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Unleashing Innovation Through Open Cloud Architecture

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CDL Taipei, IBM

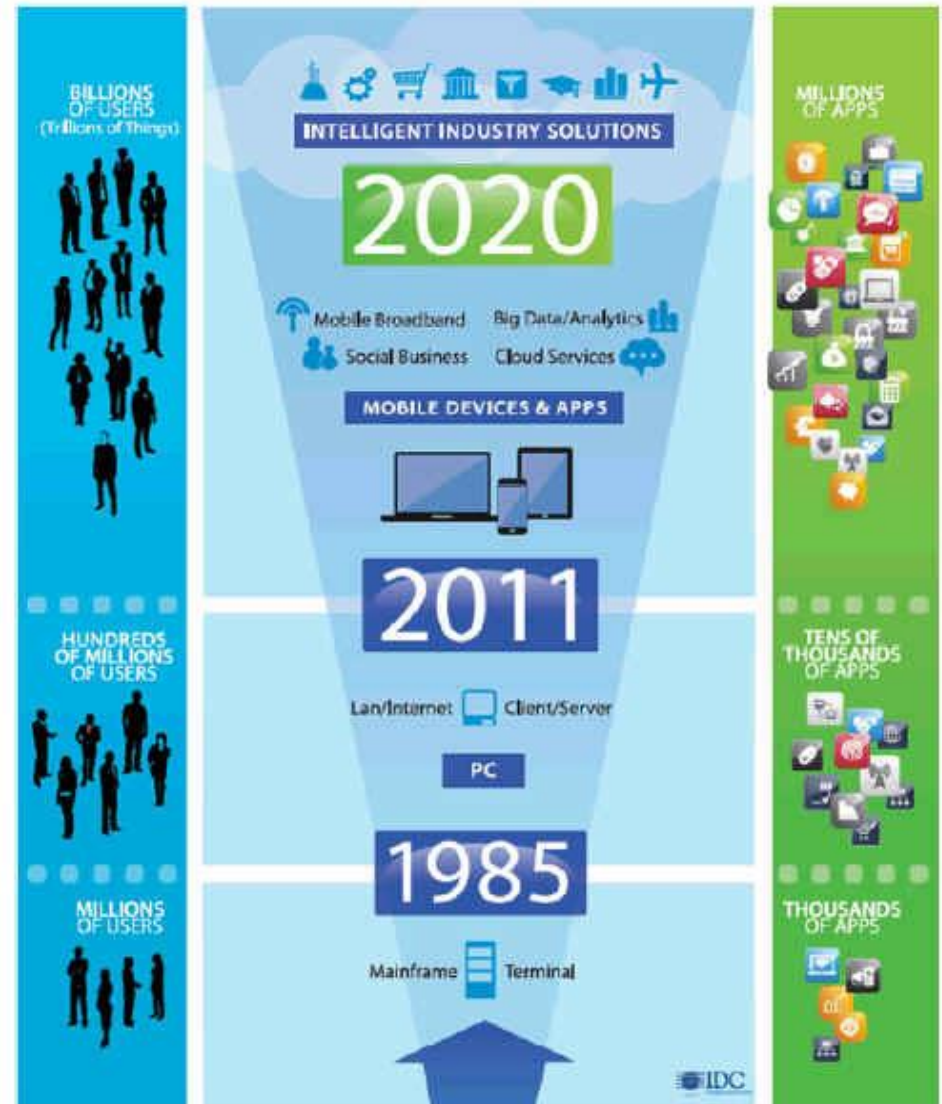
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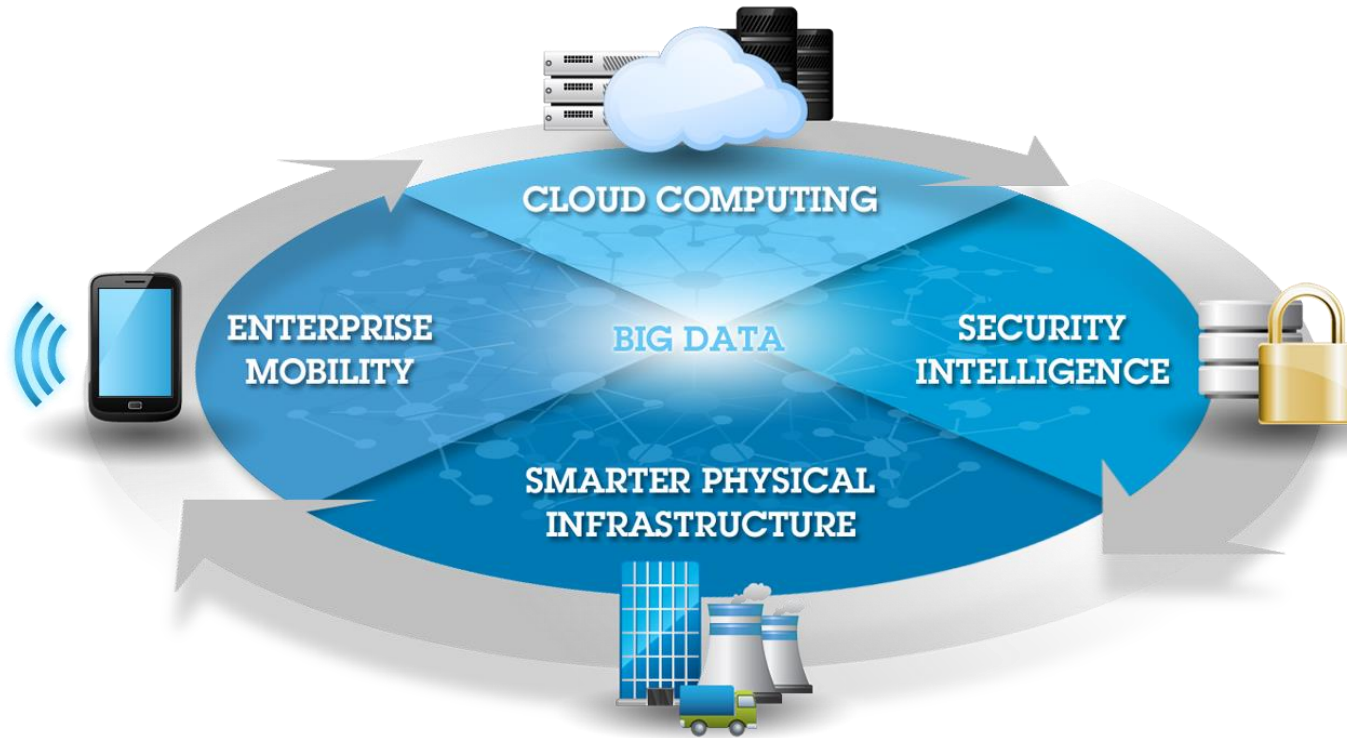
- Public IT cloud services spending reaches over \$40 billion in 2012 and almost \$100 billion in 2016, with a compound annual growth rate (CAGR) of 26.4%, five times the growth of the IT industry overall (IDC #236552, Aug. 2012)
- "The public cloud services market is forecast to grow 19.6% in 2012 to total \$109 billion worldwide. Infrastructure as a service (IaaS) is the fastest-growing segment of the public cloud services market and is expected to grow 45.4% in 2012," Gartner said.
- IBM estimated more than 1 million enterprise application users working in IBM cloud and analyzed more than \$100 billion in commerce transactions a year in the cloud environment.
- Etc.



