

# NASA Earth Science Data Systems Working Groups

## Standards Process Group

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Web Services Technical Session

July 7, 2009 University of California, Santa Barbara



# Agenda

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8:45 Welcome & Introduction - Rich Ullman, Glenn Cunningham, Allan Doyle, NASA SPG Staff

9:15 Evolution of OGC Service Architecture to add support for REST oriented approaches  
GEOSS Architecture - Joshua Lieberman, Traverse/OGC

10:00 - 10:30 BREAK

10:30 ECHO approach to web services - Michael Burnett, Vangent

11:00 Leveraging web services in a portal environment - Jason Symonds, NOAA/NIDIS

11:30 GCMD service discovery demonstration - Tyler Stevens, NASA/GCMD

12:00 - 1:30 LUNCH

1:30 REST Wrappers for OGC Services - Karl Benedict, Earth Data Analysis Center, UMN

2:00 REST and Service Registries in Virtual Observatories, Matthew Graham, Caltech Center for  
Advanced Computing Research

3:00 - 3:30 BREAK

3:30 Discussion



# Session Context & Goals



# SPG Role

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- Develop list of stable, operationally ready standards
- Collect body of technical notes related to implementation of standards
- Tech notes include specs and practices that could develop into standards
- Increasingly - SPG is called upon within NASA for information & advice about specs, standards, practices likely to impact NASA
  - internally - data systems & processes
  - externally - as partner in activities such as CEOS, GEO/GEOSS

# Goal of this session

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1. What is the current state of the art in web services relevant to NASA data systems?
2. What is being used in production environments?  
Is there widespread, operational use that should be entered into the SPG process?
3. What innovative experiments & trials are underway?  
Can these be documented as Tech Notes to promote awareness?

# Of particular interest

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Current leading-edge activities in this area suggest that existing OGC specifications and Service Oriented Architectures based on UDDI, WSDL, SOAP, etc. are mismatched with emerging architectural patterns such as REST.

How can the SPG help discern a pathway that will enable construction of robust, interoperable data systems?

# Discussion Goals

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1. Answer the three questions

