

# A new paradigm of knowledge?

How the Web transforms our comprehension of knowledge and the way of academic research

Workshop on Web Epistemics  
Bielefeld, February 15th, 2012

Thesis:

## Knowledge in Transition

Digitalization in combination with current trends in economics, politics and society transforms the principles and conventions of our knowledge culture

Reasons:

1. Theoretical model of coevolution
2. Structural changes in social diffusion of knowledge
3. E-Science



Reason 1:

## Model of Coevolution



## Digital Knowledge Society

Internet and Web 2.0



knowledge society

centralization, plurality of and  
dynamics in knowledge, but  
also a growing degree of  
fragility in epistemology

## Reason 2:

# Structural changes in the social diffusion of knowledge (success of the amateur culture)



WIKIPEDIA  
The Free Encyclopedia

Main page  
Contents  
Featured content  
Current events  
Random article  
Donate to Wikipedia

Interaction  
Help  
About Wikipedia  
Community portal  
Recent changes  
Contact Wikipedia

Toolbox

Print/export

Languages  
Simple English  
العربية  
Bahasa Indonesia  
Bahasa Melayu  
Български

Log in / create account

Main Page [Talk](#) [Read](#) [View source](#) [View history](#)

Welcome to **Wikipedia**,  
the free encyclopedia that anyone can edit.  
3,868,286 articles in English

- Arts
- History
- Society
- Biography
- Mathematics
- Technology
- Geography
- Science
- All portals

**Today's featured article**

 **Frederick Russell Burnham** (1861–1947) was an American scout and world traveling adventurer known for his service to the British Army in colonial Africa and for teaching woodcraft to Robert Baden-Powell, thus becoming one of the inspirations for the founding of the international Scouting Movement. Burnham had little formal education, attending high school but never graduating. He began his career at 14 in the American Southwest as a scout and tracker for the U.S. Army in the Apache Wars and Cheyenne Wars. Sensing the Old West was getting too tame, as an adult Burnham went to Africa where this background proved useful. He soon became an officer in the British Army, serving in several battles there. During this time, Burnham became friends with Baden-Powell, and passed on to him both his outdoor skills and his spirit for what would later become known as Scouting. Burnham eventually moved on to become involved in espionage, oil, conservation, writing and business. His descendants are still active in Scouting. ([more...](#))

Recently featured: [Vijayanagara Empire](#) – [Cartman Gets an Anal Probe](#) – [Prince Louis of Battenberg](#)

**In the news**

- Mohammed Waheed Hassan** (*pictured*) is sworn in as President of the Maldives following the resignation of Mohamed Nasheed.
- An earthquake off the coast of Negros Oriental, Philippines, kills 81 people and causes extensive damage.
- Russian scientists reportedly reach Lake Vostok, a body of water isolated under the Antarctic ice shield, after drilling a borehole 3,768 m (12,362 ft) deep.
- Spanish cyclist Alberto Contador, who tested positive for a performance-enhancing drug, is stripped of his 2010 Tour de France and 2011 Giro d'Italia victories and banned from competition for two years.
- Sauli Niinistö of the National Coalition Party is elected President of Finland.

[Wikinews](#) – [Recent deaths](#) – [More current events...](#)

