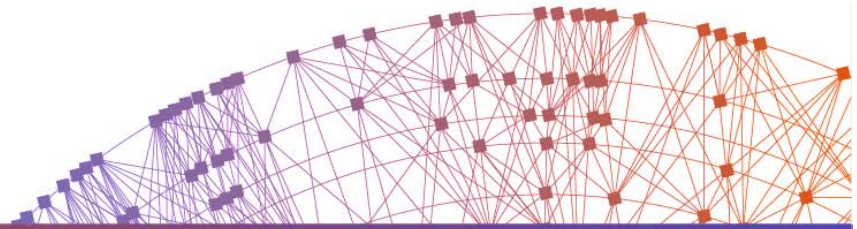
Task 3.2 New media outlets e.g. Twitter, Nature Networks
(CERN with APO and QMUL)

Structure

- Editor based at CERN.
  - *0.75 FTE, as of August 2013.*
  - *Previously full time.*

- US desk editor based at University of Indiana
  - *Full time, since November 2012.*

- Advisory board
  - ***Currently includes:*** *Open Science Grid, University of Indiana, Queen Mary University of London, Fermilab, EGI.eu, Academia Sinica Grid Computing, CERN.*

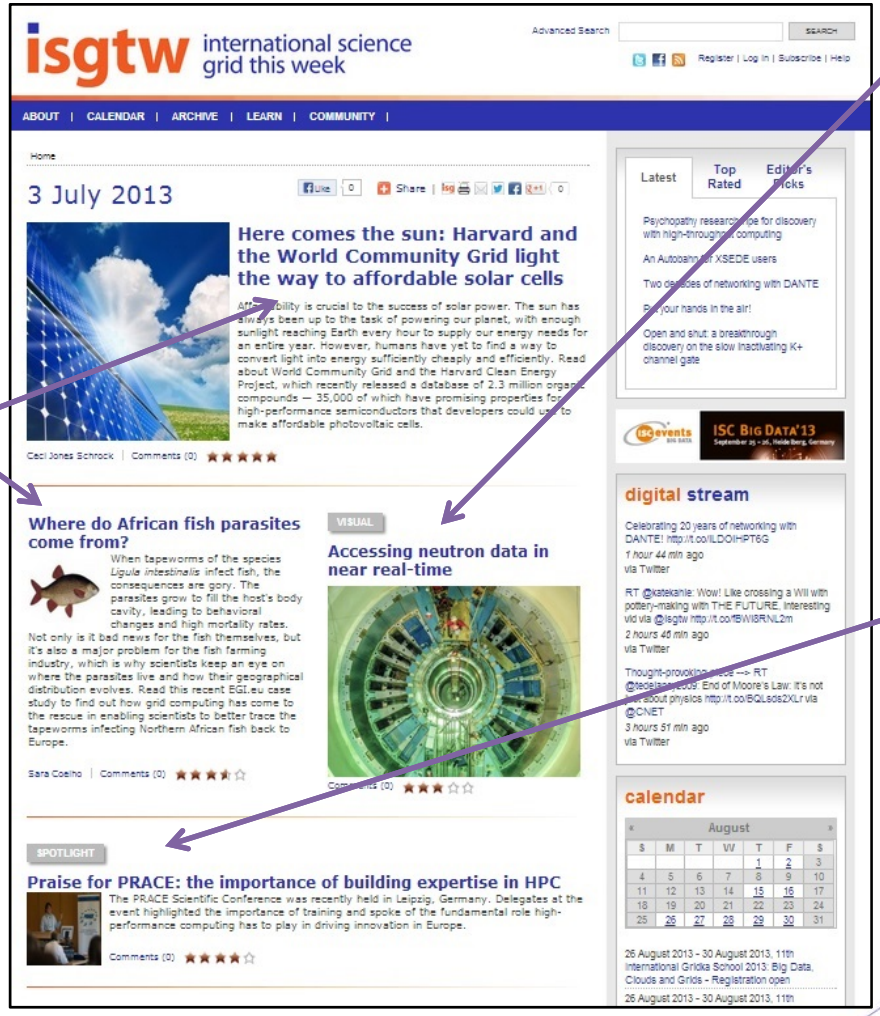


A typical issue

Two feature articles

Broad, in-depth

~ 850 words



Visual

Picture, video or infographic

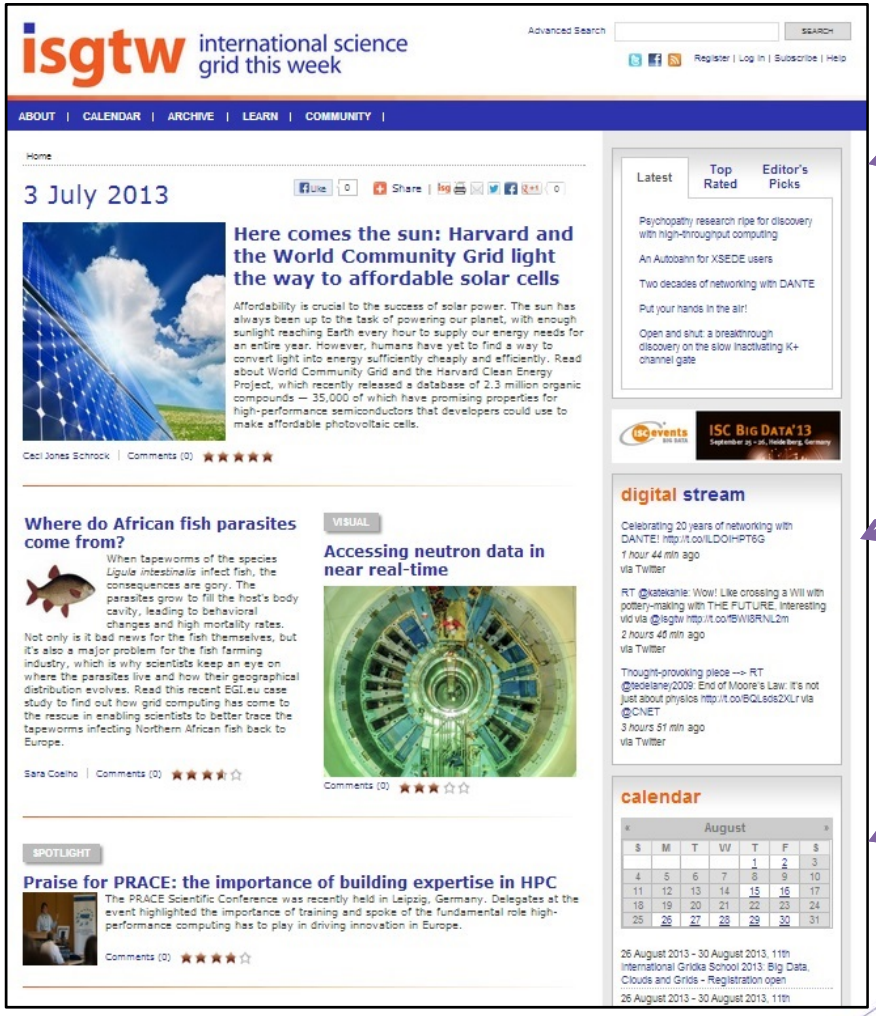