2. Develop, in real-time, a “convergence roadmap” that shows how things are coming together, based on experience.

Bonus guest co-moderator - Ted Habermann, NOAA NGDC

3. How can NASA maximize the benefit of its OGC membership?

# Why another session on Web Services?

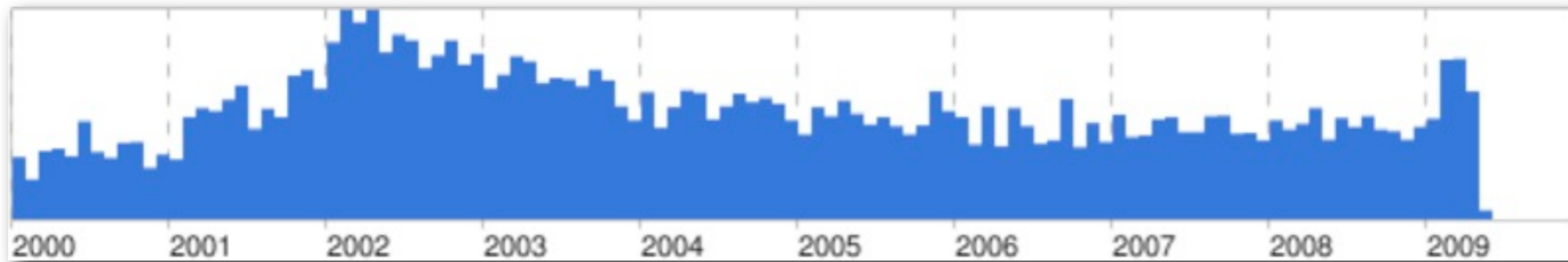


# Some concerns

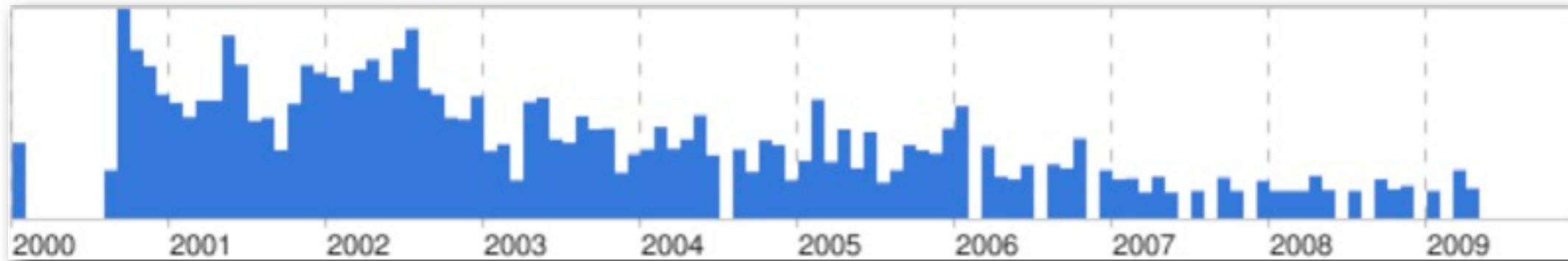
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- Web Services is a very broad and ambiguous term
- Service Oriented Architecture is also a broad and ambiguous term
- OGC's service architecture is tied to SOAP, UDDI, ebRIM
- REST is gaining adherents, but is often misunderstood, and is becoming a bit ambiguous
- People often see Web Services, SOA, OGC, and REST as a checkbox item
- New contracts need to be able to spell out specific requirements (e.g. refer to standards and other published work)
- Architectural patterns are not exactly standards

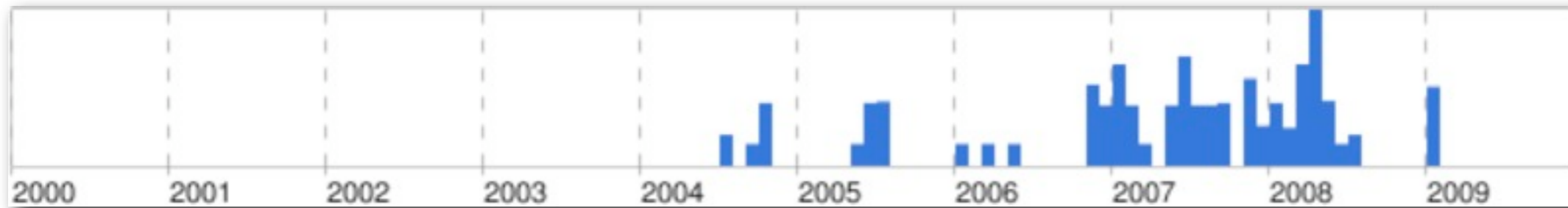
# Vox Populi - Google Timeline - 2000-2009