**On this day...**

## The example Wikipedia

### Product

generating content  
review and control  
award and sanction

QUALITY

### Process

introduction and socialization  
self-presentation  
negotiation and voting

COMMUNITY

## The example Wikipedia



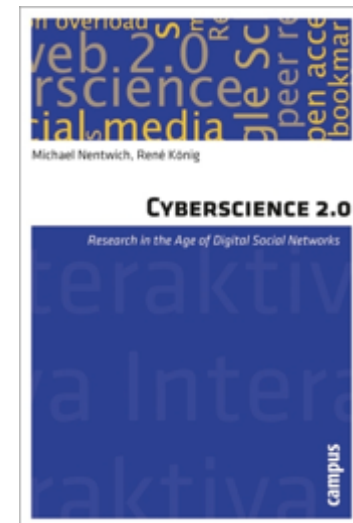
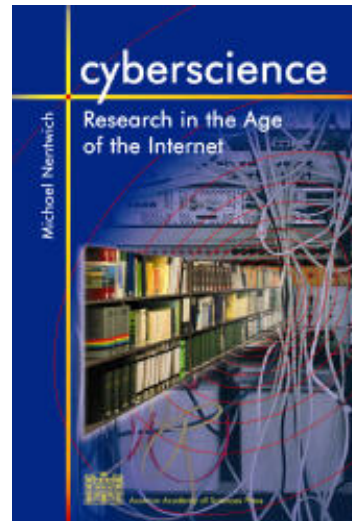
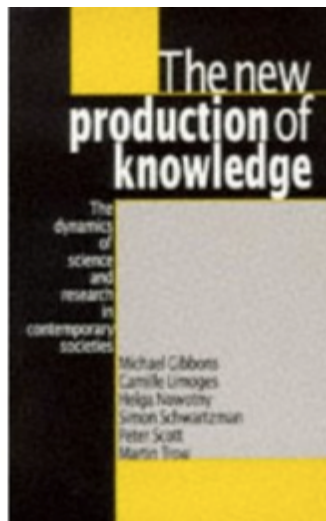
„The problem with Wikipedia is that it only works in practice. In theory, it's a total disaster.“  
(User: Rax)

<http://de.wikipedia.org/wiki/Benutzer:Rax>

Reason 3:

## Fundamental changes within the Sciences

- Science and Public (Mode 2)
- Cyberscience/ E-Science





## Cyberscience (Nentwich 1999/2003)

*„(1) First, the I&C technologies affect several framework conditions and virtually all forms of scholarly activity. Systematic screening reveals that both the organisational setting and the production of knowledge as well as scholarly communication and finally the transfer of academic knowledge (teaching) are directly affected. (2) On this basis, the second hypothesis argues that the many developments faced by scholars - constant use of the computer at the work place, shift of the communication with colleagues to E-mail, new electronic publication formats - do not only accelerate communication, as frequently assumed, but also have the potential to lead to qualitative changes in the scholarly system. This is substantiated by hints to actual or expected changes in the publication system (i.e. the heart of the scholarly communication system), the removal of spatial limitations of research and finally with respect to the distribution of roles in academia.“ (Nentwich 1999)*

## Grid and research infrastructures

### D-Grid initiative of the BMBF

- > 20 projects
- 54 universities
- 42 institutes
- 100 companies
- 36.000 computer processors

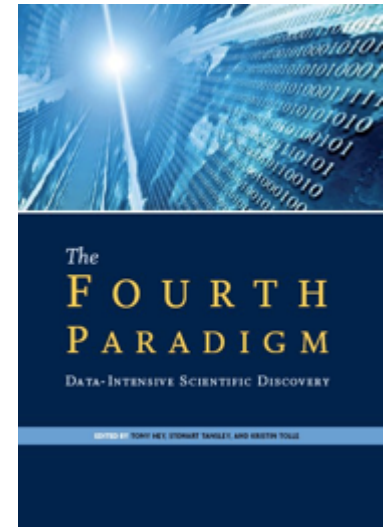
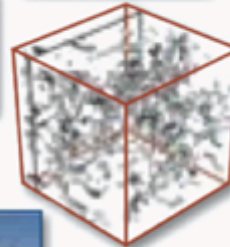