Source: IDC, 2012



Business Challenges to Innovate



200 billion
physical assets
with IT intelligence

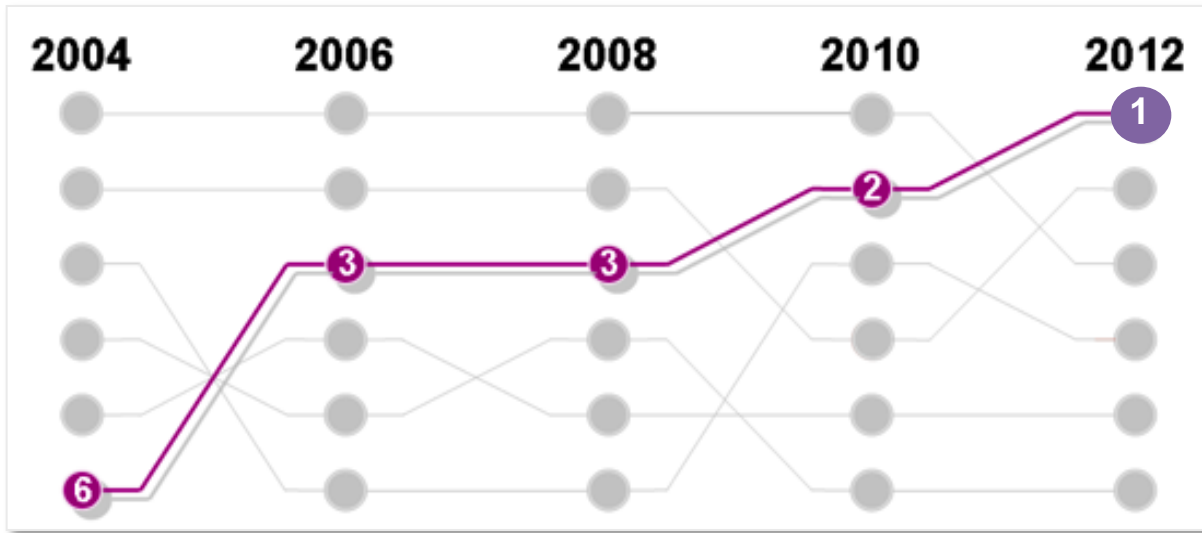
1 billion
consumers will have
smartphones

62%
of workloads will
be cloud-based

60,000
cyber attacks
every day



New Technology Plays A Critical Role



- **Technology factors**
- People skills
- Market factors
- Macro-economic factors
- Regulatory concerns
- Globalization



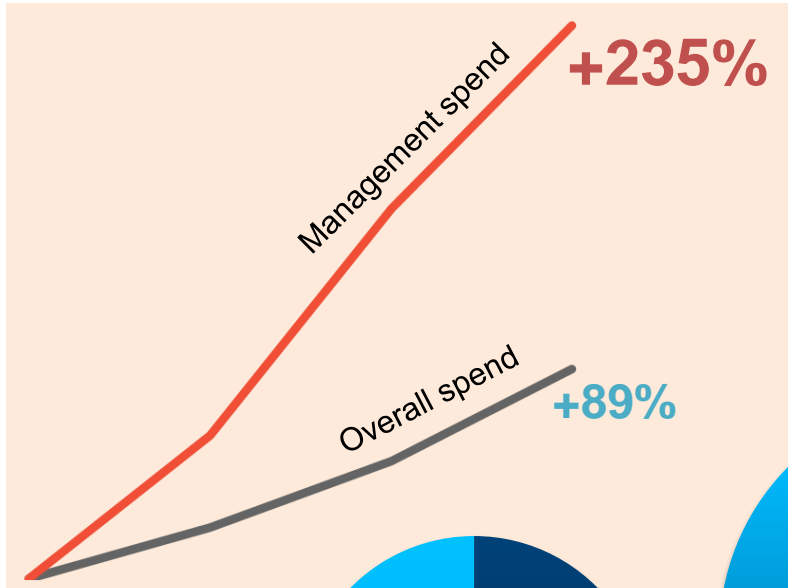
For the first time, CEOs identify technology as the most important external force impacting their organizations