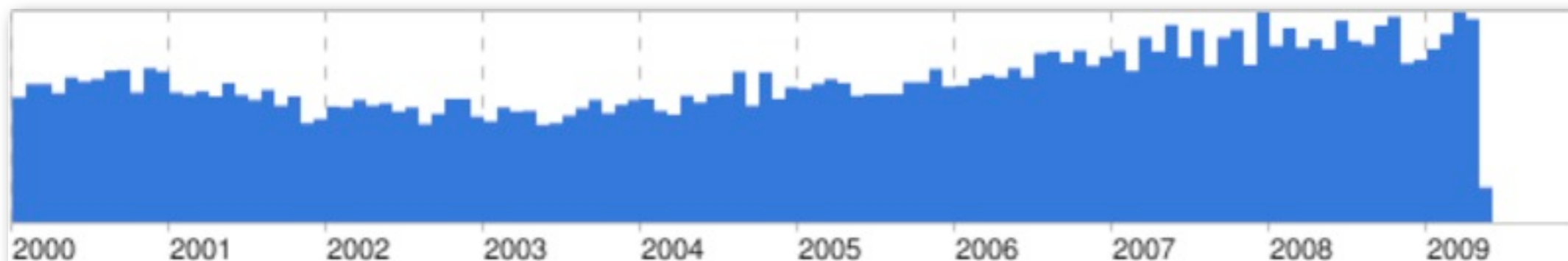
**Web Services**  
**2,360,000**



**UDDI**  
**8,760**



**ebRIM**  
**50**



**REST web**  
**309,000**

# REST (the movie)

Note: This was an animation in the original. The results of the Google search for rest soa shift were scrolled up the page. For this PDF version they are included on this slide and the next one.

Web [Images](#) [Video](#) [Maps](#) [News](#) [Shopping](#) [Gmail](#) [more](#) ▼



[Advanced Search](#)  
[Preferences](#)

Web [Show options...](#)

Results 1 - 10 of about 140,000 for [rest soa shift](#). (0.11 seconds)

## [Formtek Blog » SOA: Shift Toward Lightweight REST Services](#)

**REST** services are becoming the preferred path towards **SOA** implementation. In a recent survey by InformationWeek of 270 business professionals, 23 percent of ...

[www.formtek.com/blog/?p=234](http://www.formtek.com/blog/?p=234) - [Cached](#) - [Similar](#)

## [Survey: SOA delivering; SOAP out, REST in | Programming and ...](#)

Feb 25, 2009 ... is that there is a major **shift** taking place underneath **SOA** efforts. ... RE: Survey: **SOA** delivering; SOAP out, **REST** in mpjoshi | 04/08/09 ...

[blogs.techrepublic.com.com/programming-and-development/?...](http://blogs.techrepublic.com.com/programming-and-development/?...) - [Cached](#) - [Similar](#)

## [SOA: Making the Paradigm Shift Part 7 of N - Sam Gentile If ...](#)

**SOA**: Making the Paradigm **Shift** Part 7 of N .... The only way of describing how to use a **REST** POX service is with prose and samples." ...

[samgentile.com/.../soa-making-the-paradigm-shift-part-7-of-n-rough-draft.aspx](http://samgentile.com/.../soa-making-the-paradigm-shift-part-7-of-n-rough-draft.aspx) -

[Cached](#) - [Similar](#)

## [SOA: Making the Paradigm Shift Part 7 of N : Sam Gentile's Blog ...](#)

**SOA**: Making the Paradigm **Shift** Part 7 of N ... Particularly, Microsoft and IBM agreed, and the **rest** of the industry fell in line. ...

[samgentile.com/.../soa/soa-making-the-paradigm-shift-part-7-of-n/](http://samgentile.com/.../soa/soa-making-the-paradigm-shift-part-7-of-n/) - [Cached](#) - [Similar](#)

[More results from samgentile.com »](#)



## [Compare datapower](#)

Protecting Enterprise, SaaS & Cloud based Applications – A Comprehensive Threat model for **REST**, **SOA** and Web 2.0. This technical document describes a ...

[www.infoq.com/zones/.../Intel\\_XMLThreat\\_WhitePaper](http://www.infoq.com/zones/.../Intel_XMLThreat_WhitePaper) - [Cached](#) - [Similar](#)

## [The New Face of SOA | Blogs | ITBusinessEdge.com](#)

... Manes' January declaration of **SOA's** death , but I've definitely noticed a **shift** in ... “The **REST** philosophy has simplicity going for it, ...

[www.itbusinessedge.com/cm/blogs/.../the-new-face-of-soa/?cs...](http://www.itbusinessedge.com/cm/blogs/.../the-new-face-of-soa/?cs...) - [Cached](#) - [Similar](#)

## [REST-based SOA registry tilts at status quo - SOA Talk](#)

Last week WSO2 released a **REST**-based **SOA** registry, joining Mulesource, ... The **REST**-based registry isn't likely to create that sort of paradigm **shift**, ...

