Grid-Interop™

Open Source
and the
Smart Grid
A Tail of Possibilities

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People Power Company

#GridInterop

Grid-Interop 2011

Title: Open Source and the Smart Grid.

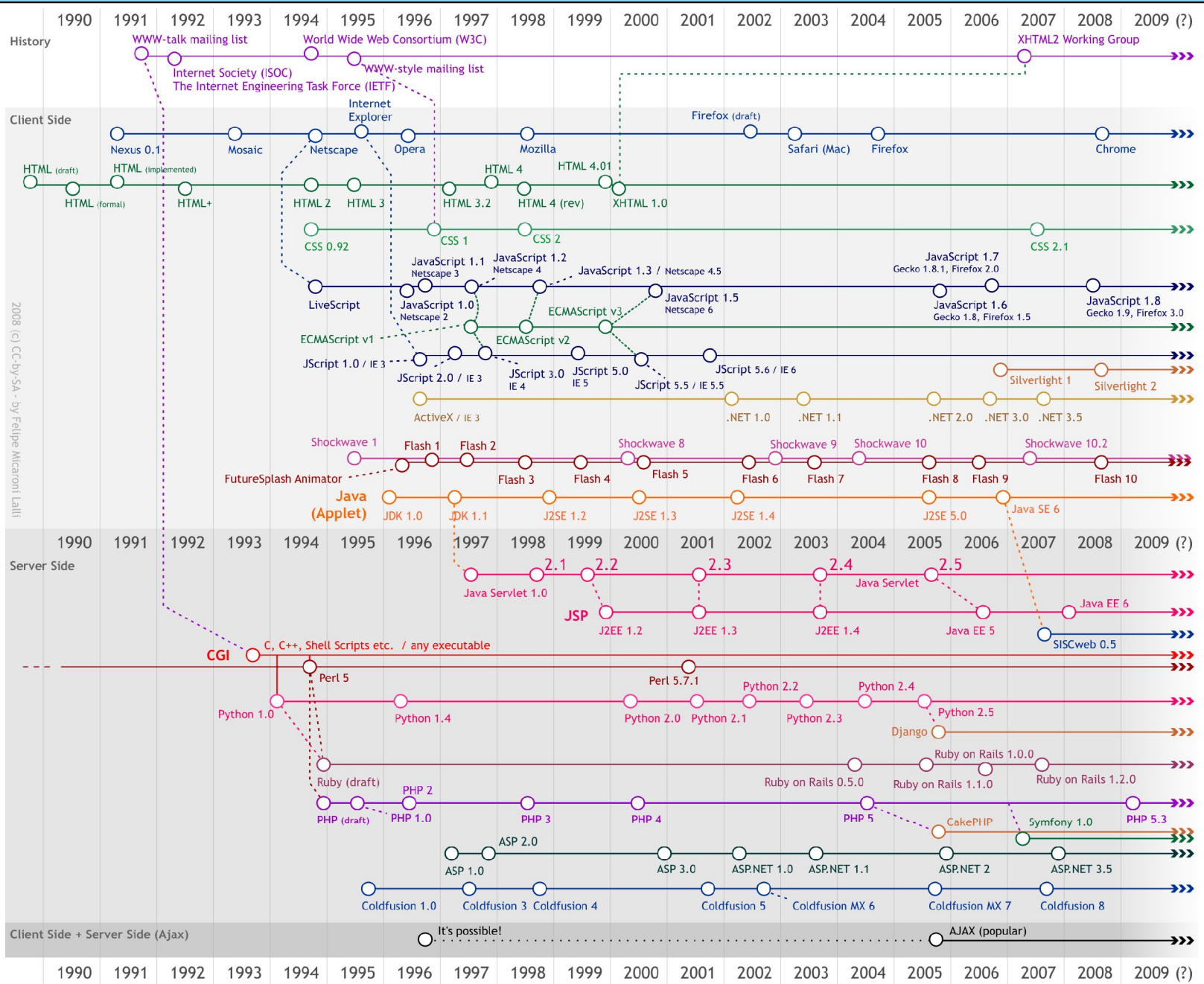
Abstract: Open Source initiatives have created platforms for innovation in numerous domains. The global internet is the best example of this, but infrastructure elements as diverse as Health Services Delivery to Voice Communications to Community Education have all benefited from the development of Open Source, Publicly Licensed information technologies.

The Smart Grid infrastructure likewise will benefit from numerous open source implementations of the body of open standards being cataloged by the SGIP. This paper surveys the current open source efforts and how they are being used within the deployments today as well as articulating a vision for "Utility Grade" open source platforms that provide end-2-end operational stacks for global energy infrastructure.

