Technology is enabling a new era of innovation…

Open technology & open APIs are empowering the world with unprecedented access to data & function

…code, community & culture are the catalyst
Various Open Source Package for 500 million users

- Redis
- HBase
- MySQL
- Cassandra
- Arcus (memcached cluster)
- Have/Hadoop
- Kafka
- Elastic Search
- Titan

http://developers.linecorp.com/blog/?p=1420
http://d2.naver.com/helloworld/809802
Open source & commerce

AliSQL: Alibaba’s fork of MySQL

- 40+ new bugs have been found & fixed
- 41 new features have been added
- 27 bottlenecks have been optimized

Widely used in Alibaba Group and Ant Financial (Alipay)

Singles’ Day Global Shopping Festival 2015/11/11

- 45M concurrent online user (max)
- 140,000 orders per second (max)
- 85,900 transaction per second (max)
- 14.3B$ sales for one day
- 710M transaction for one day

Innovators can no longer afford to act as an island

Value & insight are derived by making connections between raw data, real ability & the power to act

By leading the IT renaissance, built on an Open Cloud Architecture, IBM offers Devs & Partners the opportunity to amplify their impact with the tools & techniques of this new era.

By 2020, 60% of All companies will be 100% cloud based

55% of CIOs indicated they would source all their critical applications in the cloud by 2020

Ecosystem

Partners

Developers

Community

Culture

Code
Code: building the lynchpins of open innovation
Centers of open source gravity provide a wealth of innovation & access to valuable skills

- **2.5m lines of code** by 3600+ contributors.
- IBM has been a top-3 contributor in the past 4 releases.
- IBM currently has 450+ developers & 20 core reviewers.

- **3.2m lines of code** by 2200+ contributors.
- IBM has the largest Cloud Foundry deployment.
- IBM has 10 dedicated core contributors.

- **1.6b npm downloads** in the past month.
- IBM a founding member of the newly established foundation.

- **Pledged donation** of IBM SystemML machine.
- IBM pledged 3,500 devs, researchers & to Spark projects across 12 labs.
- Education for 1m+ data scientists & engineers on Spark.

- How do consumers make choices?
  - **84%** trust recommendations made through personal relationships.

Ecosystem Partners Developers
openstack Cloud Software
Cloud Foundry
docker
nodeJS
Spark

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Level of adoption: Open Technology

**Use**
- Install
- Run
- Use
- Scale

**Change**
- Tune parameters
- Fix bugs
- Improve
- Optimize

**Create**
- Open existing project
- Create new one
What does bad open source look like?

- Single Source committer
- Restrictive licensing
- Arbitrary hierarchies
- Lack of usability
- High committer turnover
- Large dumps of commercial code

How can you tell the difference? One or more of these characteristics may indicate problems.
Open Source Projects - Databases

Led by foundation

- Apache HBase
- Apache TinkerPop
- PostgreSQL
- Apache CouchDB

Led by corporation

- MariaDB
- MySQL
- MongoDB
- memcached
- CUBRID
Pulling ahead with Open Technology centers of gravity
Open tech underpins the Internet & is directly responsible for its success.

Cloud technology is doing the same thing – but faster.

Open technology has been delivering innovation.
IBM’s Cloud Architecture is **Open by design**

An Open Cloud Architecture enables clouds, data & workloads to work together seamlessly.
Bluemix
Open Source
Data services
IBM has a long partnership with open technology

