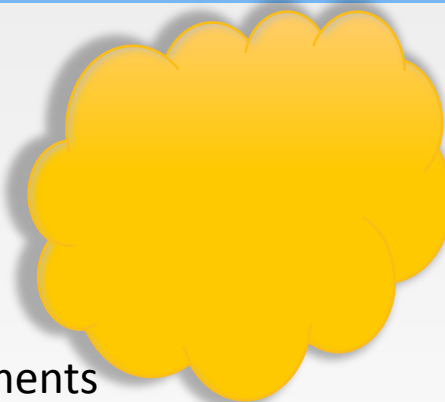# What the Web Brings to the Cloud

Jeff Jaffe, W3C CEO
Cloud World Forum, June 2013

Web and Cloud go hand in hand

- Open Web Platform impacts cloud requirements
  - *The platform for consumers*
  - *Business platform for industry*
  - *Interleave consumer and professional computing*
- Lessons from Web standardization
  - *Royalty-free standards and cohesive architectures are the keys to interoperability and a thriving ecosystem*
  - *The cloud can expand more rapidly than its current pace*

Characteristics of the Open Web Platform

- Web pages are more beautiful, interactive and intelligent

- HTML5 provides cross-browser interoperability and all browser vendors are supporting it; [now complete and stable](#)

- Video, rich multimedia, are first-class citizens

- Unprecedented device support: e-books, set-top box, automotive

- Web of Apps: full application development environment

- Social networking

- **Is the most interoperable platform in the industry**

Growing technology stack

Core	Hypertext Markup Language (HTML)
Video/Audio	HTML, Web Audio
Styles	Cascading Style Sheets (CSS)
Fonts	Web Open Font Format (WOFF)
Protocols	Hypertext Transfer Protocol (HTTP), WebRTC
Dynamic	Javascript (ES), Web Application Programming Interfaces (WebAPIs)
Graphics	Scalable Vector Graphics (SVG), 2D Canvas API
Real Time	WebRTC
Device access	WebAPIs: Geolocation, Multi-touch, etc.
Performance	WebAPIs: Navigation timing, Page visibility, Timing control

Early Majority has Embraced OWP

- [Gartner](#): "[More] than 50 percent of mobile apps deployed by 2016 will be hybrid."

- [ABI Research](#): "2.1 Billion HTML5 Browsers on Mobile Devices by 2016"

- [Kendo UI](#): "90 percent of more than 5,000 app developers and IT decision makers saying they will develop apps using HTML5 in 2013, and only 15 percent preferring a native-only approach."

Rich ecosystem surrounds the standards

- Implementer support
  - Tests for interop
  - Performance tools

- Developer community
  - Libraries, frameworks
  - Documentation
  - Tools
  - Education and training

WebPlatform.org

The result is industry transformation: Publishing example

20% of all US Newspapers are digital

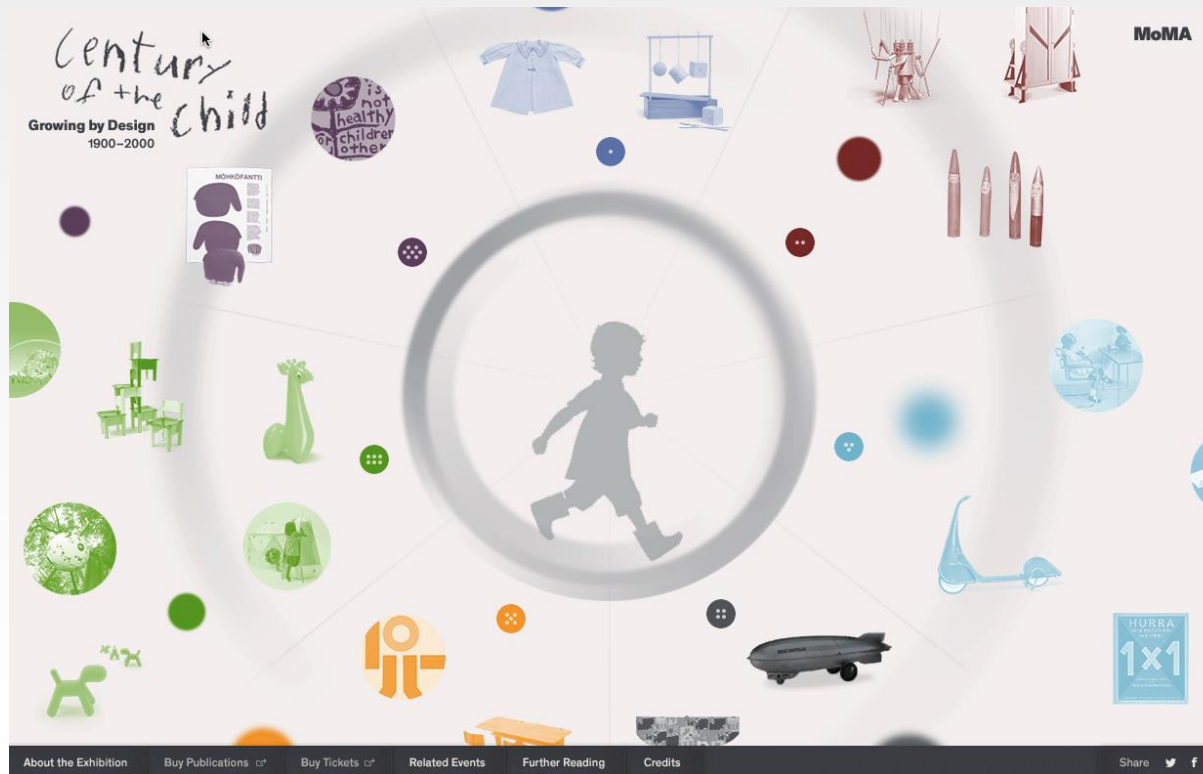"After 79 years in print, Newsweek goes digital only"