History of the Web

The Web

- 1990
- 2009

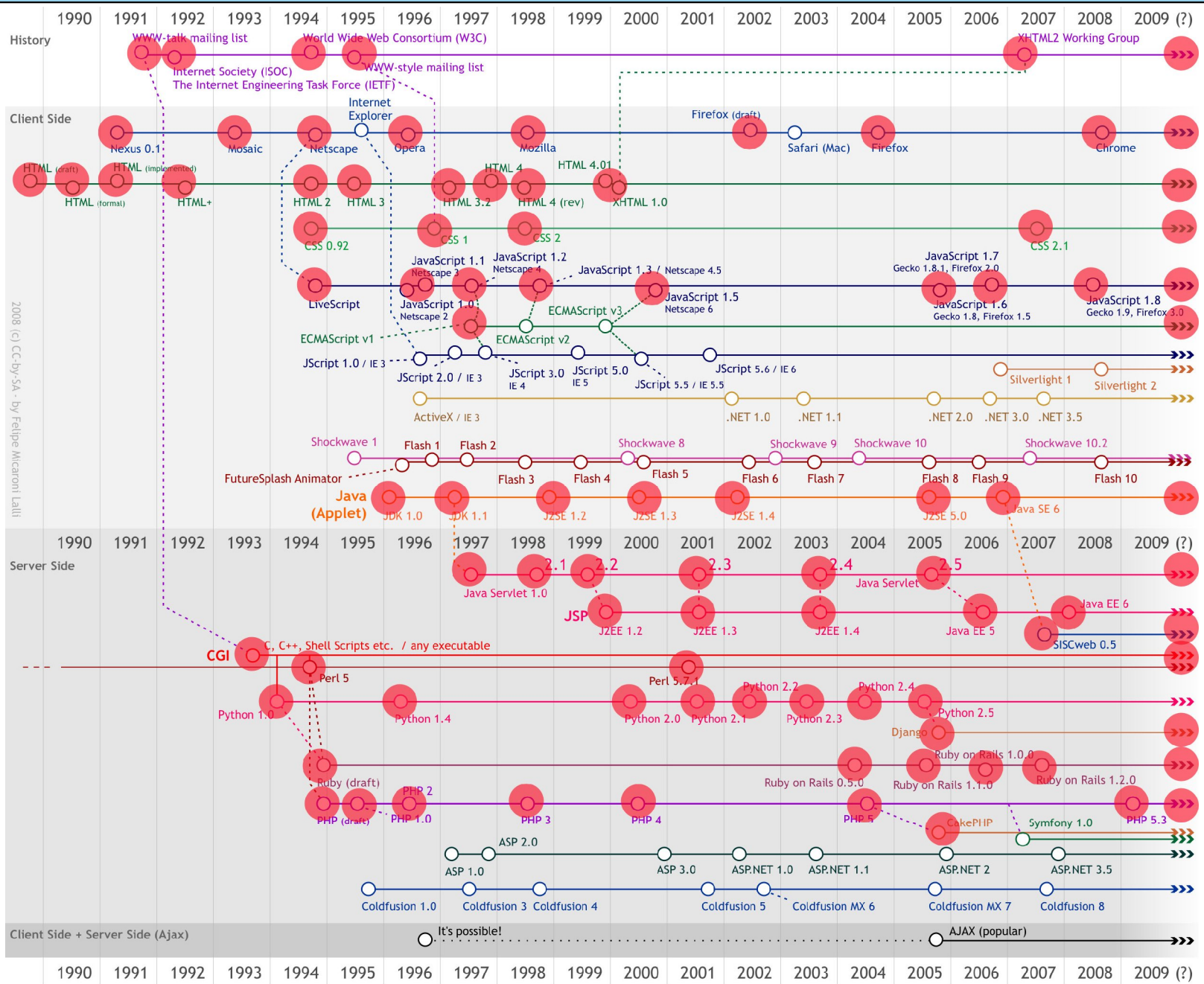


Led by Open Source

The Web

- 1990
- 2009

Open Source Public License