Source: IBM CEO Study

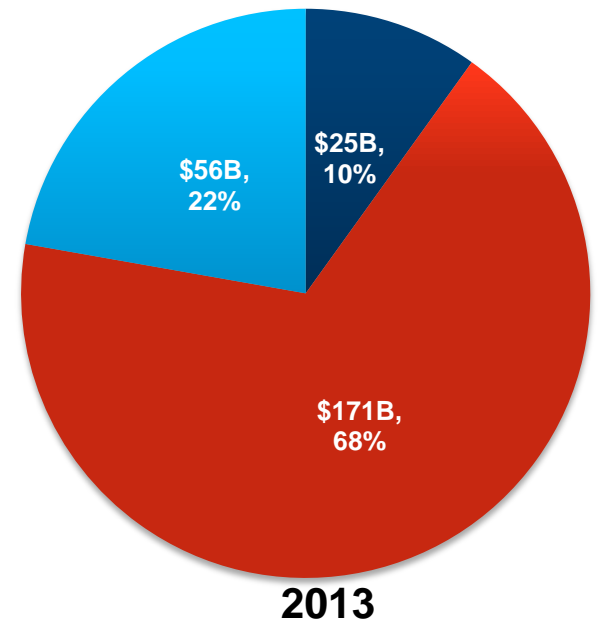
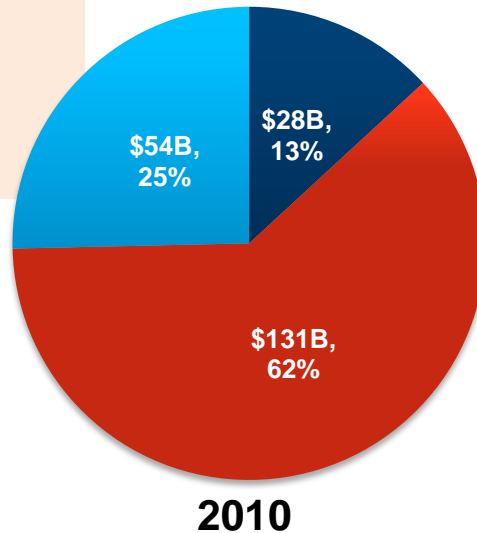
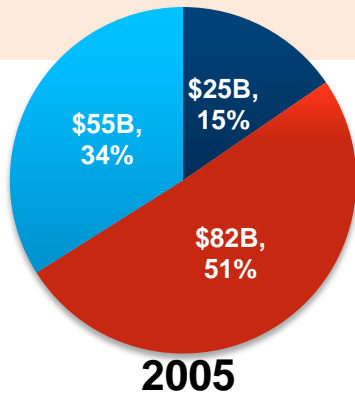
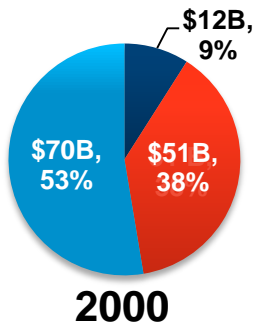
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CIO and IT Face Rapid Unsustainable Pressure



While overall spending grew 89% from \$133B to \$252B, management of infrastructure grew at 235% and now represents **close to 70% of total**



Management Server Power and cooling

Source: IDC



Leveraging Cloud to Balance Optimization with Innovation



Drives need for continuous IT
OPTIMIZATION

OPTIMIZATION

INNOVATION



Fuels investments in
INNOVATION



Organization Creates Partnerships to Apply Technology



The Economics of Computing are Changing

Lower costs and efficiency of systems of record

Transformation and innovation in new modes of engagement

Rethink IT

- React with agility
- Speed innovation
- Improve economics

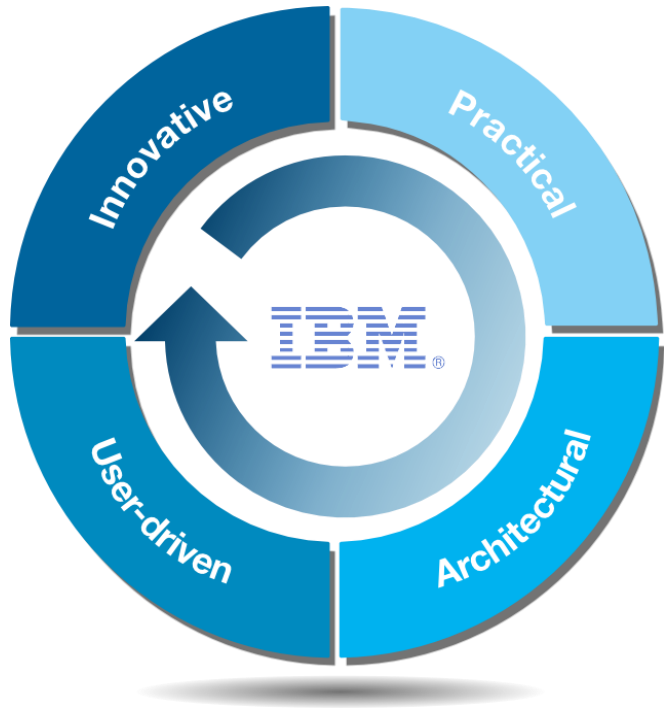
Reinvent business

- Improve operating dexterity
- Reinvent client relationships
- Provide new profit opportunity