~ 100 words

Spotlight

Fun, narrow focus

~ 350 words

A typical issue



Most popular, top-rated and editor's pick stories

Twitter feed

calendar

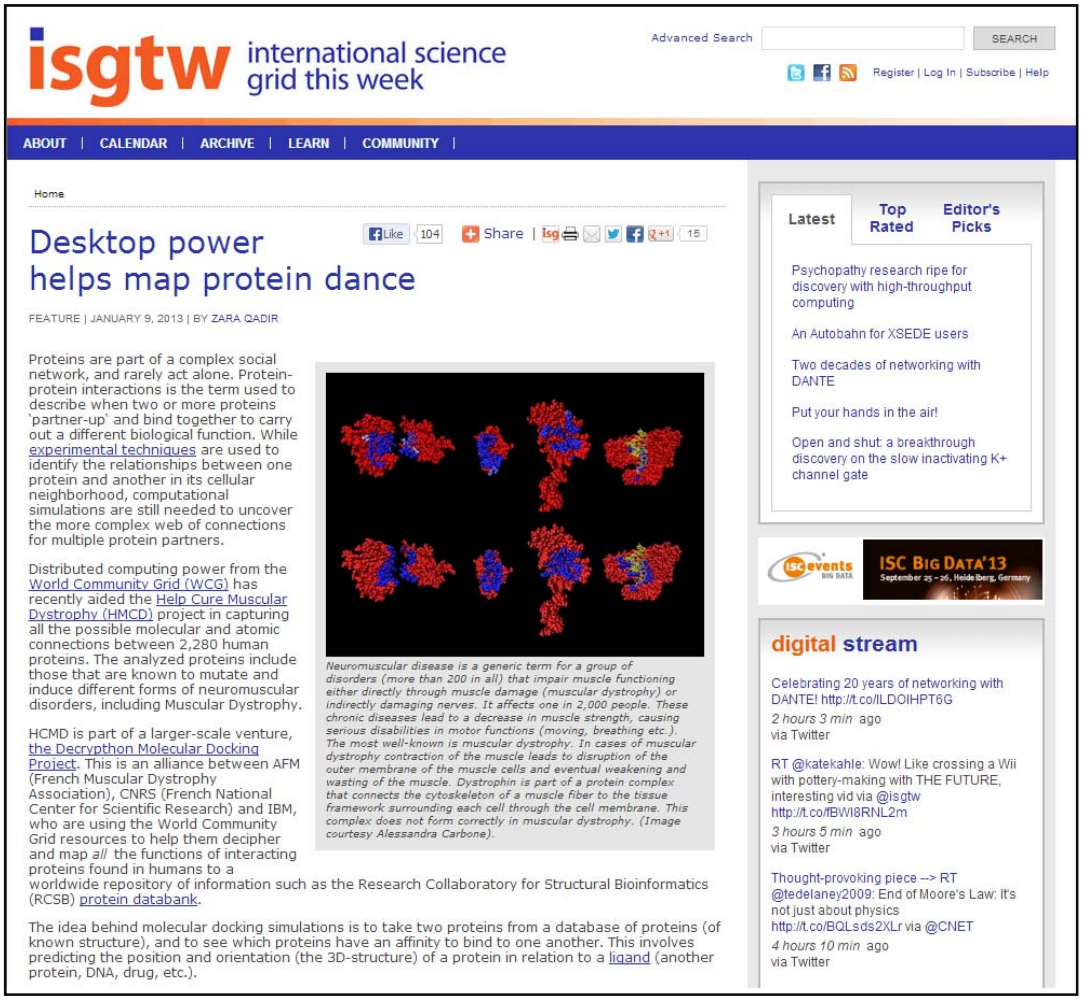
A typical issue

In the news
News from other publications

Blogs
Other blogs about science or computing

Announcements
Press releases from other organisations

Our stories



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Desktop power helps map protein dance

Like 104 Share | 15

FEATURE | JANUARY 9, 2013 | BY ZARA QADIR

Proteins are part of a complex social network, and rarely act alone. Protein-protein interactions is the term used to describe when two or more proteins 'partner-up' and bind together to carry out a different biological function. While experimental techniques are used to identify the relationships between one protein and another in its cellular neighborhood, computational simulations are still needed to uncover the more complex web of connections for multiple protein partners.

Distributed computing power from the World Community Grid (WCG) has recently aided the Help Cure Muscular Dystrophy (HMCD) project in capturing all the possible molecular and atomic connections between 2,280 human proteins. The analyzed proteins include those that are known to mutate and induce different forms of neuromuscular disorders, including Muscular Dystrophy.