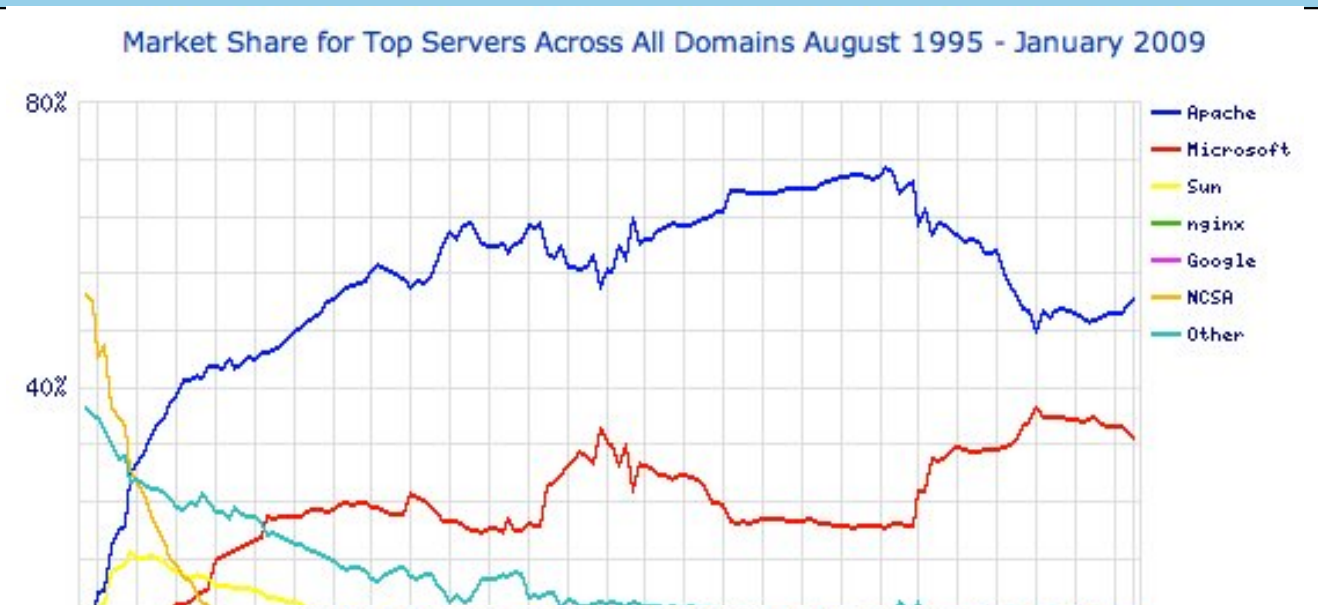


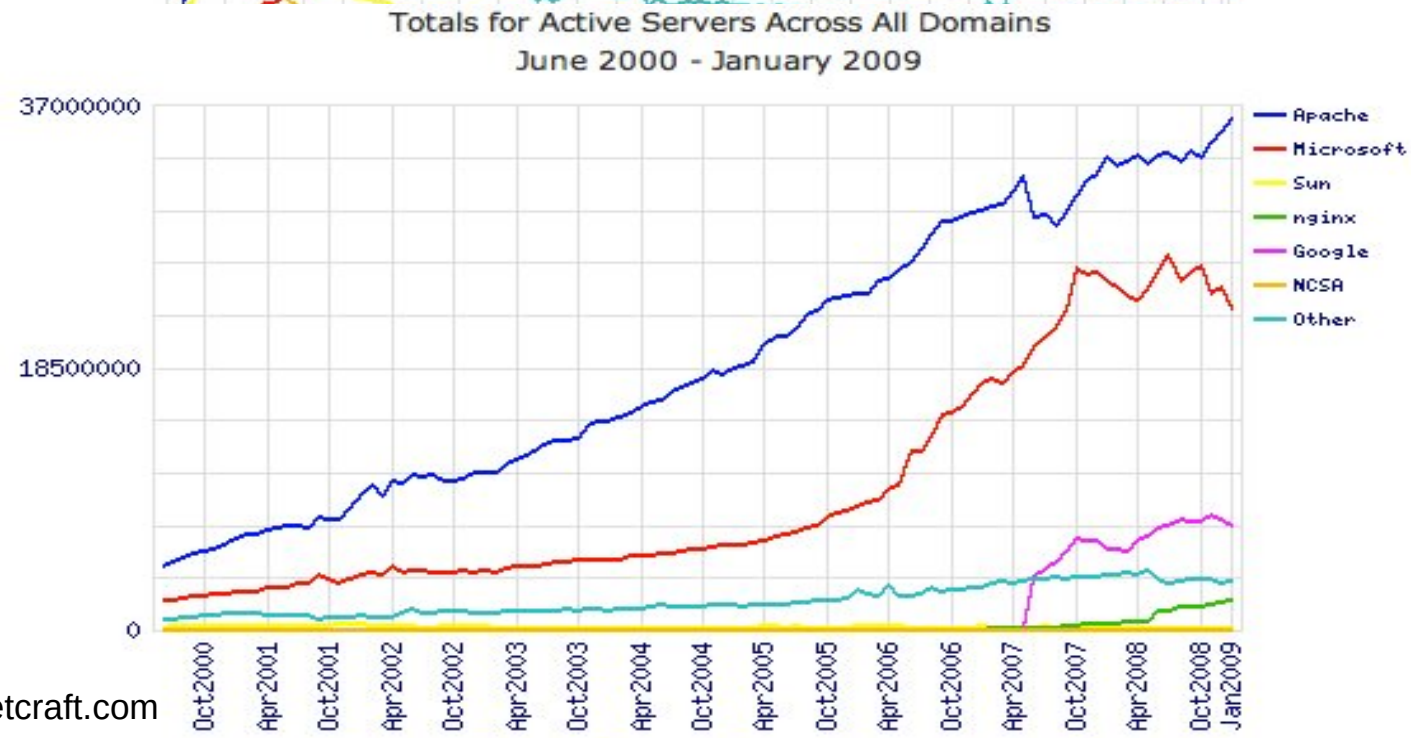
WWW Servers

- 1995
- 2009

Apache (blue)

Microsoft (red)