<table>
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<tr>
<td>• IBM forms Linux Tech Center</td>
<td>• Eclipse Foundation, Inc. becomes independent</td>
<td>• Linux contributions to kvm, oVirt, &amp; support Open Virtualization Alliance</td>
</tr>
<tr>
<td>• Leads Apache projects Xerces, Xalan, SOAP</td>
<td>• Pledged 500 patents to open source</td>
<td>• Supports Apache Hadoop (Big Data) – part of IBM BigInsights</td>
</tr>
<tr>
<td>• Starts ICU project</td>
<td>• Starts Apache Derby database, supports Geronimo app server</td>
<td>• Eclipse: Orion (web-based tooling), Lyo (OSLC), Paho (M2M protocols)</td>
</tr>
<tr>
<td>• Creates OSI-approved IBM Public License</td>
<td>• Contributions for Linux on Power, usability, security certifications</td>
<td>• Cloud Standards Customer Council: Founding member</td>
</tr>
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<td>• IBM OSDL founding member</td>
<td>• Leads Apache projects Tuscany (SCA standard), OpenJPA, UIMA</td>
<td>• Announces OpenJDK involvement</td>
</tr>
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<td>• Founder of Eclipse.org &amp; Eclipse Consortium</td>
<td>• Contributes to Eclipse Higgins</td>
<td>• Contributes to Apache Cordova (fka PhoneGap) (mobile app framework)</td>
</tr>
<tr>
<td>• Creates internal bazaar using OSS methodology</td>
<td>• Partners with Zend PHP</td>
<td>• Starts Dojo Maqetta (RIA tooling)</td>
</tr>
<tr>
<td>• Linux contributions to scalability (8-way+), reliability (stress testing, defect mgmt, doc)</td>
<td>• Accessibility code to Firefox</td>
<td>• Leads Apache OpenOffice, CouchDB (Cloudant)</td>
</tr>
<tr>
<td>• Leads Apache projects in Web Services</td>
<td>• IBM starts OpenAjax Alliance and joins Dojo Foundation</td>
<td>• OpenStack: platinum sponsor of independent foundation; over 400 IBM contributors</td>
</tr>
<tr>
<td>• Leads Eclipse projects GEF (editing), EMF (modeling), XSD/UML2 (XML Schema), Hyades (testing), Visual Editor, AspectJ, Equinox (OSGi bundles)</td>
<td>• IBM joins OpenOffice.org &amp; creates ODF Toolkit Union</td>
<td>• Increase OSS projects &amp; visibility at JazzHub &amp; GitHub</td>
</tr>
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<td>• IBM joins Open Health Tools, merging code from Eclipse OHF</td>
<td>• Cloud Foundry: platinum sponsor of independent foundation; over 10 IBM contributors</td>
</tr>
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<td></td>
<td>• Contributes to Mozilla Bespin (web editor) &amp; WebKit (browser engine)</td>
<td>• Open Data Platform: platinum sponsor</td>
</tr>
<tr>
<td></td>
<td>• Lead Apache Aries (OSGi Enterprise)</td>
<td>• Node.js: platinum sponsor of independent foundation</td>
</tr>
<tr>
<td></td>
<td>• Contributes to Apache Shindig</td>
<td>• Docker / Open Container Project: founding project sponsor</td>
</tr>
<tr>
<td>More than 1000 IBM developers involved in OSS projects</td>
<td>IBM leads 80+ OSS projects</td>
<td>IBM leads &amp; contributes to 200+ OSS projects</td>
</tr>
</tbody>
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The Cloud Standards Customer Council is the key open, end-user advocacy group for cloud standards, interoperability & best practices.

IBM is a founding member of the CSCC & worked closely with OMG to establish a strong end-user presence. Today, IBM continues to be an active member of the Steering Committee & a regular contributor.

Top Initiatives
• CSCC adoption of application-specific reference architectures
• Documentation of best practices around getting started with PaaS

Cloud Reference Architectures
• Web App Hosting published Jan., 2015
• Mobile published May, 2015
• Big Data Analytics published July, 2015
• Additional architectures in 2H15 (Security, Hybrid, DevOps, Social)

500+ Members
Participating in the CSCC
40k Whitepapers
Downloads in 2015
4k Registrants
Attended 2014-15 Webinars

6 Papers Published in 2015
• Security for Cloud Computing V2 published March, 2015
• Practical Guide to Cloud Service Agreements V2 published April, 2015
• Practical Guide to PaaS targeted Sept., 2015
• Practical Guide to Hybrid Computing targeted 4Q15

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Developed by the premier cloud community, OpenStack is an open source cloud operating system that is able to control large pools of compute, storage & networking resources throughout a datacenter.