[itknowledgeexchange.techtarget.com/soa.../rest-based-soa-registry-tilts-at-status-quo/](http://itknowledgeexchange.techtarget.com/soa.../rest-based-soa-registry-tilts-at-status-quo/) - [Cached](#) - [Similar](#)

## [Service Architecture - SOA: Why REST, WS-\\* and technology are the ...](#)

Pitching **REST**, WS-\*, ESBs etc is exactly what **SOA** should not be doing. ... The last mile is the mentality **shift** from thinking in terms of ...

[service-architecture.blogspot.com/.../why-rest-ws-and-technology-are-problem.html](http://service-architecture.blogspot.com/.../why-rest-ws-and-technology-are-problem.html) - [Cached](#) - [Similar](#)

## [Survey: SOA delivering: SOAP out, REST in | Service-Oriented ...](#)

The gist of the survey report is that there is a major **shift** taking place ... RE: Survey: **SOA** delivering; SOAP out, **REST** in: RESTful HTTP is extremely ...

[blogs.zdnet.com/service-oriented/?p=1557](http://blogs.zdnet.com/service-oriented/?p=1557) - [Cached](#) - [Similar](#)

## ['SOA' dead as of January 1st, analyst says - Program - Web ...](#)

Jan 1, 2009 ... Anne points to the apparent failure of **SOA** to upend the **rest** of the business. ... and approaches employed to work toward **SOA** will **shift**. ...

[www.builderau.com.au/.../soa/-SOA.../0,339024632,339294369,00.htm](http://www.builderau.com.au/.../soa/-SOA.../0,339024632,339294369,00.htm) - [Cached](#) - [Similar](#)

### Searches related to: **rest soa shift**

[service oriented architecture soa](#)

[soa governance](#)

[night shift soap](#)



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# Key points of REST

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Wikipedia has a great overview

[http://en.wikipedia.org/wiki/Representational\\_State\\_Transfer](http://en.wikipedia.org/wiki/Representational_State_Transfer)

Or, just go to **wikipedia.org**, search for **REST**, and look for #2 under “**REST may refer to**”

# Key principles from Wikipedia

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- Application state and functionality are abstracted into resources
- Every resource is uniquely addressable using Uniform Resource Identifiers
- All resources share a uniform interface for the transfer of state between client and resource, consisting of
  - A constrained set of well-defined operations (HTTP GET, POST etc)
  - A constrained set of content types, optionally supporting code on demand
- A protocol which is:
  - Client-server
  - Stateless
  - Cacheable
  - Layered

# HTTP basics

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type this in your browser:

`http://www.host1.com/path/file.html`

this is what gets sent to the web server

```
GET /path/file.html HTTP/1.1
Host: www.host1.com:80
[blank line here]
```

# HTTP 'verbs'

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```
GET /path/file.html HTTP/1.1  
Host: www.host1.com:80  
[blank line here]
```

GET	Send back the representation of the resource
PUT	Replace/create the resource with this representation
POST	"Process" this information
DELETE	Delete this resource



# Hypertext as the engine of application state aka HATEOAS

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Hypertext snippet - could be XML, XHTML, HTML, etc.

Current state is embodied in the contents.

```
<TITLE>Chapter 5</TITLE>  
<LINK rel="prev" href="chapter4.html">  
<LINK rel="next" href="chapter6.html">
```

Next possible states  
are in the links

**rel** is used to  
provide semantics  
about the links

the links themselves  
are meant to be  
opaque

# REST by analogy

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- Navigating some web sites can give you an idea of how REST works
- wikipedia.org - start here
  - [http://en.wikipedia.org/wiki/Portal:Contents/Quick\\_index](http://en.wikipedia.org/wiki/Portal:Contents/Quick_index)
- dictionary.com

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<http://www.esdswg.net/spg>



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4. Convergence Roadmap
5. How can NASA maximize the benefit of its OGC membership?