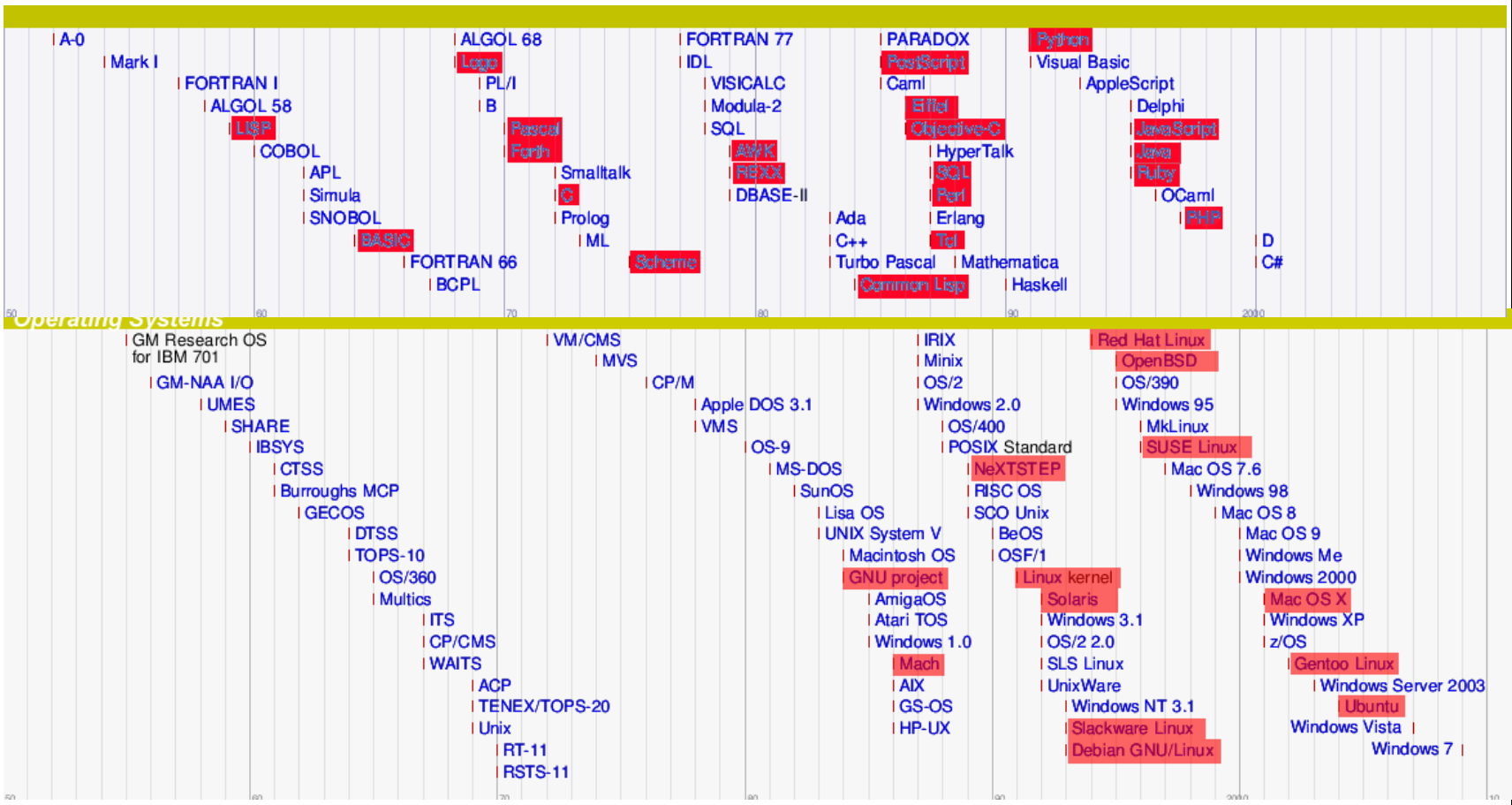


Source: Netcraft.com

Open Source Impact

Languages

Operating Systems



The Internet

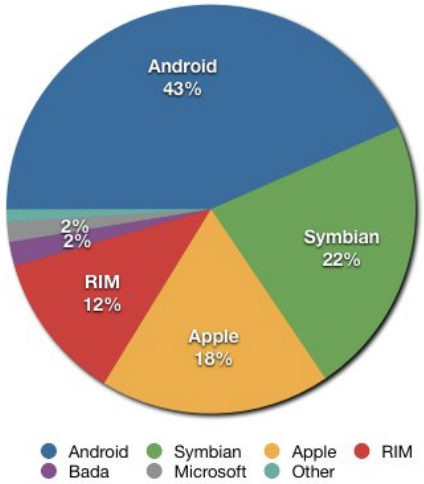
Where there exist open, available implementations of almost

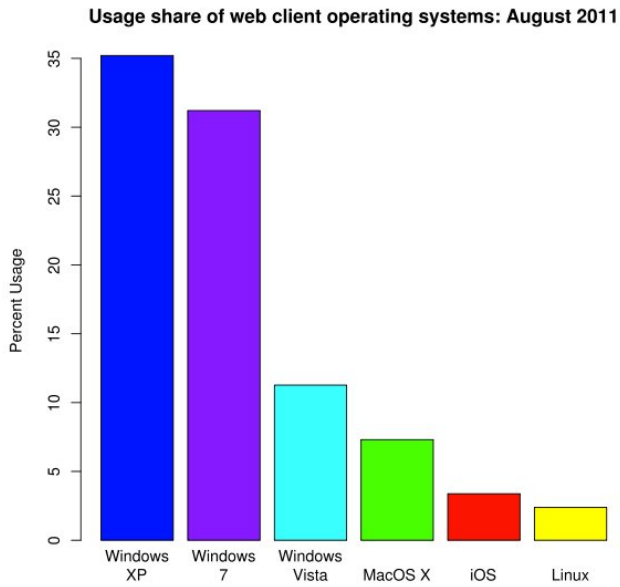
All Things →→→ The **Open** Internet of Things

In the Market Place

Platforms

- Mobile: 2010
- Desktop: 2009
- Super Computer
  - 1994-2010

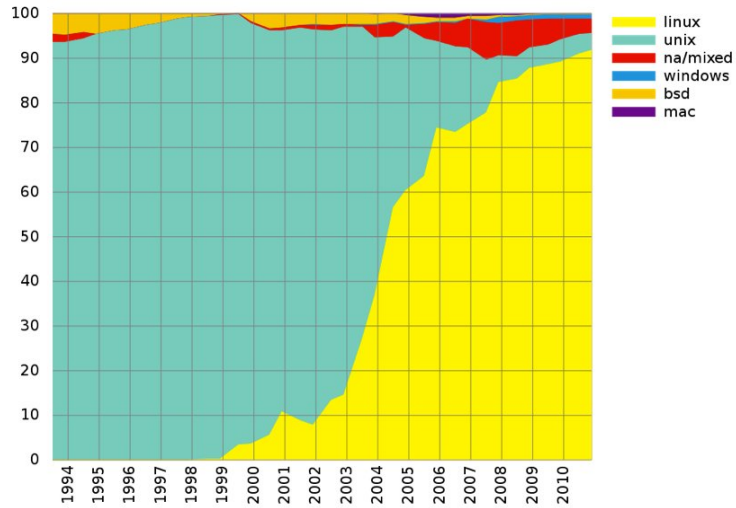




Open Source is our

Platform of choice

In all but the desktop!