## The fourth paradigm (Hey et. al 2009)

### Science Paradigms

- Thousand years ago:  
science was **empirical**  
*describing natural phenomena*
- Last few hundred years:  
**theoretical** branch  
*using models, generalizations*
- Last few decades:  
a **computational** branch  
*simulating complex phenomena*
- Today: **data exploration** (eScience)  
*unify theory, experiment, and simulation*
  - Data captured by instruments  
or generated by simulator
  - Processed by software
  - Information/knowledge stored in computer
  - Scientist analyzes database/files  
using data management and statistics

$$\left(\frac{\dot{a}}{a}\right)^2 = \frac{4\pi G\rho}{3} - K\frac{c^2}{a^2}$$



## Data-intensive Science...

*„The world of science has changed, and there is no question about this. The new model is for the data to be captured by instruments or generated by simulations before being processed by software and for the resulting information or knowledge to be stored in computers. Scientists only get to look at their data fairly late in this pipeline. The techniques and technologies for such data-intensive science are so different that it is worth distinguishing data-intensive science from computational science as a new, fourth paradigm for scientific exploration.“ (Gray 2009(2007), xix)*

## ... as a challenge

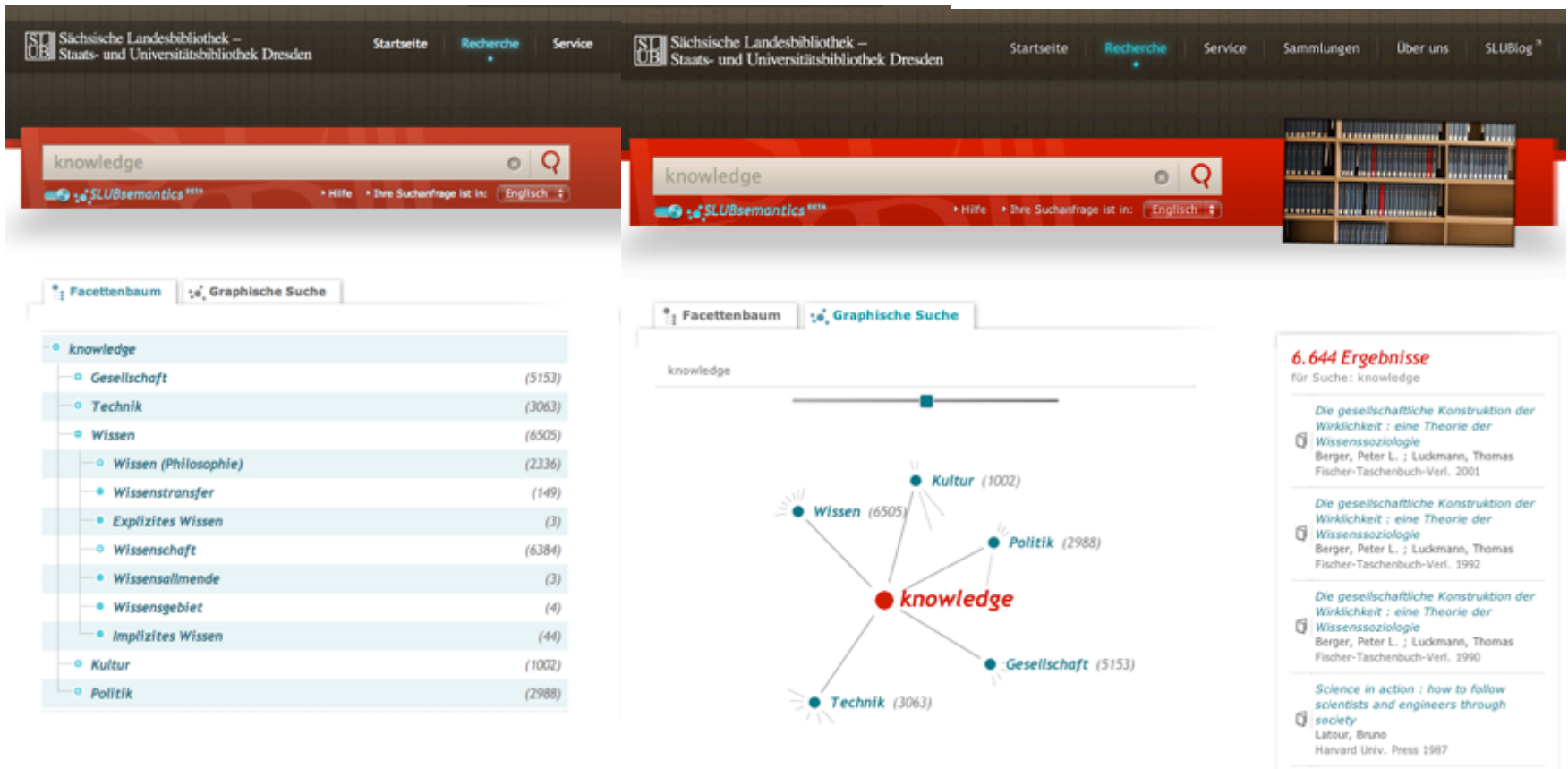
*„eScience is where ,IT meets scientists.‘ Researchers are using many different methods to collect or generate data—from sensors and CCDs to supercomputers and particle colliders. When the data finally shows up in your computer, what do you do with all this information that is now in your digital shoebox? People are continually seeking me out and saying, “Help! I’ve got all this data. What am I supposed to do with it? My Excel spreadsheets are getting out of hand!” So what comes next? What happens when you have 10,000 Excel spreadsheets, each with 50 workbooks in them? Okay, so I have been systematically naming them, but now what do I do?“ (Gray 2009(2007), xviii)*