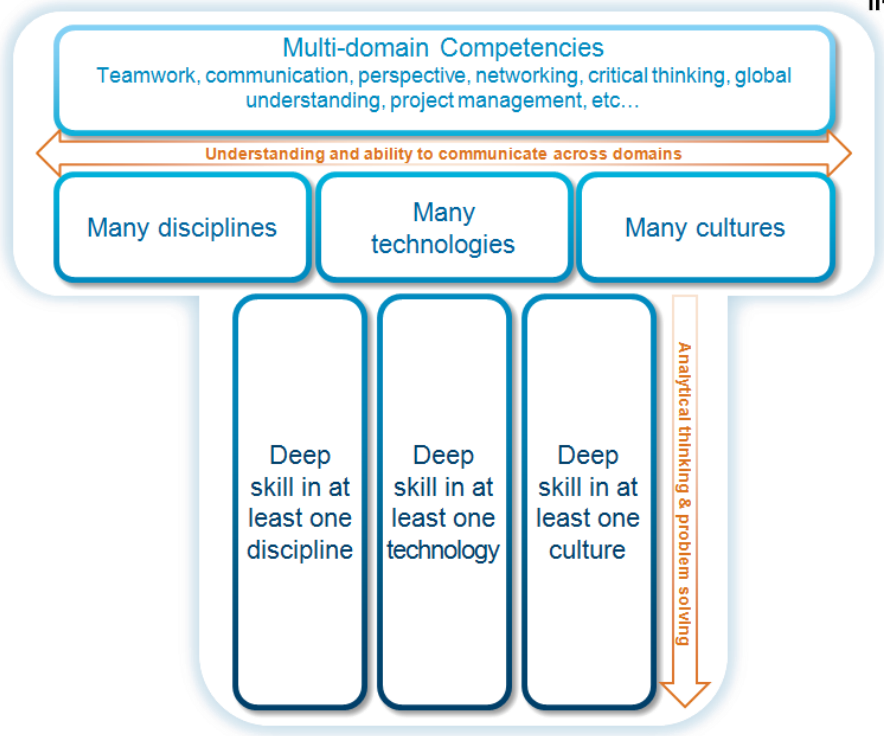




Innovation Requires A Smarter Approach



Practical standards & open source driven by user involvement

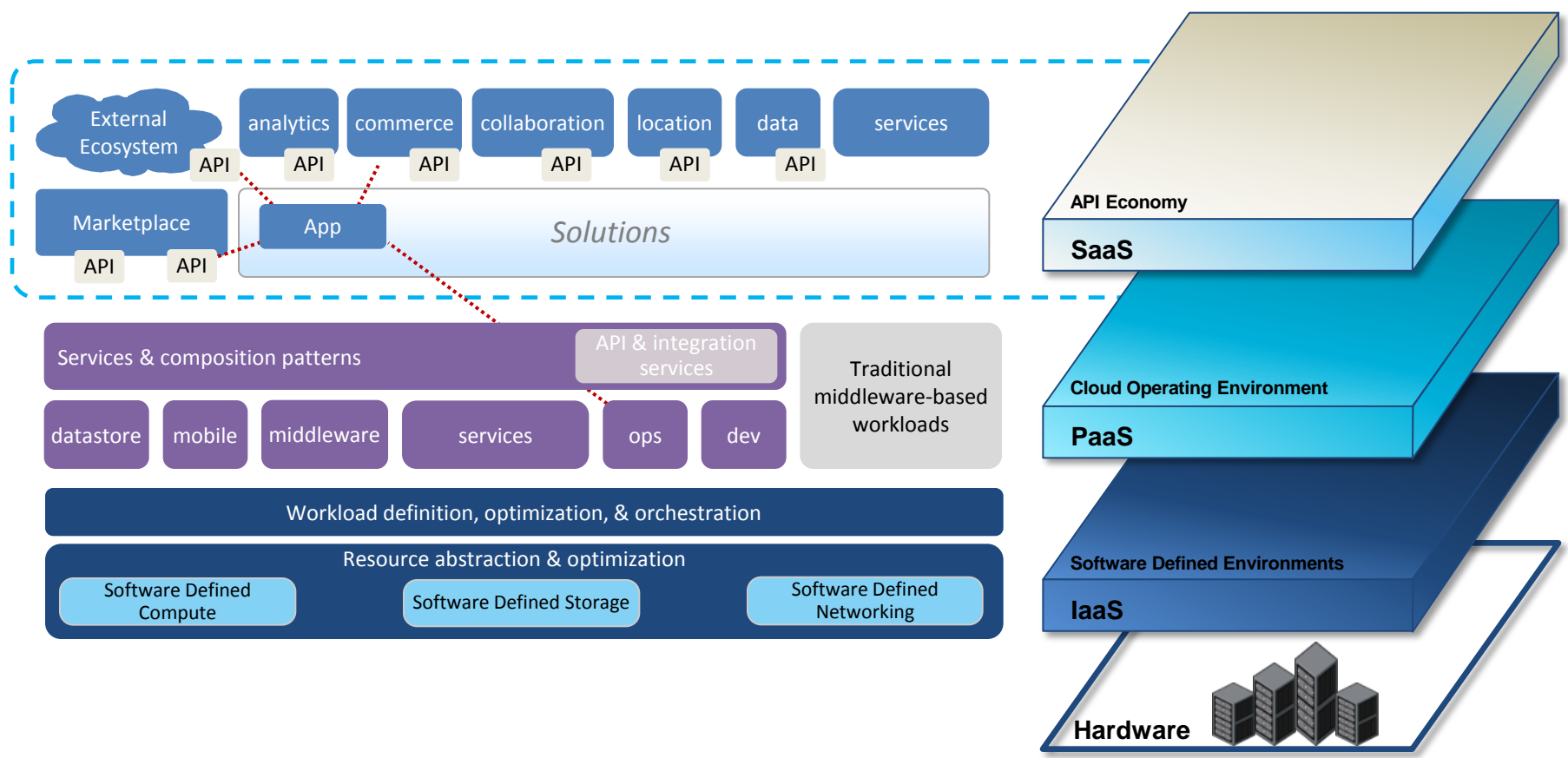


Valuable knowledge represented in T-shaped skills



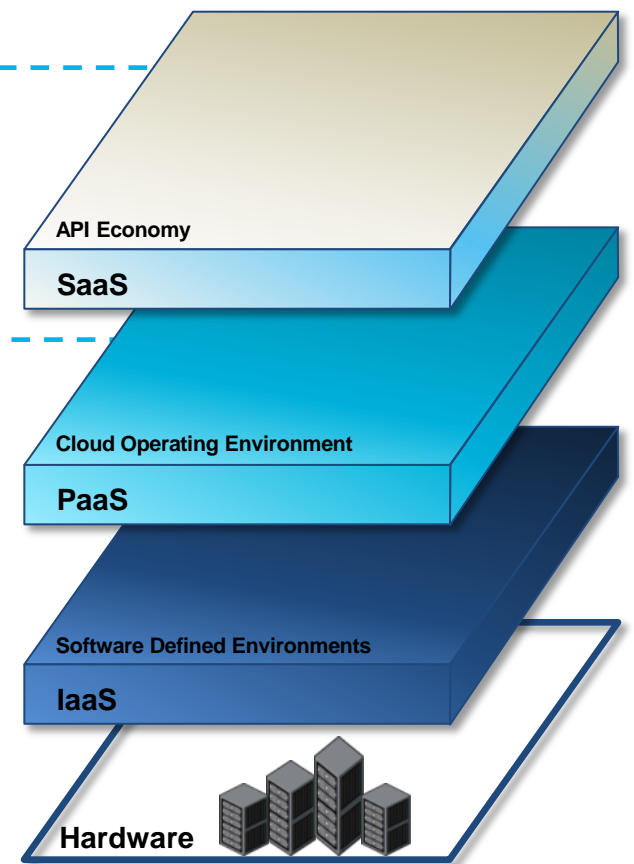
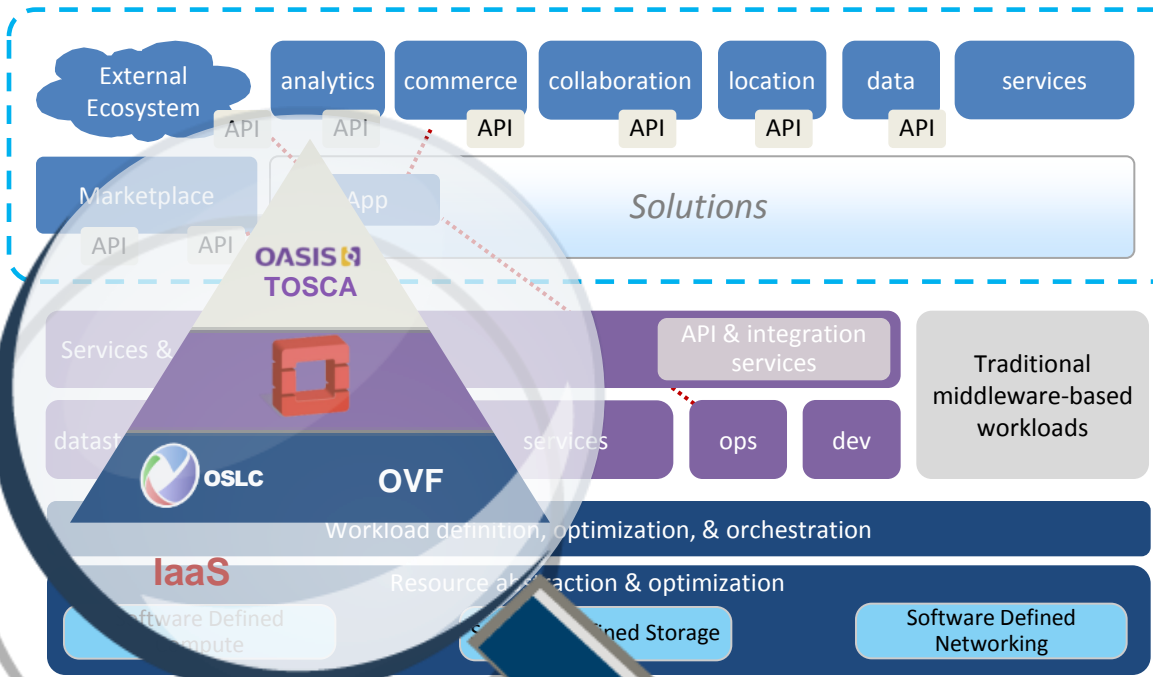


An Open Cloud Architecture Is Emerging





Open Cloud Architecture Standard (IaaS) Is Emerging





- OpenStack is a global collaboration of developers that seek to produce an **open IaaS open source cloud computing platform** for public & private clouds
- OpenStack has the largest active open source, cloud project community

Developer Growth	Over 480 contributors to Grizzly, a 45% increase from Folsom release
Top Contributors by Employer	Red Hat, Rackspace, IBM, HP, Canonical, Nebula, eNovance, Intel, DreamHost
Number of Features	Approximately 230 blueprints completed
Attracting New Plugins & Drivers	5 new networking plugins and 10 total block storage drivers
Patches Merged	7,620
Testing	On average, we deploy a complete OpenStack cloud for testing 700 times per day

OpenStack Grizzly is a testament to the success of the community & the foundation

Cloud Standards Customer Council

The Cloud Standards Customer Council (CSCC) is the premier open, end-user advocacy group for cloud standards, best practices & interoperability