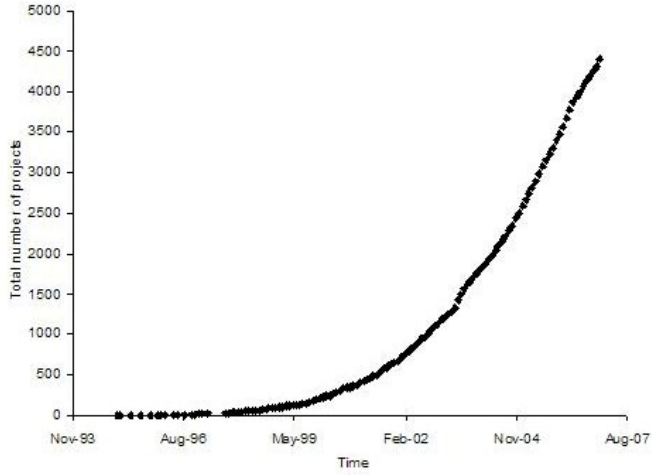
Source: wikipedia.org

Explosive Growth

The doubling rate of Open Source projects (and people) is decreasing steadily

- Should we have a “Stallman’s Law” of Open Source?

- 2001: 24 months
- 2004: 18 months
- 2008: 12 months
- 2010 : 8 months
- 2011: ??



Example:

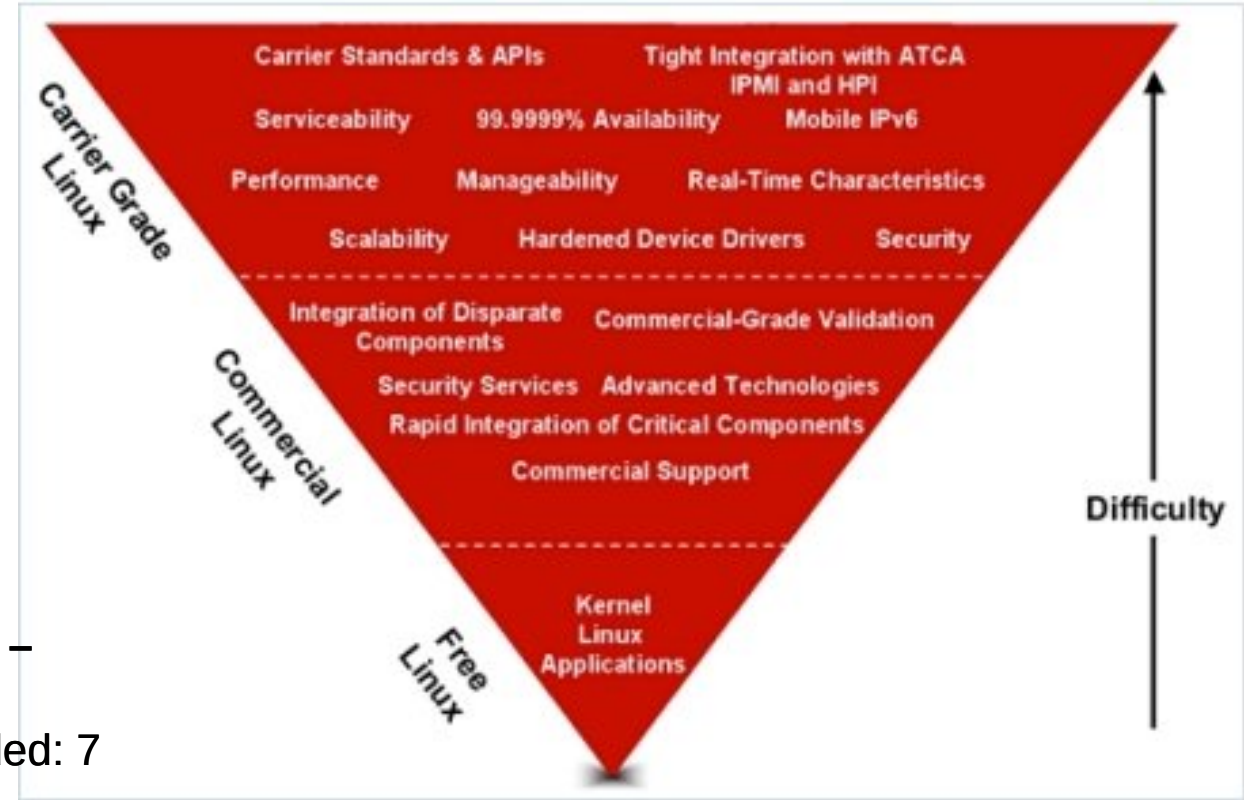
- GitHub was launched in April 2008.
- On 24 February 2009, GitHub announced that during the first year it accumulated 46,000 public repositories, 17,000 of them in the last month alone
- On July 2009 - Github announced they reached the 100,000 users mark.
- On 27 July 2009, Tom Preston-Werner announced a total of 135,000 repositories.
- July 2010 GitHub announced that it hosts 1 million repositories.
- April 2011, Github announced that it is hosting 2 million repositories.
- September 21, 2011 GitHub announced it had reached over 1 million users.

Linux: 20 Years

1991 - Linux Project Initiated:

‘’ Hello everybody out there using minix - I'm doing a (free) operating system (just a hobby, won't be big and professional like gnu) for 386(486) AT clones. This has been brewing since april, and is starting to get ready….”

– Linus Torvolds posting to minix list



2000- Open Source Development Labs –

OSDL had investment backers that included: 7 funders - Computer Associates, Fujitsu, Hitachi, HP, IBM, Intel Corporation, NEC, as well as a large collection of independent software vendors, end-user companies and educational institutions.

A steering committee composed of representatives from the investment backers directed OSDL, which also had a significant staff of its own.

2007 – Linux Foundation

The Linux Foundation serves as a neutral spokesperson for Linux and generates original content that advances the understanding of the Linux platform. It also fosters innovation by hosting collaboration events - solve pressing issues facing Linux.

Linux and an Example

The Global Linux Effort:

Some Stats:
•@3,621 lines were added; 1,550 lines were removed &1,425 lines were changed
•Every day for the past 2.5 years

•A small number of companies are responsible for a large number of changes.
•A "long tail" of companies made significant changes.