## a) Semantic Web

*„The primary focus of the current technologies addresses only the first part of the data-information-knowledge-wisdom spectrum. Computers have become efficient at storing, managing, indexing, and computing (research) data. They are even able to represent and process some of the information hidden behind the symbols used to encode that data. Nevertheless, we are still a long way from having computer systems that can automatically discover, acquire, organize, analyze, correlate, interpret, infer, and reason over information that’s on the Internet, that’s hidden on researchers’ hard drives, or that exists only in our brains. We do not yet have an infrastructure capable of managing and processing knowledge on a global scale, one that can act as the foundation for a generation of knowledge-driven services and applications. So, if the fourth paradigm is about data and information, it is not unreasonable to foresee a future, not far away, where we begin thinking about the challenges of managing knowledge and machine-based understanding on a very large scale. We researchers will probably be the first to face this challenge.“ (Parastatidis/Microsoft, 2009, 166)*

Semantic Web:

SLUBsemantics (<http://www.slub-dresden.de/>)



The screenshot displays the SLUBsemantics search interface. The top navigation bar includes the SLUB logo, the library name 'Sächsische Landesbibliothek – Staats- und Universitätsbibliothek Dresden', and links for 'Startseite', 'Recherche', 'Service', 'Sammlungen', 'Über uns', and 'SLUBlog'. The search bar contains the term 'knowledge' and shows '6.644 Ergebnisse' (6,644 results). Below the search bar, there are two tabs: 'Facettenbaum' (Faceted Tree) and 'Graphische Suche' (Graphical Search). The 'Facettenbaum' tab is active, showing a hierarchical list of facets for the search term 'knowledge'.

**Facettenbaum (Faceted Tree) results:**

- knowledge (5153)
  - Gesellschaft (1513)
  - Technik (3063)
  - Wissen (6505)
    - Wissen (Philosophie) (2336)
    - Wissenstransfer (149)
    - Explizites Wissen (3)
    - Wissenschaft (6384)
    - Wissensallmende (3)
    - Wissensgebiet (4)
    - Implizites Wissen (44)
  - Kultur (1002)
  - Politik (2988)

The 'Graphische Suche' (Graphical Search) tab shows a semantic network diagram with 'knowledge' at the center, connected to various related terms:

- Wissen (6505)
- Kultur (1002)
- Politik (2988)
- Gesellschaft (5153)
- Technik (3063)