IBM is a founding member of the OpenStack foundation, and played an integral role in its establishment. Additionally, with over 400 developers contributing, IBM is a top contributor to the project.

Top Initiatives
- Improvements to security, federation & audit support
- Swift & GPFS encryption
- Extend hybrid storage functionality of Cinder
- Trove usability with DB2 & CouchDB

OpenStack: by the numbers

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total contributors</td>
<td>3,834</td>
</tr>
<tr>
<td>Lines of code</td>
<td>2.6m</td>
</tr>
<tr>
<td>New contributors in the past 30 days</td>
<td>78</td>
</tr>
<tr>
<td>Days since last commit</td>
<td>4</td>
</tr>
</tbody>
</table>
Docker is an open platform to build, deploy & run applications using portable containers. June 22nd, The Open Container Initiative launched to ensure independent open governance of the community.

IBM is a top contributor to the Docker open project, representing nearly 10 percent of all contributions. IBM is a founding member of the Open Container Initiative launched June 2015.

Top Initiatives
- Grow the Open Container Project ecosystem
- Harmonize container community around a single defacto standard

Docker: by the numbers
- 1,103 Total contributors
- 150k Lines of code
- Very High Project Activity
- 30 New contributors in the past 30 days
- 5 Days since the last commit
A robust development platform for the people, Cloud Foundry is a powerful & flexible PaaS cloud allowing coders to build & deploy apps on their own terms – using the languages & the tools they want.

IBM is a founding member of the Cloud Foundry Foundation, and played an integral role in its establishment. IBM is a key contributor with 10 dedicated committers & code contributions second only to Pivotal.

Top Initiatives
• Growth of the CF foundation & the brand
• Increase IBM contrib’s & the number of dedicated contributors
• Launch the IBM hosted CF Dojo in TRP
• “Diego” into production

Cloud Foundry: by the numbers

Total contributors: 2,376

Lines of code: 3.3m

New contributors in the past 30 days: 100

Days since the last commit: 5

Very High Project Activity
Node.js is a JS runtime platform for easily building fast, scalable network apps. On June 16th, The Node.js Foundation to ensure open governance of the project & to reunite the forked codebase. IBM is a founding member of the Node.js Foundation, and played an integral role in its establishment. Currently, IBM is focused on the business & technical aspects of reunifying the project.

Top Initiatives
- Reunify Node.js forks w/the original codebase & normalize community relations & process

Node.js: by the numbers
- Total contributors: 726
- Lines of code: 2.0m
- New contributors: 5
- Days since last commit: 4
- Project activity: High

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CouchDB is an Apache project to build a robust, scalable, noSQL DB that embraces the web by using basic web technologies as its interface.

Cloudant is a leading contributor to the project & several of its developers sit on the Project Management Committee.

Top Initiatives
- Horizontally scalable database clustering
- Declarative query language
- User & Admin Dashboards
- Core storage engine enhancements

CouchDB: by the numbers

- Total contributors: 296
- Lines of code: 420k

Very High
Project Activity

In the past 30 days:
- 1 New contributors

Since the last commit:
- 6 Days
Apache Spark is an open source cluster computing framework with in-memory primitives to significantly outperform Hadoop deployments.

IBM has significant interests in Spark and has pledged 3.5k researchers to work related projects & education for 1m data scientists. Additionally, IBM plans to donate its SystemML machine learning to Spark.

Top Initiatives
- Complete the donation of SystemML as OSS
- Spark as a Service on Bluemix
- Establish the Spark Technology Center

Spark: by the numbers
- 793 Total contributors
- 564k Lines of code
- 53 New contributors in the past 30 days
- 1 Days since the last commit

Project Activity: Very High
The ODPi Foundation is a shared industry effort focused on promoting and advancing the state of Apache Hadoop and Big Data technologies for the enterprise.

IBM is a founding member of the ODPi Foundation & is heavily involved in its establishment.