Google Ad Revenue Now More Than U.S. Print Publications Combined

E-Books See Triple Digit Growth As Paper Book Sales Dive

Pew: Survey Finds Rising Reliance on Libraries as a Gateway to the Web

Open Web Platform Demo

OWP gives mobile device independence

Go mobile now with the Salesforce Platform—and don't get left behind by the mobile revolution.

The Salesforce Platform has more than 14 years of cloud experience, and already powers 3 million apps for more than 100,000 companies. New Mobile Services deliver everything you need to quickly build mobile apps for customers and employees. Unlock your customer and back office data, and run on any device.

Infrastructure included: Scalability is built-in

Easy development for business analysts and developers: Support for clicks, code, and common languages

Large developer ecosystem: 1+ million strong
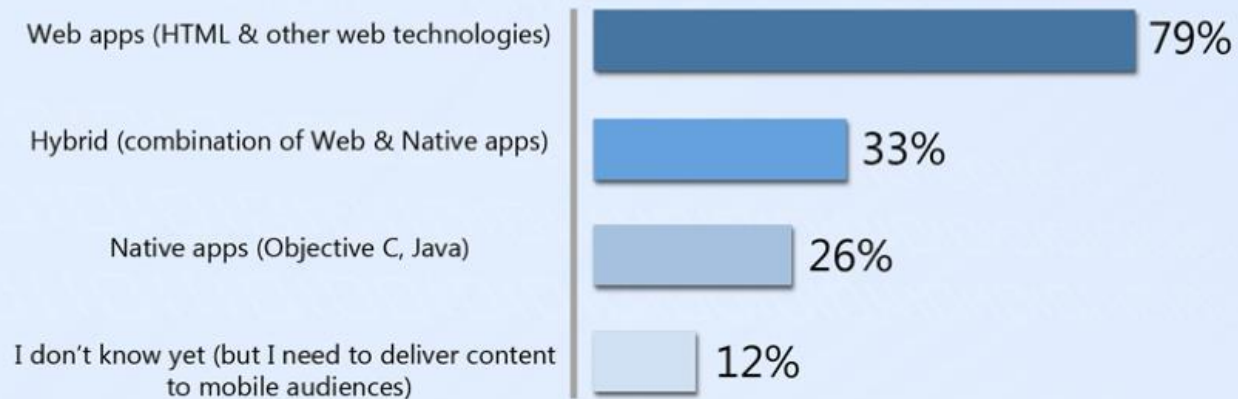
Salesforce Mobile SDK: Use familiar REST APIs and JavaScript packages

HTML 5, HYBRID, NATIVE

IDENTITY & SECURITY

SOCIAL

DRAG & DROP DEV

DATABASE

FILES

DEVELOPER MOBILE PACKS

MOBILE SDK

Source: Salesforce.com

HTML5 momentum for mobile

How do you plan to deliver content and services to your mobile audience in 2013?