On the right side, a list of search results is displayed, including:

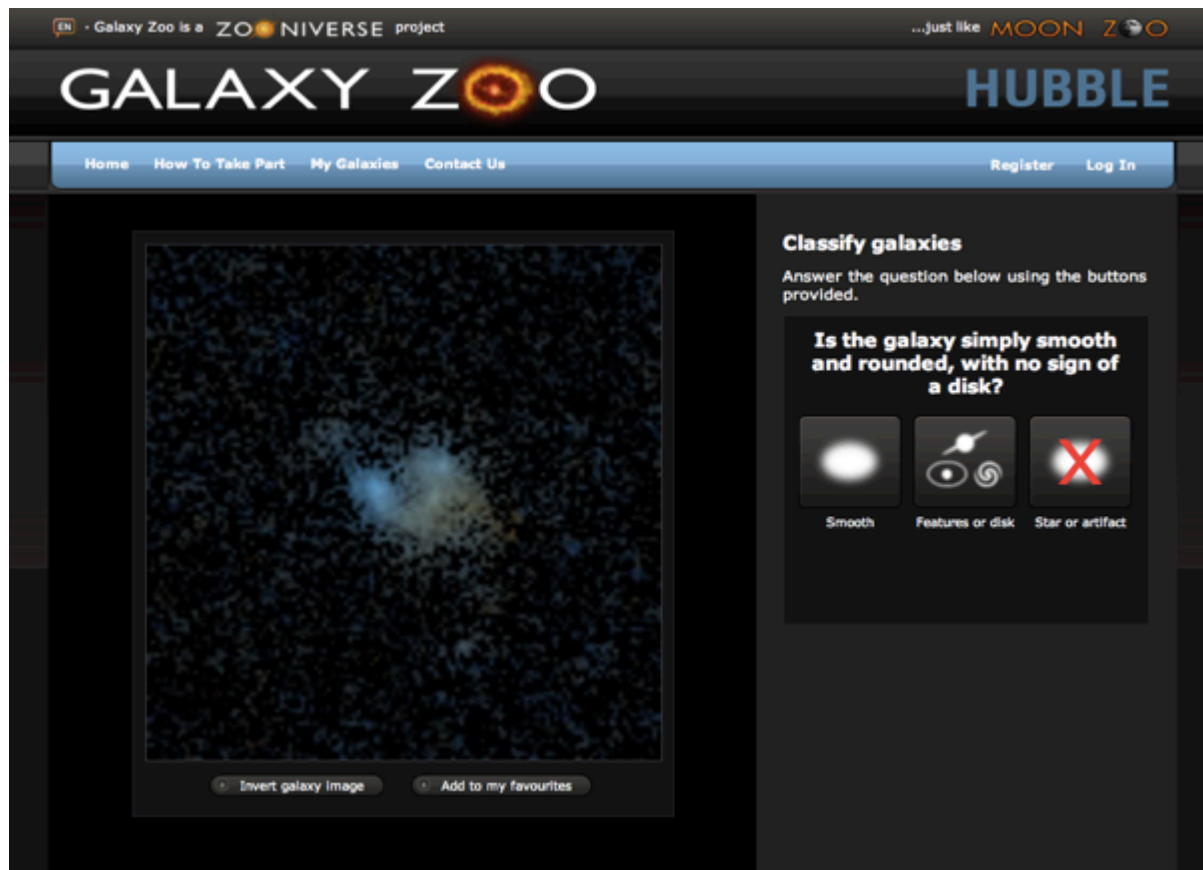
- 6.644 Ergebnisse** für Suche: knowledge
- Die gesellschaftliche Konstruktion der Wirklichkeit : eine Theorie der Wissenssoziologie* Berger, Peter L. ; Luckmann, Thomas Fischer-Taschenbuch-Verl. 2001
- Die gesellschaftliche Konstruktion der Wirklichkeit : eine Theorie der Wissenssoziologie* Berger, Peter L. ; Luckmann, Thomas Fischer-Taschenbuch-Verl. 1992
- Die gesellschaftliche Konstruktion der Wirklichkeit : eine Theorie der Wissenssoziologie* Berger, Peter L. ; Luckmann, Thomas Fischer-Taschenbuch-Verl. 1990
- Science in action : how to follow scientists and engineers through society* Latour, Bruno Harvard Univ. Press 1987