- Providing customer-lead guidance to the multiple cloud standards & open source defining bodies
- Establishing criteria for interoperable cloud computing that address customer pain points

“CSCC forms new Security Working Group”

- Established Feb 2012; Co-chairs: The Kroger Co. & Boeing

“CSCC forms new SLA Working Group”

- Established Feb 2012; Co-chairs: Boeing & IBM

Platinum Sponsors



Gold Sponsors



TODAY

50 Sponsors

8,900+ Individual Members

189+ Orgs

400+ Organizations participating

2011 Deliverables	2012 Deliverables
Practical Guide to Cloud Cloud Computing Use Cases	Practical Guide to Cloud SLAs Security for Cloud Computing



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The Topology & Orchestration Specification for Cloud Applications (TOSCA) enables compose once & play anywhere management of cloud infrastructure topologies.

TOSCA provides:

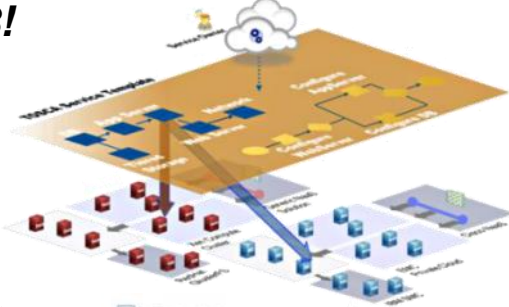
- A packaging specification for cloud services & related artifacts
- A structural model for cloud services, components & relationships
- A process model for build & management plans

“OASIS Forms TOSCA Technical Committee to Advance Open Standard for Cloud Portability ”

• Established Jan 2012; Co-chairs: CA Technologies & IBM

New!