•There is a new Linux kernel release every 2.7 months.

•The top 10 individual developers have contributed almost 15
•the top 30 developers have contributed 30 %.
•70% of the kernel development is done by developers who are being paid by companies for their work.
•Individual development community has doubled in the last 3 years.

There are few developers who contribute a lot and
lots of developers which contribute a bit.

Passion Drives the Effort!

Company Name	# of Changes	% of Total
None	11,594	13.9%
Unknown	10,803	12.9%
Red Hat	9,351	11.2%
Novell	7,385	8.9%
IBM	6,952	8.3%
Intel	3,388	4.1%
Linux Foundation	2,160	2.6%
Consultant	2,055	2.5%
SGI	1,649	2.0%
MIPS Technologies	1,341	1.6%
Oracle	1,122	1.3%
MontaVista	1,010	1.2%
Google	965	1.1%
Linutronix	817	1.0%
HP	765	0.9%
NetApp	764	0.9%
SWsoft	762	0.9%
Renesas Technology	759	0.9%
Freescale	730	0.9%
Astaro	715	0.9%
Academia	656	0.8%
Cisco	442	0.5%
Simtec	437	0.5%
Linux Networx	434	0.5%
QLogic	398	0.5%
Fujitsu	389	0.5%
Broadcom	385	0.5%
Analog Devices	358	0.4%
Mandriva	329	0.4%
Mellanox	294	0.4%
Snapgear	285	0.3%

Application Domains

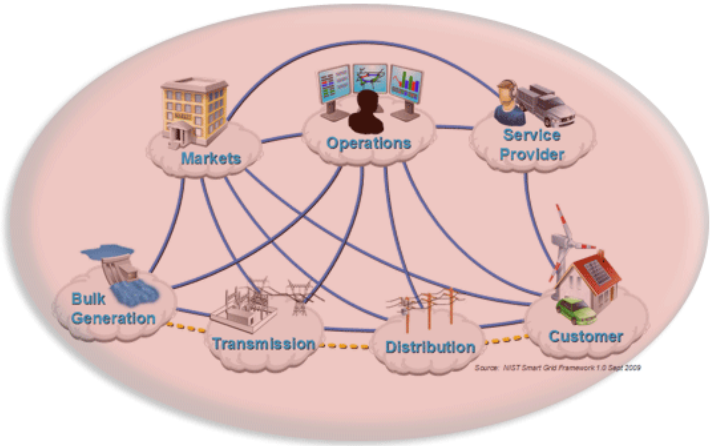
Apache Foundation – 100+ Projects used by 400 of the worlds Fortune 500 companies

Eclipse Foundation – 175+ Members – 1M+ Eclpise plug-ins – Dominant Development Platform

Health, Finance, Media … The list goes on.

Tracks from the 2011 O'Rielly Open Source Conference:

- Business
- Citizen Science
- Cloud Computing
- Community
- Education
- Emerging Languages
- Geek Lifestyle
- Government
- HealthcarJavascript & HTML5
- Mobile Platforms
- Open Data
- Open Hardware
- Operations & System Administration
- Perl
- PHP
- Programming
- Python
- Ruby
- Tools and Techniques



Energy is Missing

--- The Smart Grid is Missing!!!

And our goals of transformation and interoperability –

Our goals of innovation and sustainability –

Are all suffering without a platform to sustain, nurture, and enable our success!