## **b) Citizen Science**



Citizen Science:

Galaxy Zoo (<http://www.galaxyzoo.org/>)



Citizen Science:

Fold it (<http://fold.it/portal/>)


**foldit** BETA  
 Solve Puzzles  
for Science

12:12:21 GMT
 [PUZZLES](#)
[BLOG](#)
[FEEDBACK](#)
[GROUPS](#)
[FORUM](#)
[PLAYERS](#)
[WIKI](#)
[FAQ](#)
[RECIPES](#)
[ABOUT](#)
[CONTESTS](#)
[CREDITS](#)



Click to learn how you contribute to science by playing Foldit.

### What's New

#### Another Developer Chat Thursday Feb. 16th at 19:00 GMT

Today's Developer Chat focused mostly on current issues with the client, you can read the transcript from the chat here: <http://fold.it/portal/chats>, so we will have another Developer Chat next Thursday at 11am PDT (19:00 GMT).

If you cannot make it to the chat at that time, please post your questions in the comments to this news post and we will address all of them during the next chat.

Today the Foldit team went through many of the highly-voted feedbacks and hopefully they will be resolved soon (as soon as we solve the client problems). If you would like to help us diagnose exactly what is wrong with the current clients, please join the Contest we have created for this: <http://fold.it/portal/node/991787#comment-15549>.

Thank you for your patience and we hope to be able to talk to most of you next Thursday (especially those of you who were in distant time zones).

(Thu, 02/09/2012 - 05:27 | [0 comments](#)) [f Share](#)

#### GET STARTED: DOWNLOAD

 Win Beta  
Windows XP/Vista/7

 Mac Beta  
Intel OSX 10.4 or later

 Linux Beta  
Linux

#### RECOMMEND FOLDIT

#### USER LOGIN

Username: \*


Password: \*




- Create new account
- Request new password
- Sign in using Facebook

SOLOISTS		EVLVERS		GROUPS	TOPICS
PLAYER	PUZZLE	SCORE			
bobcat 185 250	513: RosettaSer...ns	10,005			
BootsMcGraw 13 8	512: Electron D...y 7	10,725			
johnmitch 185 13	511: CASP ROLL ...006	12,150			
Kaputnik 185 8554	Beginner Puzzle...ma	9,989			
Lemon Friend 185 858	Beginner Puzzle...ma	9,924			
spmm 10 4	Beginner Puzzle...ma	10,020			
		FULL			