Neuromuscular disease is a generic term for a group of disorders (more than 200 in all) that impair muscle functioning either directly through muscle damage (muscular dystrophy) or indirectly damaging nerves. It affects one in 2,000 people. These chronic diseases lead to a decrease in muscle strength, causing serious disabilities in motor functions (moving, breathing etc.). The most well-known is muscular dystrophy. In cases of muscular dystrophy contraction of the muscle leads to disruption of the outer membrane of the muscle cells and eventual weakening and wasting of the muscle. Dystrophin is part of a protein complex that connects the cytoskeleton of a muscle fiber to the tissue framework surrounding each cell through the cell membrane. This complex does not form correctly in muscular dystrophy. (Image courtesy Alessandra Carbone).

HCMD is part of a larger-scale venture, the Decrypthon Molecular Docking Project. This is an alliance between AFM (French Muscular Dystrophy Association), CNRS (French National Center for Scientific Research) and IBM, who are using the World Community Grid resources to help them decipher and map *all* the functions of interacting proteins found in humans to a worldwide repository of information such as the Research Collaboratory for Structural Bioinformatics (RCSB) protein databank.

The idea behind molecular docking simulations is to take two proteins from a database of proteins (of known structure), and to see which proteins have an affinity to bind to one another. This involves predicting the position and orientation (the 3D-structure) of a protein in relation to a ligand (another protein, DNA, drug, etc.).

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ISC Big Data'13 September 25 – 26, Heidelberg, Germany

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4 hours 10 min ago via Twitter

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Zara Qadir

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03:06

Scientific field:
Biomedicine

e-Infrastructures:
Grid

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Why can't every cloud have an HPC lining?

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FEATURE | OCTOBER 3, 2012 | BY ANDREW PURCELL

"Privacy is by far the hardest issue to tackle for cloud computing," says Paolo Balboni, scientific director of the European Privacy Association and founding partner at ICT Legal Consulting in Milan.

Balboni was speaking during a panel discussion session on the challenges of high performance computing (HPC) in the cloud, which proved to be one of the highlights of last month's ISC Cloud '12 conference in Mannheim, Germany. His assessment of the situation reflects the views of the entire panel, who agreed that if scientific research institutions and small-to-medium-sized enterprises (SMEs) are to embrace HPC in the cloud on a large scale, there are still major privacy-related issues which first need to be overcome.

HPC and the cloud. It could be a match made in heaven... if some key barriers can be overcome first.

Giles Hogben, European research director for The Cloud Security Alliance, was also on the panel. He says: "If we want to see not just big science organizations, but also SMEs and people who are developing commercial intellectual property (IP) in the cloud, security and trust are going to be two of the most important factors."

"One of the biggest barriers for SMEs is that their IP has to be stored in a trustworthy environment," he adds. "It's very likely that you will have a working environment where you crunch your data and then an external data hub on your network. You need to be able to segregate the two in case you're processing highly sensitive scientific data."

Hogben highlights in particular the privacy issues surrounding organizations which deal with highly sensitive data, such as genome-sequencing labs: "You need to make sure that once you've used the physical resources, such as hard disk storage, that the next customer isn't going to be able to run some fancy algorithm on the disk and then actually see your data. You need a secure way of deleting, de-provisioning and even destroying hardware at the end of its life-cycle."

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Scientific field:
Industry and policy

e-Infrastructures:
Clouds and HPC

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Researchers edge closer to solving 270-year-old math problem thanks to grid computing

FEATURE | SEPTEMBER 26, 2012 | BY ANDREW PURCELL

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Goldbach's 1742 letter to Euler

In the summer of 1742, Christian Goldbach, a famous Prussian mathematician and former tutor to Tsar Peter II, exchanged a series of letters with his friend, the great Swiss mathematician Leonhard Euler. Out of this exchange came the Goldbach conjecture, which in its simplest form states: "every even integer greater than 2 can be written as the sum of two primes".

For example:
4 can be expressed as 2 + 2,
6 can be expressed as 3 + 3,
8 can be expressed as 3 + 5,
10 can be expressed as 5 + 5 or 7 + 3,
12 can be expressed as 5 + 7,
14 can be expressed as 3 + 11 or 7 + 7,
16 can be expressed as 3 + 13 or 5 + 11, etc.