- Web apps (HTML & other web technologies) — 79%
- Hybrid (combination of Web & Native apps) — 33%
- Native apps (Objective C, Java) — 26%
- I don't know yet (but I need to deliver content to mobile audiences) — 12%

Base: 4,359 enterprise, SMB and independent developers worldwide
Source: Zend Technologies, Zend Developer Pulse™: Developers and App Economy 2013

Source: Zend Developer Pulse, Q2 2013

Entertainment broadens the platform

- Web and TV Interest Group
  - Streaming media
  - Captions
  - Content protection
  - Testing for consumer electronics
  - Recording and downloading
  - Stereoscopic 3D
  - Terminal capabilities

*"Globally, consumer Internet video traffic will be **69 percent of all consumer Internet traffic in 2017**, up from 57 percent in 2012."*

"In 2017, the gigabyte equivalent of all movies ever made will cross global IP networks every 3 minutes. Global IP networks will deliver 13.8 petabytes every 5 minutes in 2017."

Source of quotations: Cisco

Automotive, publishing broaden the platform

- Automotive Business Group
  - Safety
  - New UI paradigms
  - Vehicle APIs

- Digital publishing Interest Group
  - ePub based on Web standards
  - Pagination
  - High-end typography

Greater expectations

- Robustness and stability
  - Developing large-scale testing program, e.g. for consumer electronics

- Performance
  - User expectations higher due to native apps

- Interoperability
  - Phones, tablets, televisions, automobiles, ebooks, …

- Capability
  - APIs for access to device capabilities, distribution, monetization, etc.
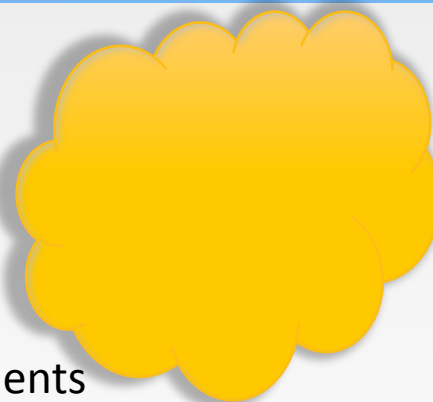
Implications for Cloud

- Cloud supports computing
  - Personal computing is the Web
    - Cloud is impacted by what the Web is; namely
      - Apps
      - Video
      - Books
      - Entertainment
      - Automotive Infotainment
  - And industry computing is also the Web…

Web and Cloud go hand in hand

- ✓ Open Web Platform impacts cloud requirements
  - ✓ *The platform for consumers*
  - ✓ *Business platform for industry*
  - ✓ *Interleave consumer and professional behavior*
- • Lessons from Web standardization
  - • *Royalty-free standards and cohesive architectures are the keys to interoperability and a thriving ecosystem*
  - • *The cloud can expand more rapidly than its current pace*

Key to success of Web community: Built on open standards

- Due process, cooperation, broad consensus, transparency

- Multi-stakeholder participation
  - *Address use cases for diverse use cases*
  - *For social issues such as privacy you need all players*
  - *Web is global; need international participation*

- Longevity
  - *Ensure humanity's knowledge remains available long into the future*
 - *Specifications are freely available*

Web and Cloud both large economic forces

- Web/Internet
  - [McKinsey 2011](): Almost **$8 trillion** exchange hands annually in e-commerce
    - … and the Web is much more than e-commerce

- Cloud
  - [Gartner](): "The public cloud services market is forecast to grow 19.6 percent in 2012 to total **$109 billion worldwide**."
  - [Forrester](): "The SaaS software market will increase 25 percent in 2013 **to $59 billion**, a 25 percent increase. In 2014, the market is expected to total $75 billion."
  - [McKinsey 2013](): "We estimate the total potential economic impact for cloud technology across sized applications could be $1.7 trillion to $6.2 trillion **in 2025…**"
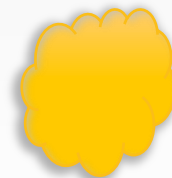
How did the Web reach that number?