## c) Virtual Research Environments (VRE)




<b>Startpage</b>	<b>Startpage</b>	Search <input type="text"/>
<ul style="list-style-type: none"> <li>Overview</li> <li>General Concepts</li> <li>What is eSciDoc for?</li> <li>System Architecture</li> <li>Content Model</li> <li>Publications</li> <li>Software</li> <li>eSciDoc Applications</li> <li>eSciDoc Services</li> <li>eSciDoc Infrastructure</li> <li>Community</li> <li>Support</li> <li>eSciDoc Days</li> <li>User Groups</li> <li>Sustainability</li> <li>Sponsors</li> <li>Getting Started</li> <li>Download</li> <li>Installation</li> <li>Hints</li> <li>License</li> <li>Imprint</li> </ul>	<p><b>eSciDoc - The Open Source e-Research Environment</b></p> <p>eSciDoc is an e-Research environment developed specifically for use by scientific and scholarly communities to collaborate globally and interdisciplinary. It comprises core functionality including a <a href="#">Fedora</a> repository (<a href="#">eSciDoc Infrastructure</a>), a set of complementing services (<a href="#">eSciDoc Services</a>), and application build on top of the infrastructure and the services (<a href="#">eSciDoc Applications</a>) that enable innovative eScience scenarios. Scientists, librarians, and software developers can work with research data, create novel forms of publications, and establish new ways of scientific and scholarly communication. <a href="#">more...</a></p> <p><b>News</b></p> <p>26. Oktober 2011 09:02</p> <p><b>eSciDoc Infrastructure 1.4 released!</b></p> <p>The eSciDoc team proudly announces the general availability of the <a href="#">release 1.4</a> of the <a href="#">eSciDoc Infrastructure</a>. Features of this release include</p> <ul style="list-style-type: none"> <li>• Architectural improvements             <ul style="list-style-type: none"> <li>◦ SOAP interface dropped</li> <li>◦ Enterprise Java Beans (EJB) removed</li> <li>◦ Fedora is now accessed via its REST interface</li> </ul> </li> <li>• Improved ingest behavior             <ul style="list-style-type: none"> <li>◦ Works much better with large files</li> <li>◦ Ingest times are less affected by repository size</li> </ul> </li> <li>• Support for OpenID</li> <li>• HTTP compression             <ul style="list-style-type: none"> <li>◦ More efficient data transfer between server and applications</li> </ul> </li> <li>• Configurable Vocabularies for Content Relations             <ul style="list-style-type: none"> <li>◦ Reference externally defined vocabularies in escidoc.properties</li> <li>◦ May be referenced as local files or remotely via HTTP</li> </ul> </li> <li>• Update of included libraries</li> </ul>	<p><b>Page Actions</b></p> <ul style="list-style-type: none"> <li>+ My Prefs</li> <li>+ Print Page</li> <li>+ Log in</li> </ul> <p><i>This page last changed on 16:28 31-Jan-2011 by HKA.</i></p>



Except where otherwise noted, the content of this website is licensed under a [Creative Commons 3.0 Attribution License](#)

## Virtual Research Environments: E-Science Interfaces

**E-Science Interfaces**


LOS

STARTSEITETEAMPROJEKTPUBLIKATIONENKONTAKTARTIKELKOMMENTARE

### Vortrag am HLRS

7. FEBRUAR 2012 VON [SONJA PALFNER](#) [HINTERLASSE EINEN KOMMENTAR](#)

Am 1.2.12 fand mein Vortrag am High Performance Computing Center Stuttgart (HLRS) statt. [Hier sind die Folien.](#) Anwesend waren vor allem Mitarbeiterinnen und Mitarbeiter am HLRS. Vor dem Vortrag hatte Prof. Resch noch Zeit mir den Rechenraum zu zeigen. Vor allem der „Zwischenboden“ hat mich beeindruckt, da er wie eine eigene Etage unter den Rechnern begehbar ist. Das erleichtert die Arbeit an der Recheninfrastruktur ungemein, da immer wieder Menschen an die Kabel müssen und sie dafür am HLRS nicht wie Höhlenforscher durch enge Schächte kriechen müssen. Leider habe ich im Gebäude kein Foto gemacht 😊. Aber hier ist das HLRS von außen:



#### > Kategorien

- [C3-Grid](#)
- [Institutionalisierung](#)
- [Projektgedanken](#)
- [TextGrid](#)
- [Uncategorized](#)
- [Veranstaltungen](#)
- [Virtuelle Forschungsumgebungen](#)
- [Vorträge](#)

#### > Archiv

Wähle den Monat ↓

#### > Links

- [C3-Grid](#)
- [TextGrid](#)