Despite the simple formulation of this conjecture, it is notoriously difficult to find a proof; 270 years later, one still remains to be found. While there have been numerous attempts at providing one, the most recent high-profile effort having been published in the ArXiv just two months ago, none have thus far been accepted by the wider mathematical community In fact, such has been the difficulty in finding a rigorous mathematical proof that in 1992, UK publishing company Faber and Faber offered $1,000,000 to anyone who could provide a compelling proof within the decade. However, the prize went unclaimed.

The stunt was an attempt on behalf of the publisher to promote Apostolos Doxiadis's new book, *Uncle Petros and Goldbach's Conjecture* . And, while the prize offered may not have led directly to a proof, the novel did at least inspire Silvio Pardi, a computer-science technologist at the Italian National Institute for Nuclear Physics (INFN). Pardi's day job involves working for the SuperB experiment at a Tier 2 center of the Worldwide LHC Computing Grid (WLCG), supporting CERN's ATLAS experiment. However, after reading the book he decided to get in touch with a pair of mathematicians who were working on finding a proof for the Goldbach conjecture to offer his help. Tomás Oliveira e Silva and Siegfried Herzog had been working together on the problem since 2001, using an algorithm to verify that the Golbach conjecture held for ever larger numbers. This method of numerical verification is by

A *brief* history

On 7 June, 1742, Goldbach wrote a letter to his friend Euler, proposing that: "**every integer which can be written as the sum of two primes, can also be written as the sum of as many primes as one wishes, until all terms are units.**"

Scrawled in the margin of this letter, Goldbach also proposed the following: "**every integer**

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Mathematics

e-Infrastructures:
Grid

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The mystery of the slowing space probes

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Find out how big data preservation helped to solve the Pioneer anomaly

FEATURE | JANUARY 16, 2013 | BY STEFAN JANUSZ

It could have been the slowing of their on-board clocks. They could have been feeling the effects of dark energy. Or, perhaps, they provided just the evidence needed to support a theory of modified Newtonian dynamics – proposed to explain why spiral galaxies don't lose their shape as they spin.

In the end, though, the explanation as to why NASA probes Pioneer 10 and 11 were slowing down more quickly than expected as they traveled through space turned out to be much more simple. Thermal radiation was emanating from the decaying radioisotopes which serve as the probes' power sources and this was producing a small amount of thermal recoil. Thermal recoil is a miniscule force which results from the emission of thermal photons from a surface. If the emission of these photons is unevenly distributed across the surface of a spacecraft, they could cause an imbalance in the forces acting on different parts of the spacecraft. This is exactly what happened in the case of Pioneer 10 and 11, due to each probe's radioactive power source being held on the end of a long boom, so as to prevent it interfering with sensor equipment. Consequently, even though the thermal recoil effect was roughly equivalent to the slowing of a car by the photons from its headlights, the imbalance in photon emissions turned out to be subtly diminishing the crafts' velocities as they ventured ever further into deep space. In fact, the discrepancy between the predicted and actual velocities of the Pioneer space probes was so minute that that it caused a Doppler shift of only 1.5Hz in 1.4GHz radio signals from the craft several billion kilometers out from Earth (indicating a slowing of roughly just one billionth of the crafts' original velocities). As such, despite the appeal of the array of exotic explanations on offer for the slowing effect observed, the cause was discovered thanks to the kind of conscientiousness and rigor that marks out a great scientist – or at least gives them a significant head start.

Artist's conception of the Pioneer 10/ 11 probe. Image courtesy NASA Ames Research Center.

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Stefan Janusz

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Scientific field:
Physics and astronomy

e-Infrastructures:
Big data

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Big in 2013 - find out what the experts say

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FEATURE | DECEMBER 19, 2012 | BY ANDREW PURCELL

Danish physicist and Nobel laureate Niels Bohr once said: "Prediction is very difficult, especially if it's about the future." So, when it came to highlighting the most exciting developments that 2013 is likely to have in store for scientific computing, we decided to heed this warning and get leading figures in the field to do our prediction for us...

Greener on the other side?