TOSCA Specification v1.0 Published March 2013!



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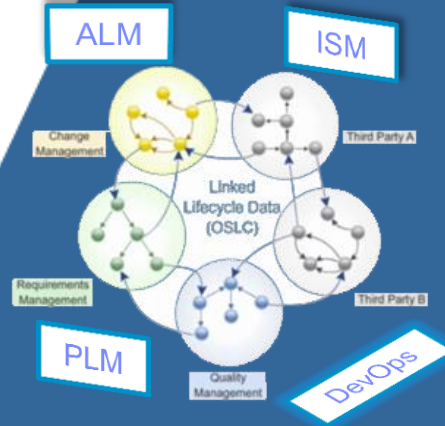
Open Services for Lifecycle Collaboration (OSLC) is an open community dedicated to making it easier to use lifecycle tools in combination

Enables the combination of tools to connect & streamline workflows, reducing effort, cost & frustration throughout the cradle-to-grave lifecycle of an application.

Community driven & governed efforts include 40+ organizations

Based on W3C Linked Data, OSLC is defined by scenarios: solution oriented

Specifications cover many domains due to a wide range of interests, expertise, & participation



Inspired by the web
Proven



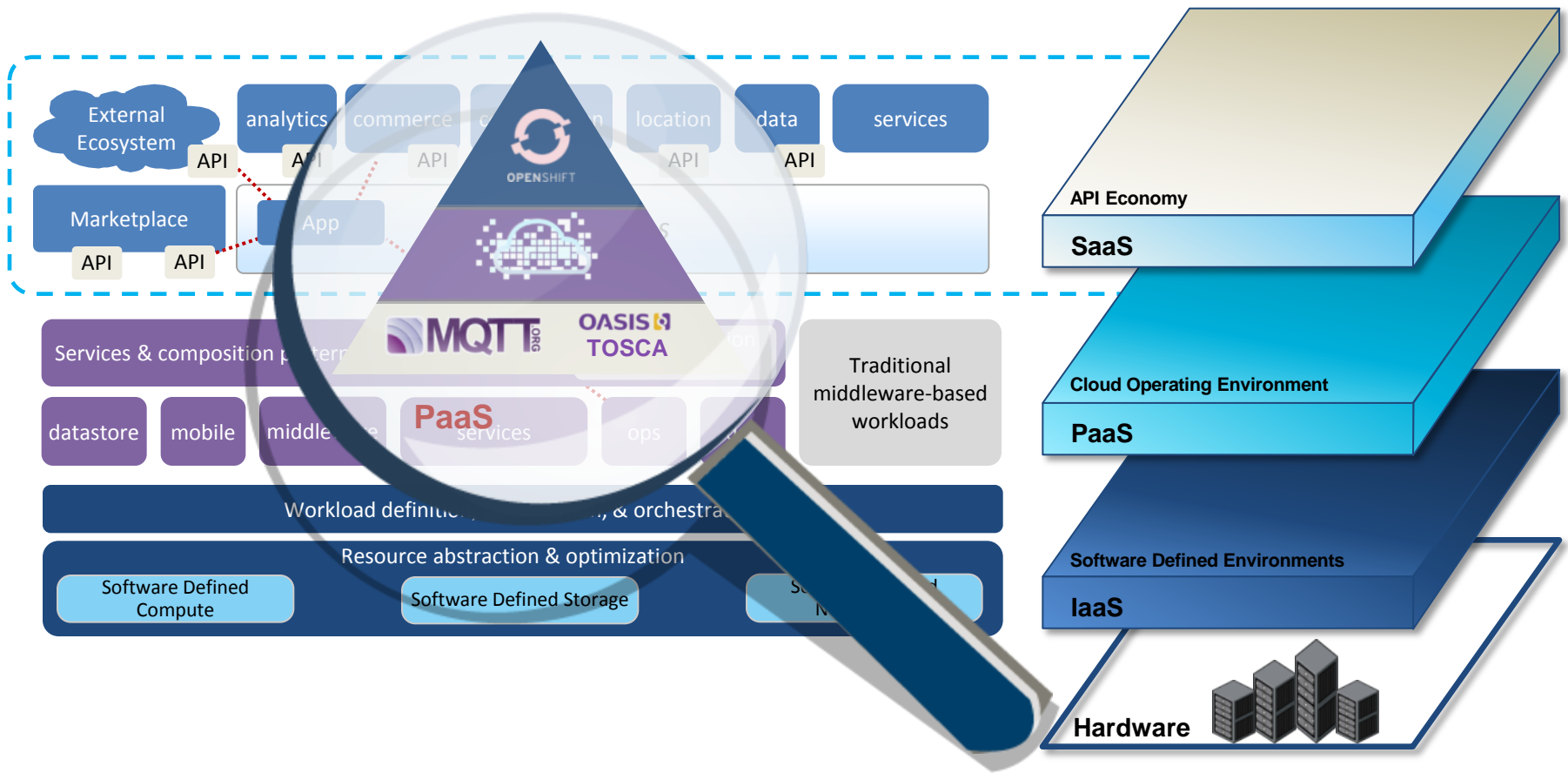
Free to use & share
Open



Changing the industry
Innovative



Open Cloud Architecture Standard (PaaS) Is Emerging





Systems Interaction Shape Open Cloud Architecture



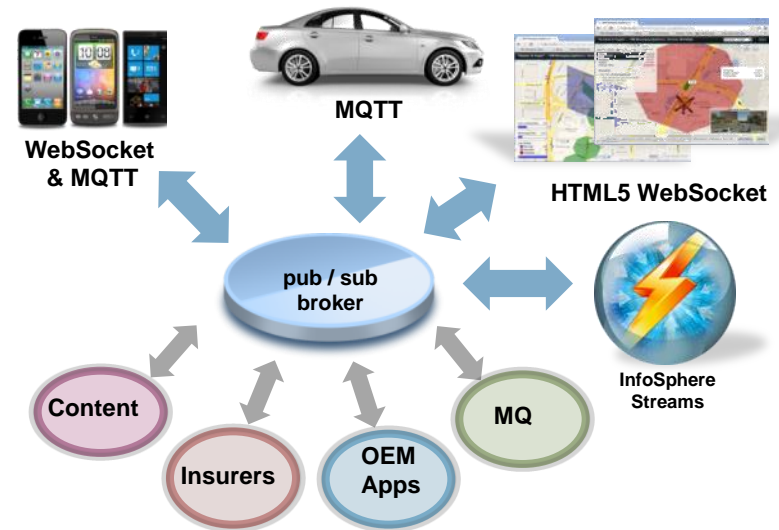


Mobile and Internet of Things (IoT) Come to Life



MQTT is a lightweight publish/subscribe protocol with predictable bi-directional message delivery, ideal for bandwidth-limited applications, such as mobile & Internet-of-things

- Useful for applications where a small code footprint is required or network bandwidth is limited