- Universal architecture
- Designed for all devices
- Designed for all people

- Built on open standards
- Implementable Royalty-Free
- Strong open source community

Universal architecture

- World Wide Web is a global information space (URIs)

- Design is universal, including provisions for access control
  - *Universality makes **sharing easy** (when sharing is desired)*
  - *Don't satisfy social requirements by introducing interop barriers*

- Global linkability gives powerful network effects
  - ***Silos lower value***

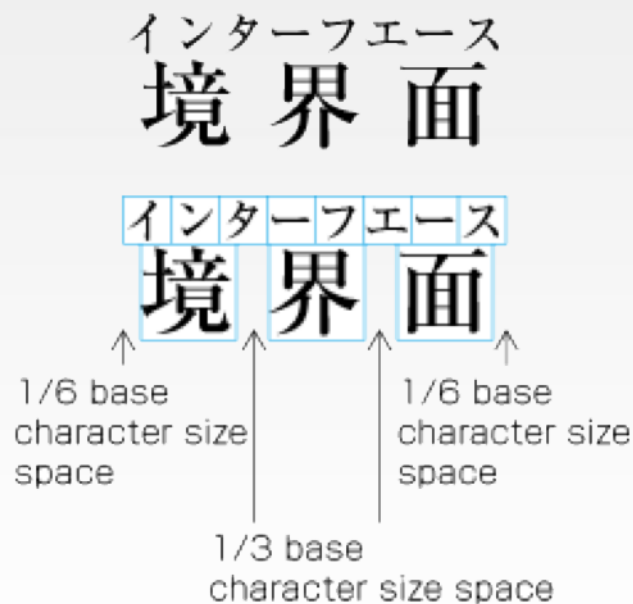- Global interoperability increases value to all

Designed for all devices

Designed for all people

- Accessibility

- Multilingual

インターフエース
境 界 面

インターフエース
境 界 面

↑ 1/6 base character size space

↑ 1/3 base character size space

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Diverse classes of Web software

- Browsers

- Authoring tools

- Servers

- (HTML) mail clients

- Converters
  - Word processor save as, …

- Search engines

- Mobile operating systems
  - Tizen, FirefoxOS, …

- Assistive technologies
  - Important for accessibility

- **Future software we don't know about!**

Implementable Royalty-Free

- Royalty-Free Web from the start
  - *From CERN's original declaration*
  - *W3C's RF Patent Policy*

- Royalty-Free standard platform levels playing field
  - *Infrastructure that the entire planet will use cannot be proprietary*

- Level playing field fosters innovation
  - *Supports all software models (closed, **open source**)*

Strong open source community

- Apache leading Web server

- Webkit used in numerous browsers

- Many others

Usage share of web servers

Apache	(black)
Microsoft	(red)
Google	(green)
nginx	(blue)
lighttpd	(cyan)
qq.com	(magenta)
Sun	(yellow)

Year
Source: Netcraft
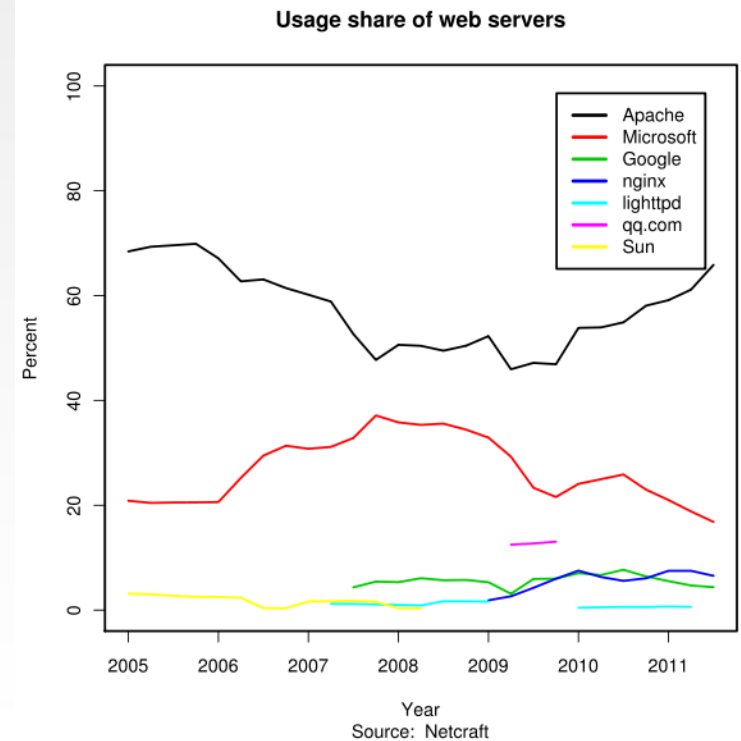
Factors holding back cloud adoption