Top Initiatives
- Create certifications for ODP compatible distributions
- Create guidelines for ODP isvs / consumers
- Introduce more big data projects into ODP

24 Member companies

Up from 15 in February

150 Bugbash participants

Resolved 186 Hadoop Issues

4 Hadoop Platforms available

- IBM Open Platform
- Infosys Information Platform
- Hortonworks Data Platform
- Pivotal HD

Based on a vision of a common ODP core
Emerging initiatives

Cloud native applications group is an effort to standardize container interfaces to connect runtimes with management & automation resources.

The Open Container Project is a lightweight, open governance structure for that aims to open industry standards around container formats and runtime.

Swagger is an open, community driven framework to describe, produce & visualize RESTful APIs.
Next step of Open Technology

OpenWhisk, a distributed compute service for developing and executing application logic in response to events.

The Hyperledger Project is a collaborative effort created to advance blockchain technology for a cross-industry open standard.

IBM provides open sources at GitHub.com, GitHub.com and GitHub Enterprise is integrated with Bluemix for open development and adoption.
OpenWhisk provides a distributed compute service to execute application logic in response to events. There are several key architectural concepts:

- **Triggers:** A class of events emitted by event sources.
- **Actions:** Encapsulate the actual code to be executed which support multiple language bindings including NodeJS, Swift and arbitrary binary programs encapsulated in Docker containers. Actions invoke any part of an open ecosystem including existing Bluemix services for analytics, data, cognitive, or any other 3rd party service.
- **Rules:** An association between a trigger and an action.
- **Packages:** Describe external services in a uniform manner.

Combined these allow developers to compose solutions using modern abstraction and chaining which can be created, accessed, updated and deleted via the CLI. For convenience, special SDKs like our iOS SDK can be used for specific environments.
WHAT IS THE HYPERLEDGER PROJECT?

The Hyperledger Project is a collaborative effort created to advance blockchain technology by identifying and addressing important features for a cross-industry open standard for distributed ledgers that can transform the way business transactions are conducted globally.

WHY CREATE THE PROJECT?

Blockchain is a peer-to-peer distributed ledger technology for a new generation of transactional applications that establishes trust, accountability and transparency while streamlining business processes. Think of it as an operating system for interactions. It has the potential to vastly reduce the cost and complexity of getting things done.

https://www.hyperledger.org/
IBM Offerings Supporting Hyperledger

LINUX FOUNDATION HYPERLEDGER PROJECT | IBM Blockchain ON IBM CLOUD | IBM Blockchain SOLUTIONS

BLUEMIX SERVICE

Managed Service on IBM Cloud
Your private Blockchain network in 1-click
Learn with sample applications
Develop your own Smart Contracts

http://www.ibm.com/blockchain/
Node-RED is a tool for wiring together hardware devices, APIs and online services in new and interesting ways.

**Getting Started**

For Linux/OS X, if you already have Node.js installed, run:

```
$ sudo npm install -g node-red
$ node-red
```

Otherwise, head over to the Getting Started guide.

Already got Node-RED installed and wonder where the download button has gone? Head over to the Upgrading guide.

Latest version: v0.13.4 (npm)
Not all open tech is built the same
Unleash innovation with open & transparent communities

Open Source Development

- Responsible Licensing
- Accessible Commit Process
- Diverse Ecosystem
- Participative Meritocracy
- Open Governance
Open Tech in the Cloud

IBM’s Cloud Offerings deliver faster development, interoperability with a vast ecosystem of compatible services, and fuel innovation, allowing customers of all sizes to engage in global markets in new and exciting ways.

“IBM firmly believes that open source is the foundation of innovative application development in the cloud.”
Open source from IBM

Let's work together - developerWorks Open is where today's cutting edge developers have a unique opportunity to collaborate and create tomorrow's big innovations. READ MORE

Many developerWorks Open projects are now integrated with Bluemix, IBM's cloud-based platform for building, managing, and running applications. Look for the Bluemix buttons in the "How to contribute" sections of projects like these:

https://developer.ibm.com/open/
A New Way Forward
Type of Open Source

By community

By foundation

By corporation

- git
- openstack
- Linux
- MariaDB
- Cloud Foundry
- MySQL
Open

Open Source
Open Standards
Open Communities