- Sensors, network-connected appliances & devices, home automation & automobile network-services could all benefit from the protocol
- Designed for millions things, millions of events, very dense, very green technology
- 93x faster, 10x less battery, 8x lower bandwidth versus HTTPS
- MQTT community intends to standardize the specification under OASIS



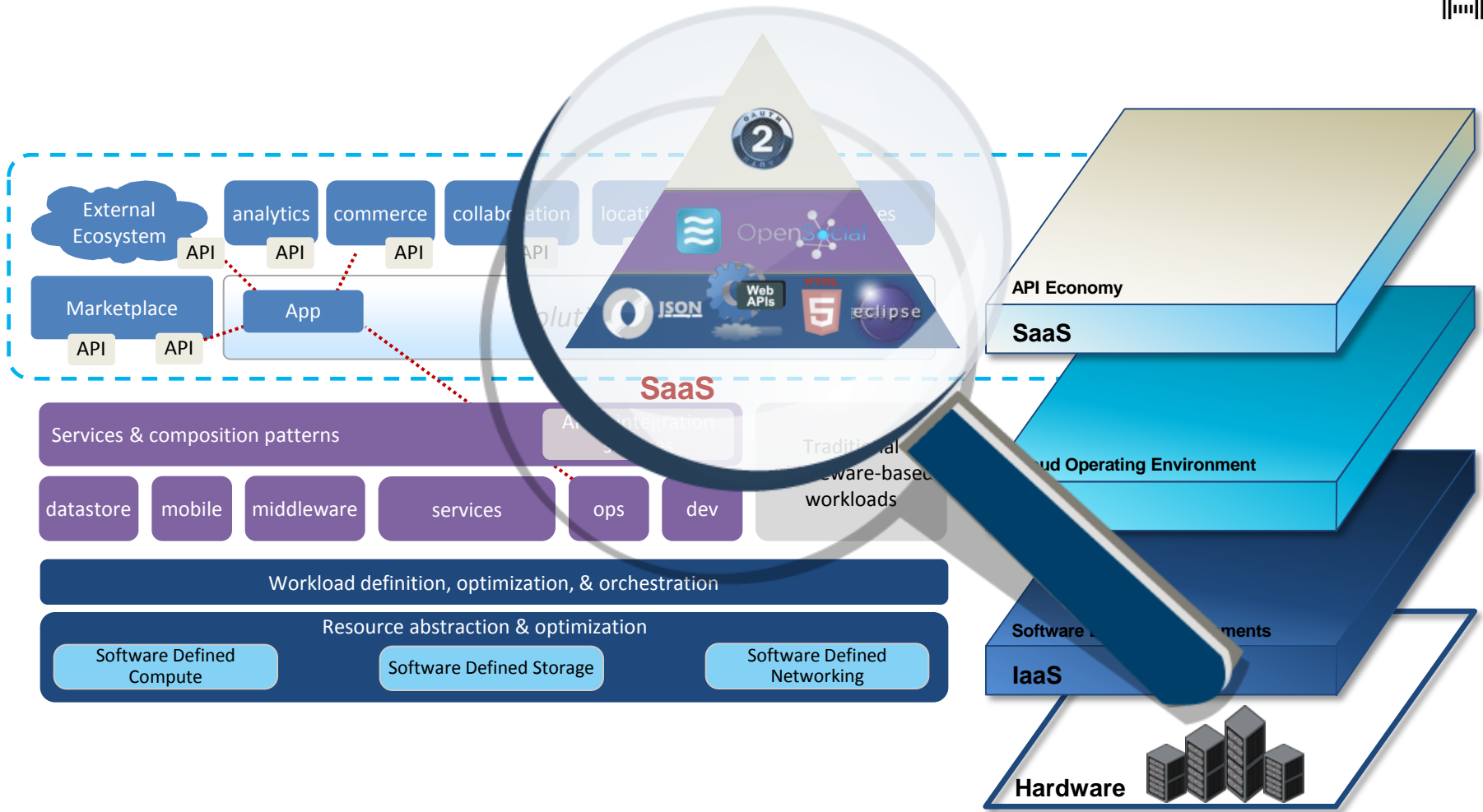
MQTT was invented by Dr Andy Stanford-Clark of IBM, and Arlen Nipper of Arcom

<http://mqtt.org>

IBM extends its capabilities with MQTT



Open Cloud Architecture Standard (SaaS) Is Emerging





JavaScript Object Notation (JSON) is a text-based open standard designed for human-readable data interchange. transmitting structured data over a network connection.

- Based on a subset of the JavaScript programming language, it is easy for humans to read & write, and easy for machines to parse & generate
- Used primarily to transmit data between a server & web application, serving as an alternative to XML

JSON is built on two universal data structures

- A collection of name/value pairs. In various languages, this is realized as an object, record, struct, dictionary, hash table, keyed list, or associative array.
- An ordered list of values. In most languages, this is realized as an array, vector, list, or sequence.