What are your customers' biggest challenges/concerns about adopting cloud services? (top 10 challenges shown)

Challenge	Percentage
Loss of control	48%
Integration with existing architecture	41%
Data loss and privacy risks	39%
Not sure the promise of a cloud environment can be realized	28%
Implementation/transition/integration costs too high	28%
Risk of intellectual property theft	27%
Lack of standards between cloud providers (interoperability)	25%
Legal and regulatory compliance	22%
Transparency of operational controls and data	22%
Lack of visibility into future demand, associated costs	21%

Source: KPMG International's 2012 Global Cloud Providers Survey.

(n = 179)

"lack of standards between cloud providers (interoperability)"

Source: "Breaking through the cloud adoption barriers," KPMG, February 2013

What are we hearing about cloud standards?

- Not the right time
  - *Market too young*
  - *People haven't agreed what to standardize*
  - *Moving too fast*

- Not the right place
  - *Too many cloud standards organizations*

- Not necessary
  - *Open source projects are replacing standards*

Cohesive focus on Web standards in 5 years

- 1989: Web invented

- 1991: Web software available via FTP

- 1994: HTML standardization starts at IETF in September (through 1995)

- 1994: W3C launched

- 1996: CSS 1 Recommendation

- 1996: Portable Network Graphics (PNG) Recommendation

- 1997: HTML 3.2 Recommendation

Market too young for standardization?

- 1950s: Underlying concepts for cloud formulated

- 1960s-1990s: Time-sharing of resources

- 1990s: Web provides abstraction layer above hardware; VPN, ASPs

- 2006: Amazon Web Service

- 2008: Eucalyptus open source platform for private clouds

Source: Wikipedia

People haven't agreed what to standardize

Cloud services: market forecast and current players
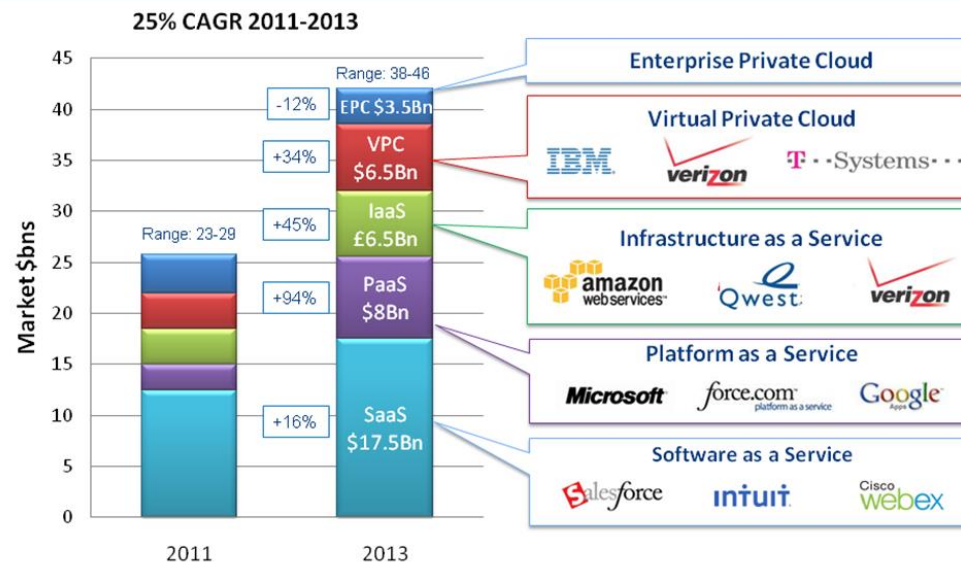
But the consequence is that silos are getting deeper

- IT innovation truly is continuous

- But that does not conflict with standardization
  - A stable base is required to facilitate the next level of innovation

- Solution
  - Welcome innovation
  - Stabilize technology at the right time
  - Agile process to build consensus, get implementation experience

You standardize a fast-moving market by also welcoming innovation

- W3C Approach
  - Working Groups
  - Workshops (targeting industry requirements)
  - Member Submissions (candidate technology)
  - Community Groups (free, open to all)
  - Business Groups (target industry requirements)
  - Collaboration with other organizations