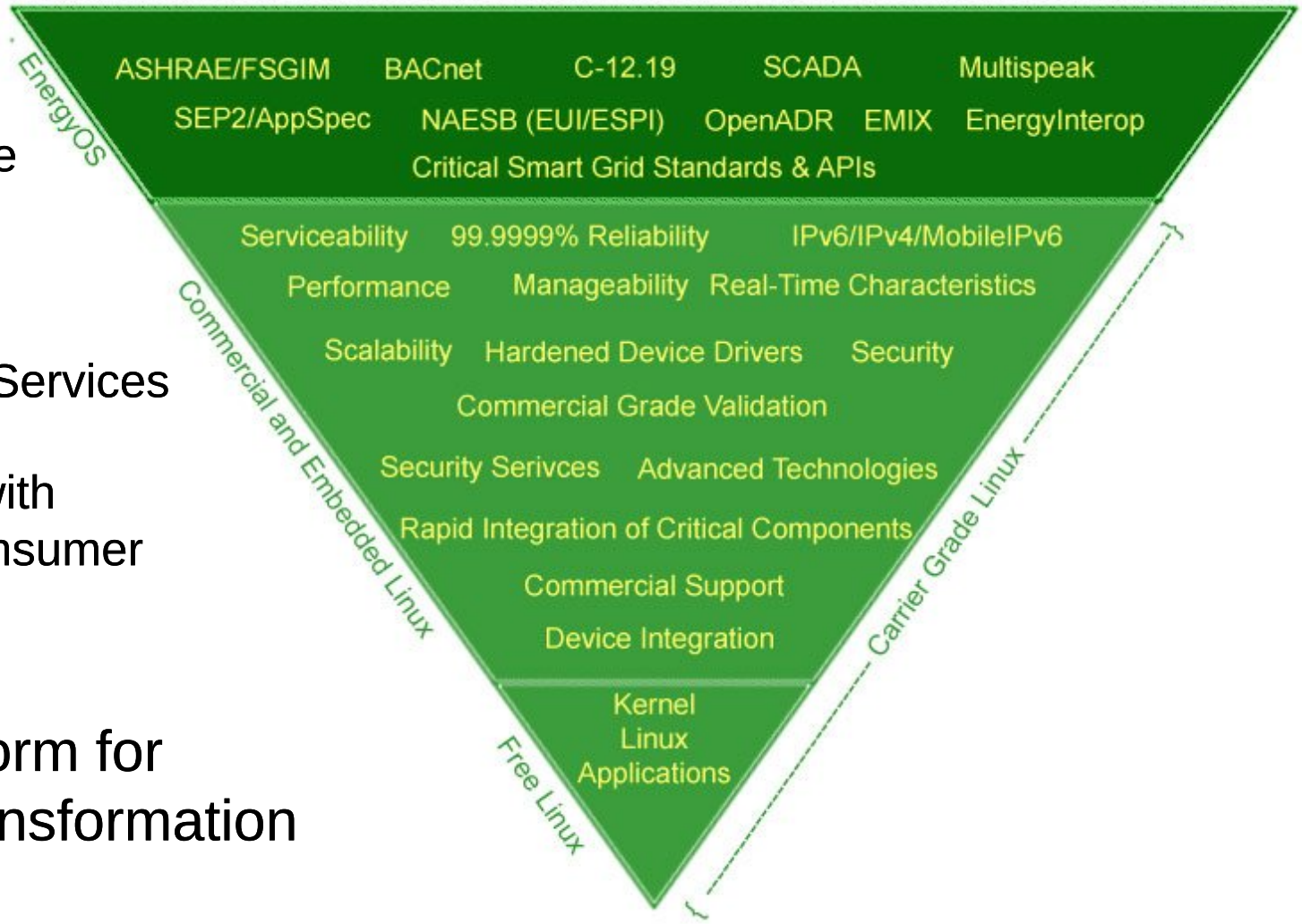
Open Source for the Smart Grid

Built on the Strength
Of those who have come
before us

Focused on Application
Level Interoperability & Services

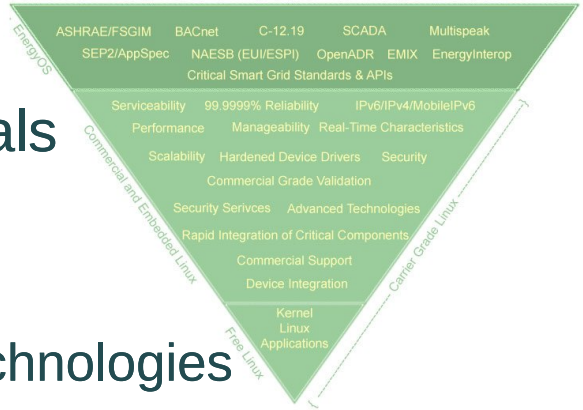
Through collaboration with
Industry, Policy, & Consumer
Stakeholders

Developing a Platform for
Innovation & Transformation



Leveraging the organization and evolution fostered by the SGIP

Our Vision: A Transformed Energy Infrastructure Built Through Collaborative Efforts Toward Common Goals



Our Mission: To provide a Platform for Innovation - Enabling The Realization and Rapid Evolution of Interoperable Technologies

www.energyos.org info@energyos.org

Board Of Advisors:

Dr. Wilfred Pinfold – Intel Corp.
Dr. Kurt Yeager - Galvin Energy Initiative
Dr. James Mater - QualityLogic
John Nunneley - Gridata/Sunspec/SGIP.GB
Stan Curtis - OpenCommons

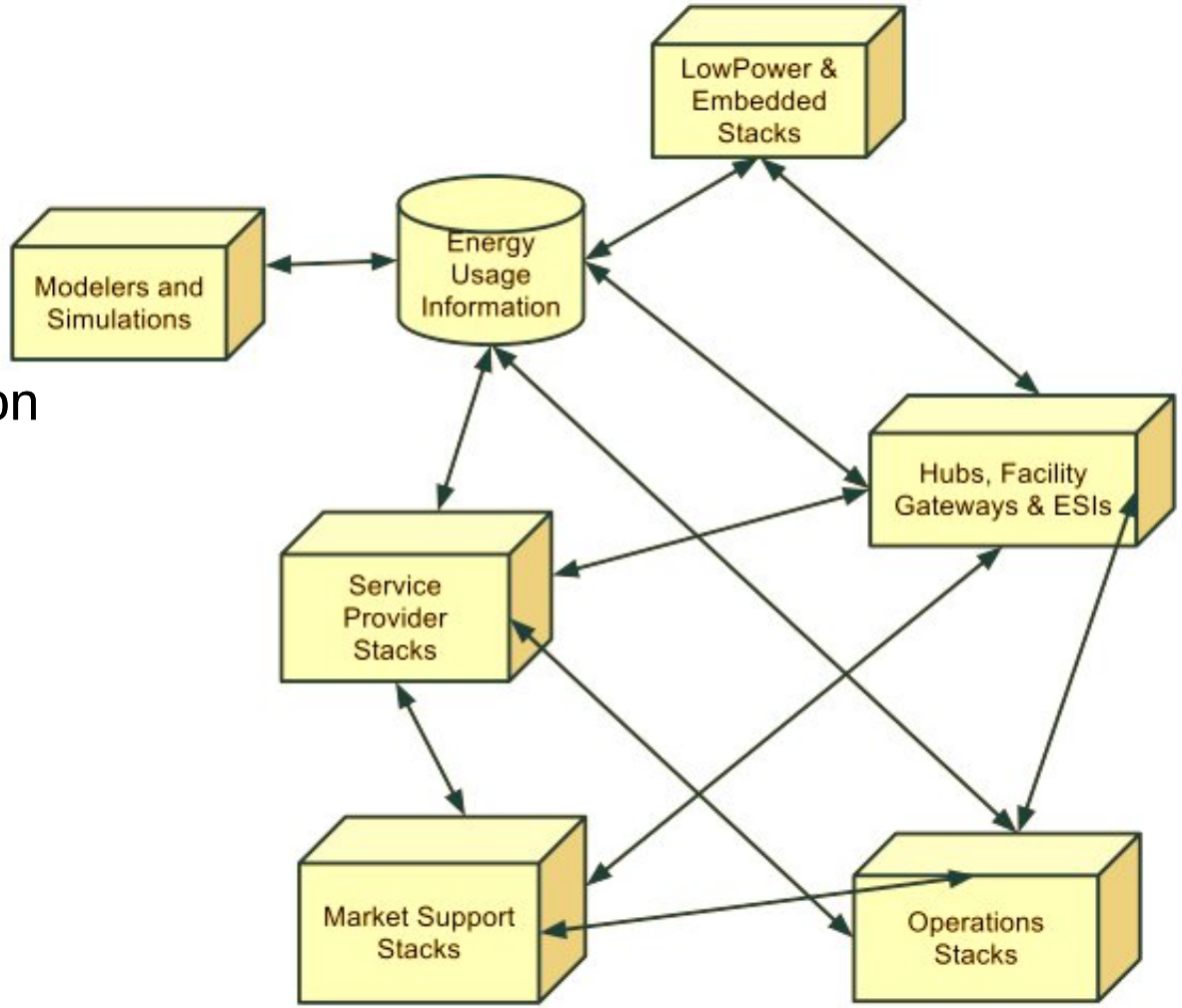
John Teeter - People Power Company
Irv Badr - IBM
Dr. Richard Soley – CEO, Object Management Group
Stuart Cohen – CEO Collaborative Software Initiative
Mike Coop - Think Smart Grid