The University of Tennessee's Jack Dongarra, who has been involved in the publication of the Top500 list of supercomputing sites since its launch in 1993, warns that "major challenges are ahead for extreme computing". He says that, in terms of power efficiency, supercomputers really need to reach around 50 gigaflops per watt, compared to just the two gigaflops per watt which is common today. 50 gigaflops per watt is the level of power efficiency which needs to be reached if the US Department of Energy's goal of reaching an exaflop machine at under 20MW by 2022 is to to be achieved.

What does 2013 hold in store? (Image courtesy HoboElvis, Flickr)

Jeff Hollingsworth, general chair of this year's SC12 conference, also sees power efficiency as a major issue for high-performance computing: "In 2013, we will start to see serious developments in the areas of rethinking power and energy utilization for HPC. In particular, we will see new software models to help programmers better deal with dark silicon, true costs of data motion, and software-based resiliency." Also, with large GPU-enhanced machines, such as Blue Waters and Titan now up and running, 2013 could be a "critical year" for this technology too, he argues.

Bill Gropp of the University of Illinois is a co-principal investigator on the Blue Water's project. He says he is looking forward to petascale supercomputing with Blue Waters moving into full operations early next year. "After years of work to design and deploy the system (as well as a first-rate data center to house it and our other infrastructure) and to prepare science and engineering codes to take full advantage of the hundreds of thousands of processors in the system, it will be exciting to see it

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Andrew Purcell

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3,267

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Scientific field:
N/A

e-Infrastructures:
HPC, HTC, grid, clouds, big data, etc.

Conference coverage

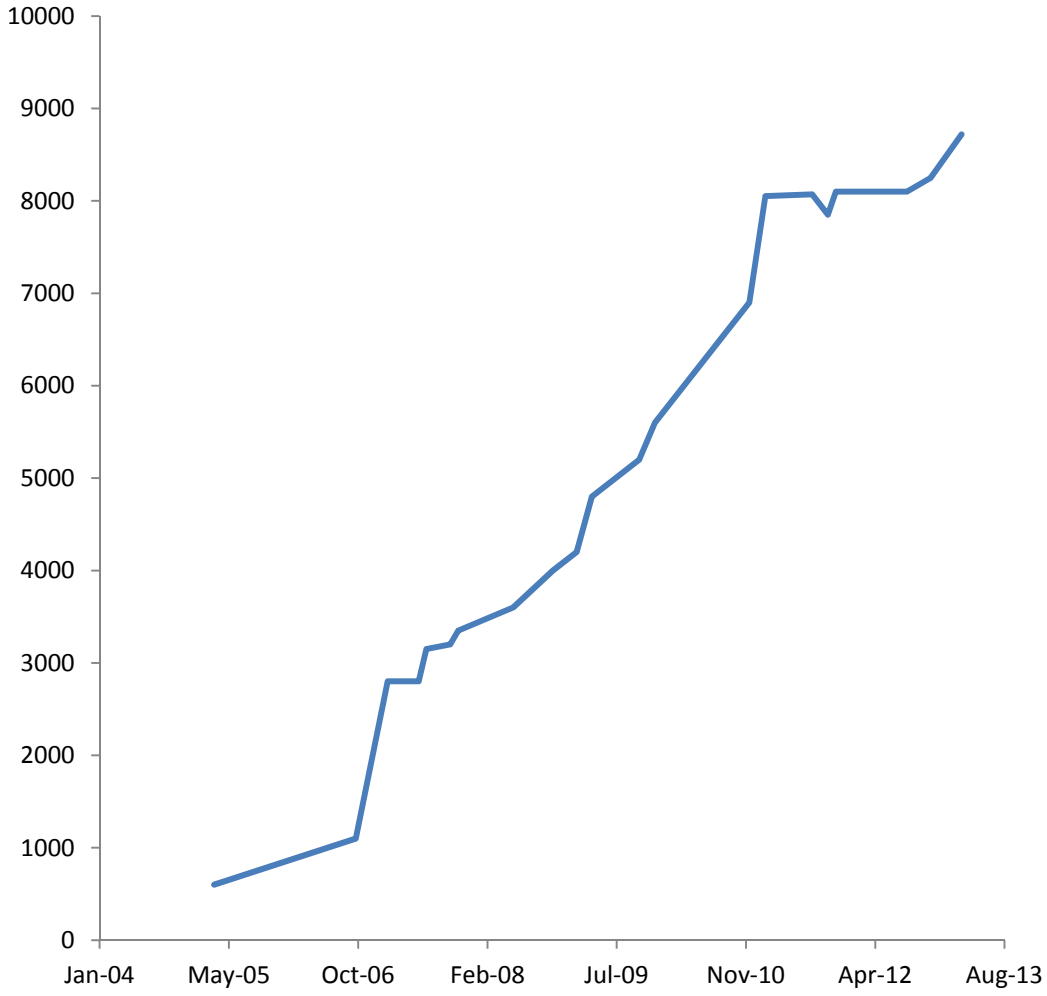
- Media partnerships
- Event highlights
- Exclusive stories
- In-depth analysis
- Brand awareness
- Increase readership