[WEB AND AUTOMOTIVE]
Shift
into High Gear
on the Web
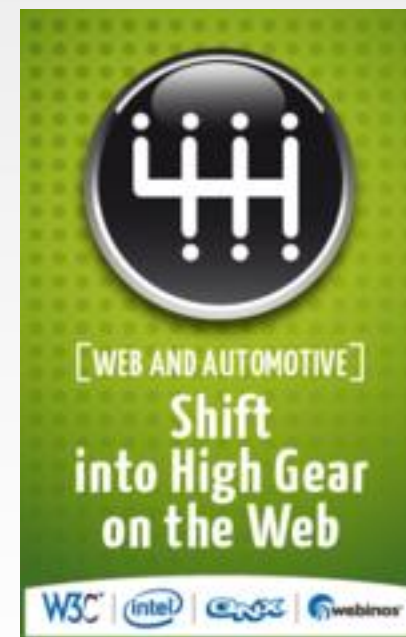
Community/Business Group Growth

	June 2011	June 2012	June 2013
Number of Groups	0	82	128
Number of Participants	0	>1280	>2850

Several CG specs now on Standards Track

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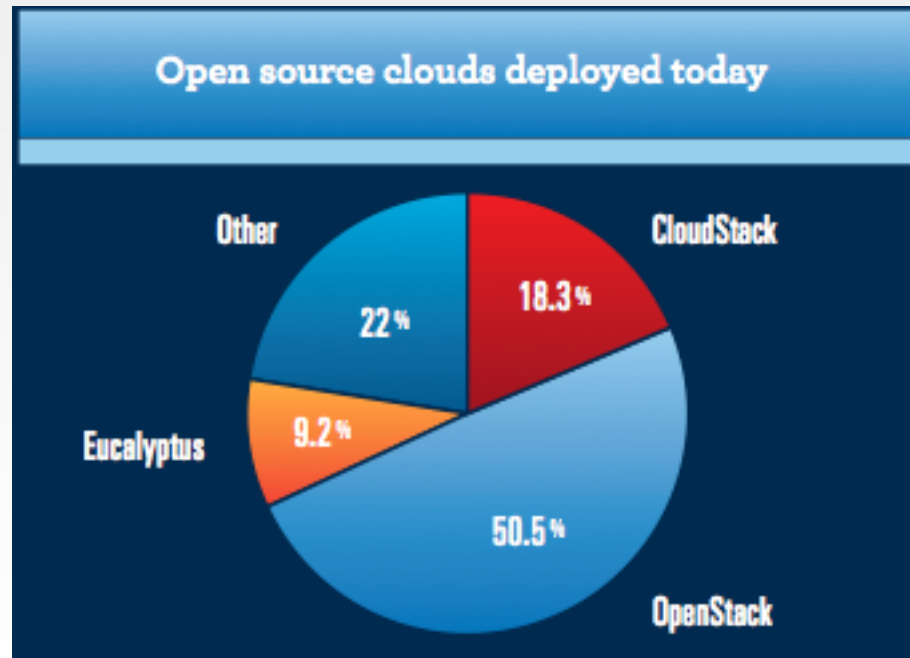
Not the right place: too many stds orgs

- DMTF

- ETSI

- GICTF

- ISO

- ITU

- NIST

- OGF

- OMG

- OCC

- OASIS

- SNIA

- CSA

- TOC

- ARTS

- TM Forum

- More at cloud-standards.org

Cloud community needs to fix this

Not necessary: open source replaces stds

Open source clouds deployed today

- Other 22%
- CloudStack 18.3%
- Eucalyptus 9.2%
- OpenStack 50.5%

Open Stack thriving

Fastest Growing Global Open Source Community

COMPANIES	COUNTRIES
189	100
INDIVIDUAL MEMBERS	TOP 10 COUNTRIES
9,000+	United States, China, India, Great Britain, Australia, France, Russia, Canada, Ireland, Germany

TOTAL DEVELOPERS	AVERAGE MONTHLY CONTRIBUTORS	CODE CONTRIBUTIONS
929	245	3,241

Source: State of the Stack, Randy Bias, April 2013

Market still seeking open standards

What drove you to make the decision to migrate to an open source cloud?