Utility Grade Smart Grid Deployment Stacks

For Facilities
- Residential
- Commercial
- Industrial

For Transmission & Distribution
- Substation
- Management
- Facilities

For Service Providers
- Interoperability Libraries
- Program modules
- Business Processes
- Distributed Energy Resources

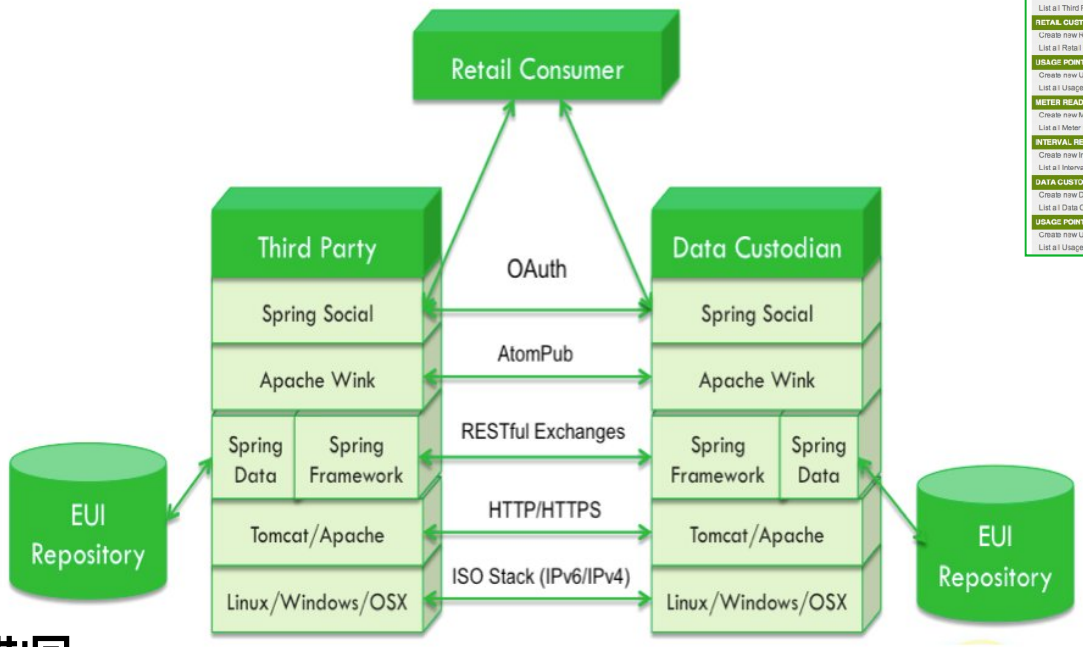


Top2Bottom - End2End - Smart Grid Platfroms for Innovation

OpenESPI · Open Source Energy Services Providers Interface

Standards: NAESB REQ-22 Energy Services Provider Interface (ESPI)
NAESB REC-18/19┼PAP10 Energy Usage Information Model (EUI)

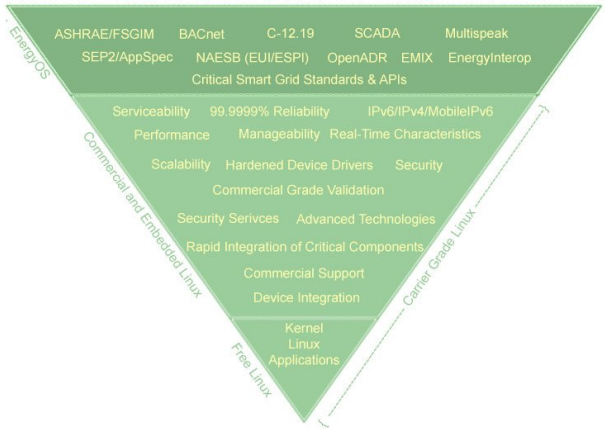
Project Page: http://www.openespi.org



Conformant

Till the Next Release!

EnergyOS.org



OpenESPI

OpenInterop

Join Us

Building the Future

Platform for Innovation

Thank You

John Teeter
Chief Scientist
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