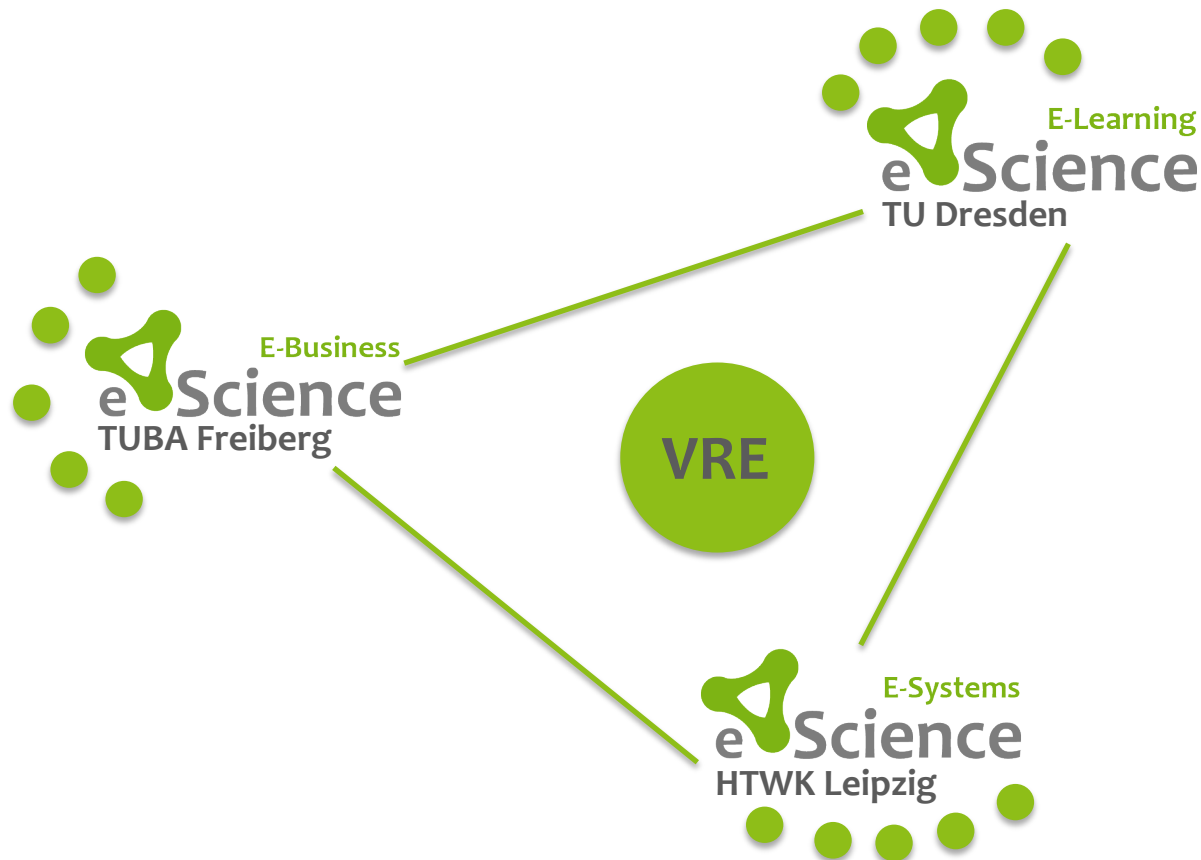
Virtual Research Environments:

## E-Science Interfaces

*„Virtual Research Environments and centers are the new technical and institutional interfaces of a changing topology of the science. Therefore, their design and the reflection of these processes are of central importance, since they are influencing the institutional constitution and the production of knowledge significantly.“ (Palfner 2010, 2)*

Virtual Research Environments:

eScience – Network Saxony (<http://www.escience-sachsen.de>)



## Conclusion

Fundamental changes in knowledge are taking place

- Semantic Web, Citizen Science and VREs will transform the core structures of academic work and thus probably also the principles and conventions of the understanding and management of knowledge
- Scientists will have to accept that doing e-science is not possible without changing traditional scientific roles and concepts



**»Wissen schafft Brücken.«**