Conference coverage

Metrics & analysis

- Newsletter subscriber numbers, some indication of how these subscribers interact with the newsletter.
- Readership survey, conducted annually.
- Website statistics from Google Analytics.
- Social media interactions.

Subscribers



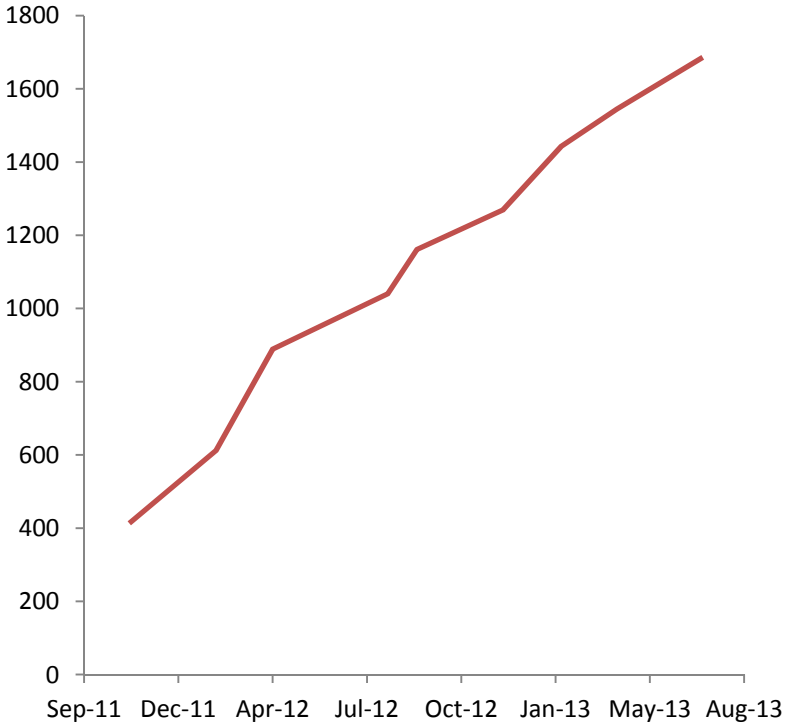
8,784 newsletter subscribers

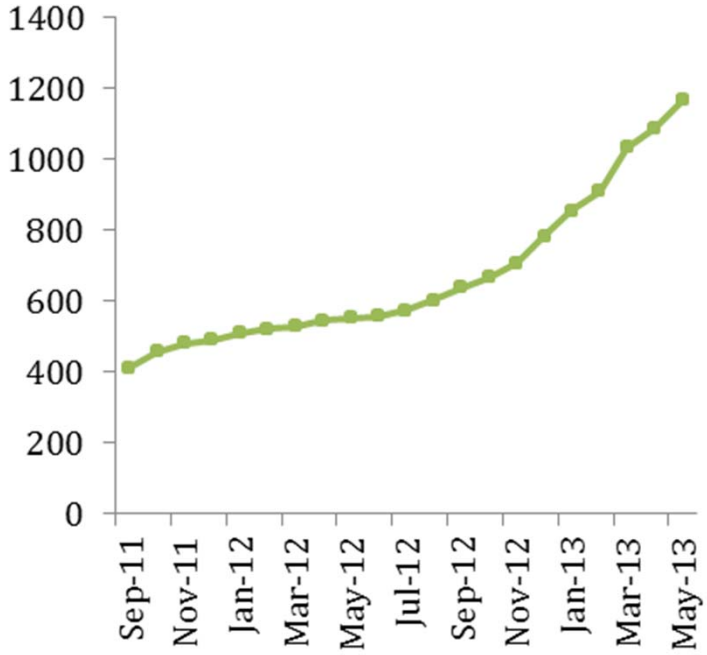
Subscriber numbers had reached a plateau