Source: "The State of the Open Source Cloud 2012", Zenoss, October 2012
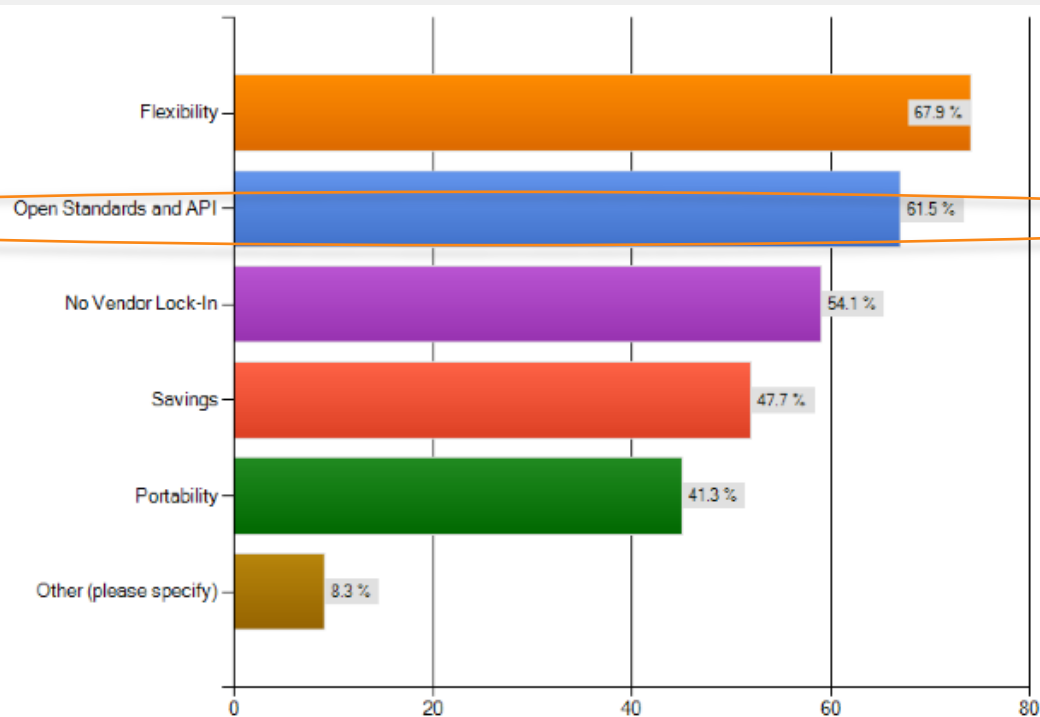
Does open source substitute for standards?

- [Gartner](): "Don't assume that "open source" equates to open standards, broad interoperability and freedom from commercial interests. In reality, OpenStack is dominated by vendor interests, where they want customers to adopt their own offerings, potentially to include proprietary lock-in. "

Popular open source can still fragment

SWOT: OpenStack

Strengths:
- De facto winner
- Incredible community
- Unstoppable velocity
- Clear innovation curve

Weaknesses:
- No benevolent dictator
- Lack of IaaS experience for many developers
- Interoperability will be difficult
  - Not impossible, *difficult*

Opportunities:
- Build an SQL92 base for cloud compute (see Threats)
- Public cloud compatibility as first order initiative
- vCloud private cloud compatibility as first order initiative

Threats:
- Splintering, fragmentation, and customization
- Forking or ivory tower thinking

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cloudscaling

Source: State of the Stack, Randy Bias, April 2013

Why might Open Source fragment?

- Vendors make different choices for different business goals

- Design choices based on devices supported

- Open source reduces barriers to entry
  - Which brings in more players and diversity
    - Which perversely creates more choices and fragmentation
      - Unless there is also a standard

What standards give you that OSS does not

- Consensus agreements

- Horizontal review (security, privacy, device independence, accessibility, internationalization)

- Clear patent licensing commitments

- Longevity

- Government recognition

- A rich ecosystem with interoperability testing, validation, documentation, training

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Call to action: How the Cloud can further thrive

- Consensus agreement on cohesive architecture(s)

- Royalty-Free open standards driven by small number of bodies

What this will enable

- Sharing
  - *Data portability (when desired)*
  - *Integration with existing services*

- Metrics
  - *Easier to determine compliance*
  - *Innovation around analytics*

- Path for innovation

- Trust
  - *Transparency*
  - *Competition for trust*

- Lower costs
  - *More competition*
  - *Interoperability through freely available published standards*

- Growth for the Cloud industry

Distinction by service, not silo

- Price

- Quality of service

- Additional capabilities

- Open standards compliance

The time has come

Royalty-Free Standards
For
Cohesive Cloud Architecture