WWW@CERN
its creation - its success - its lessons
- an example of innovation -

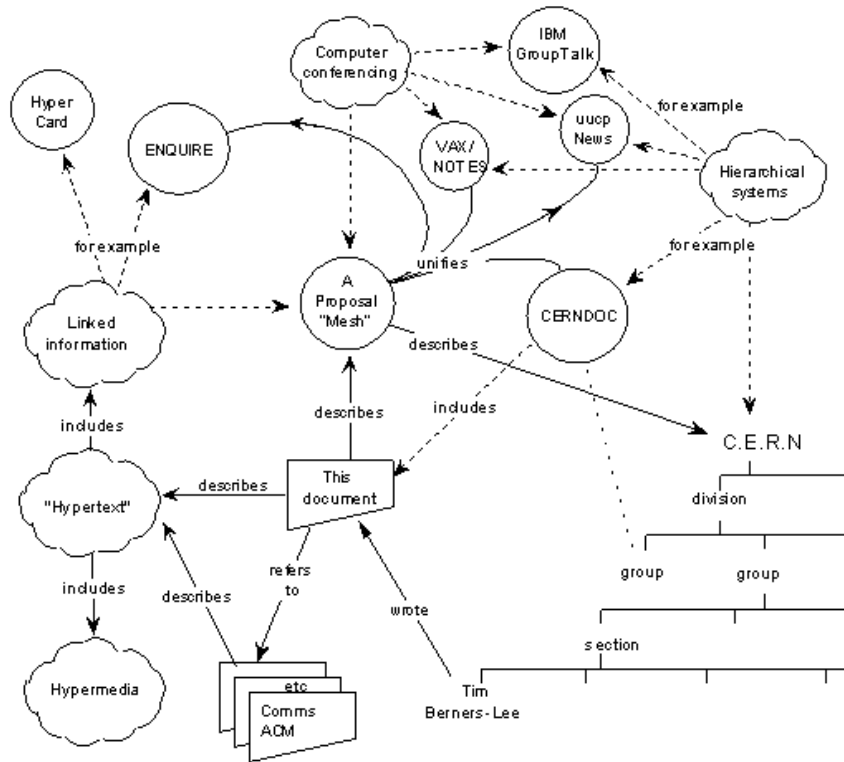**Ben Segal / CERN, Geneva**

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CERN: HST2011, 19 July, 2011

"Vague but exciting"

(reaction of Mike Sendall to the 1st proposal by Tim Berners-Lee, March 1989)

One man's dream…

"People just need to agree on a few simple things…"

Tim Berners-Lee to present speaker - 1989

What is WWW?

"HTML": Hypertext Markup Language
"HTTP" : Hypertext Transport Protocol
"URL" : Uniform Resource Locator
plus a CLIENT ("Browser") and a SERVER.

Entirely developed and programmed by

Tim Berners-Lee

(prototyped from September to December, 1991)

Background

Tim Berners-Lee had:

vision & perseverance

and also…

fine implementation skills for

design - choice of tools - programming

… but he was not in an ideal place! …

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Inside CERN : 1980-90

The Political Order:

- **Physics**
- **Accelerators**
- ***THE REST (…… Computing)***

Order in Computing:

- **Big mainframes (IBM, etc)**
- **Big peripherals (Tape robots, etc)**
- ***THE REST (…… Networking)***

Order in Networking:

- **External (X.25, DECnet, SNA)**
- **Internal (CERNET, Ethernet)**

===> ***(Internet + Distributed Computing)*** <===

So what else was needed?

- **his manager's tolerance and interest**
- **CERN spirit: "hands-on" plus pragmatism**
- **Internet technology: just accepted at CERN**
- **Open Source movement gaining strength**
- **the NexT machine and NextStep OS**
- **"underground" spirit of the project**
- **"just enough" space to work in…**
- **the "KISS" principle: Keep It Simple, Stupid…**

.. plus some lucky accidents ..

- **BS had coached TBL for his official CERN project (RPC), noticed his talents and helped him to get support and equipment (including two NexT machines).**

- **BS knew a French student (J-F Groff) was under-used and helped to arrange his transfer to work with TBL.**

- **TBL's manager (MS) knew Robert Cailliau was interested in hypertext and Open Source, so encouraged him to help TBL.**

- **The Open Source community contributed a lot of effort to the project after TBL published it on the Internet in August 1991.**

- **Commercial applications began to be allowed on the Internet after the US Congress changed the law (1991).**

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Summary

WWW was "accidentally" created at CERN:

from within its ***weakest*** part
and using ***"underground"*** resources,

but in fact its "weakness" helped, because:

it had to be kept simple

and:

it had to use outside resources

(thus spreading it faster)

So what are the lessons?

- **Try to reveal innovative talent: use contests, brainstorming sessions, white-board areas …**

- **Encourage open interaction with outside people**

- **Make "just enough" space for test projects**

- **Allow personal research time (20% at Google)**

- **Be humble - Black Swans are not planned!**

Black Swans…

"History does not crawl, it jumps…"

Nassim Nicolas Taleb, 2007
"Black Swan: *The Impact of the Highly Improbable*"

The future

after …

WWW, Google, Facebook, YouTube, Wikileaks…

… what's next?

… we can only prepare the ground …

Credits

To two managers with vision and political skill, who knew how to make space for innovation in a conservative environment:

Mike Sendall

Les Robertson