Growth has now resumed

Changing ways in which people access our content…

Social media





News aggregator sites also very important.
(e.g. Reddit, StumbleUpon, Slashdot, Digg, Paper.li, etc.)

Klout score: 56

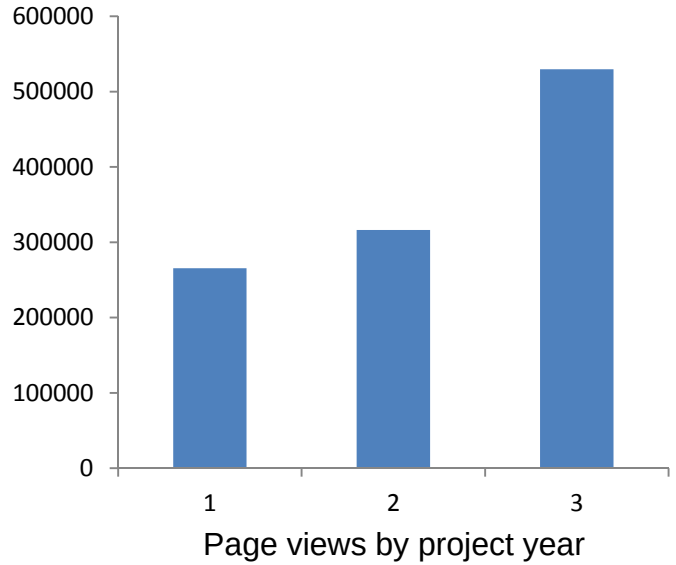
1796 Twitter followers

1297 Facebook likes

Web stats

From the end of November, onwards…

- **More than doubled page views!**
- **Visitors up 40%**
- **Average time spent on site up and number of pages viewed per visit both up by half.**
- **Number of unique visitors up by one third.**
- **Bounce rate down 6.5%**



Page views by project year

Readership survey

- Ran survey in May
- 17 questions, predominately multiple choice
- Over 100 respondents
- We asked readers for their age, profession, gender, interests, what they liked about iSGTW, how they access/use our website, etc.
- Newsletter main source of traffic, but social media becoming more important
- Almost one quarter of readership is female
- Difficulty targeting young readers – just 10% under 30

Readership survey

- Announcements/events continues to be used by around only half of readers
- Highly engaged readership
  - Majority read at least 3 out of every 4 issues.
  - 80% have forwarded/discussed articles
  - Over half have bookmarked articles
  - 13% have cited or linked to iSGTW in a blog, paper, poster or talk
- Used as a source by others in media
  - Over 1 in 10 visitors to the site are journalists/science communicators
- Articles pitched at right difficulty level and cover good range of topics and regions
- Raising awareness of e-science tools
- Aiding research and exposure

Challenges and the future

- Shape editorial policy
- Continue with efforts to attract more female readers and young readers
- Improve usage of announcements/events section
- Continue to track impact
- Increasing visitors through social media and subscribers
- Website development
- Collaborate closely with events, other projects, publications
- Continuing support for US desk editor at Indiana University
- Support from CERN

Summary

- Huge increase in traffic to site – solid foundation.
- Maintaining broad scope, both geographically and in terms of subject areas.
- Dedicated audience, which is growing. Continue using social media and collaborations to grow further.
- At the heart of the e-infrastructure community.

"Keep doing a fab job"

"This is a very important online journal"

"You're doing a great job"

"ISGTW beats all the center newsletters"

"Keep up the good work."

"Thanks for your excellent work"