OAuth is an open protocol to allow secure authorization in a simple and standard method from cloud, web, mobile & desktop applications.

- Allow authorized access applications to REST API endpoints.
- Key security technology for the integration of REST APIs into the enterprise, whether inside or outside the firewall.
- Adoption in the market continues to grow since version 2 & OAuth is now an underlying security protocol in four other security standards.

IBM is a regular contributor to OAuth, providing expertise on security & authorization methods



MongoDB is a scalable, high-performance, open source schema-less database written in C++

- One of the most popular choices for developers seeking a NOSQL solution.
- Non-relational database that focuses on flexibility, power, speed & ease of use
- Aims to facilitate horizontal scaling, ease-of-development & the storage of vast quantities of data more efficiently
- Data is stored in JSON-like documents with dynamic schemas (BSON) to make the integration of data across applications easier





The Apache Software Foundation is a non-profit organization, formed in 1999, to provide organizational, legal &

financial support for a broad range of over 140 open source software projects. The Foundation provides an established framework for intellectual property and financial contributions that simultaneously limits potential legal exposure for our project committers



Apache Cordova is the open source project that makes “write once and run anywhere” hybrid applications using platform services feasible.

- Cordova focuses on continual maintenance & enhancements “shim” code, supporting Hybrid application development
- Currently focused plug-in management, supporting next device releases, and new W3C Mobile API's
- Since its creation in 2010, IBM has been a significant contributor to this project, adding new capabilities & a focus on release management



HTML5 is the common language for building rich internet applications across platforms, while still supporting native mobile functions without plugins.

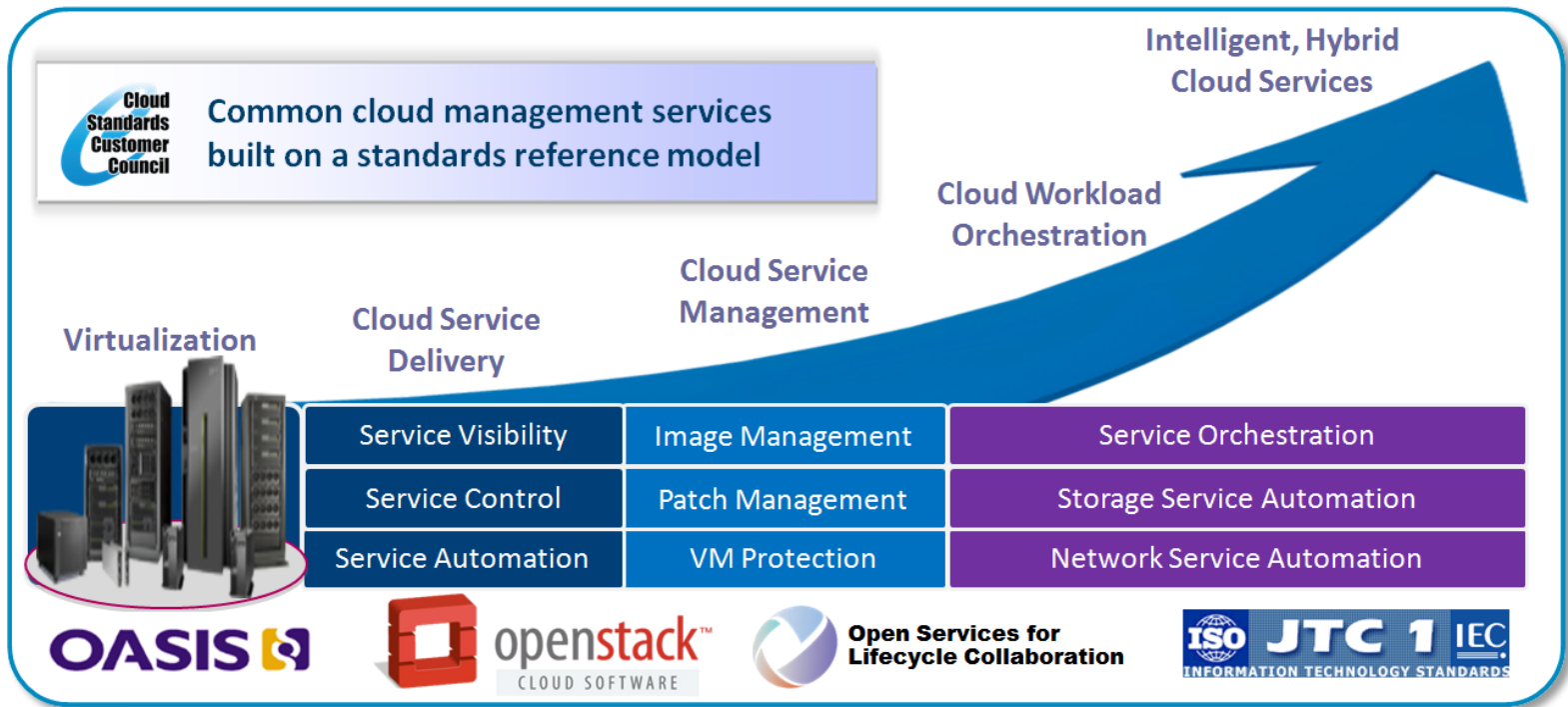
- HTML5 represents the evolution of HTML 4 / XHTML & incorporates standards such as SVG and CSS.
- A wide range of desktop & mobile platforms support HTML5, simplifying application development
- It brings native support for technologies, including audio & video, that until recently required plugins
- HTML 5 continues to improve on social technologies like offline & storage, connectivity/real time, multimedia, device access, geolocation & semantics.

IBM is co-chairing the HTML Working Group, along with representatives from Microsoft & Apple



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Open Architectures Enable Innovation Through Interoperability



Get Started, Today...



Learn & Engage



openstack.org



cloud-council.org



cordova.apache.org

Take a Test Drive



IBM SmartCloud
Orchestrator BETA



ibm.co/10huGZV



ibm.co/10tE3Ha



Project ICAP
Technology Preview



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