Microsoft & Red Hat stronger together
Judge us by the actions we have taken in the recent past, our actions today and in the future

— Satya Nadella, CEO of Microsoft
Microsoft is a company by, of and for developers
Five defining time periods have shaped the modern developer’s outlook. Let’s explore how specific cultural and business dynamics—as well as influential people—have driven each era’s evolution.

1960s / 1970s
**Origins**

1980s
**Movement**

1990s
**Commercialization**

2000s
**Proliferation**

Today
**Mainstream**
1960s/1970s: ORIGINS

The origin of OS culture starts in early 60’s academia, the hotbed of the hippie counterculture movement. Technology is at home in science fiction, but not our living rooms. Programmer and user are one and the same. Software comes with hardware. The communal mindset drives OS origins as university researchers begin exploring what technology can do vs. the technology itself.
Computers, Collaboration and Idealism

Personal computers begin to proliferate. User and programmer are no longer one, and the creation and distribution of software is separated from the hardware. The academic researchers of the 60s and 70s have turned into the first developers. Source code becomes subject to copyright law. The Free Software movement is born.

1980s
Proliferation of personal computers spurs development of software applications.

Developers create productivity programs for non-technical types.

Operating systems become copyrighted.

The Free Software Foundation is born.

Apple Computer, Inc. v. Franklin Computer Corp. (3rd Cir. 1983)

- Object code is a literary work protectable by copyright.
- An operating system is protectable
  - An operating system is a set of instructions which are executed (other than a process under it) on a machine. Only the instructions are protectable.
- Infringement when the code “represents the only means of the expression of the ideas underlying it.” Total compatibility is a “commercial and competitive objective” not an idea.

1980s

Richard Stallman

In response, Richard Stallman leaves MIT AI Lab where he initiated free collaboration between programmers, to start GNU and the Free Software Foundation. Their mission is to create the first free Operating System. They have the pieces but are missing the kernel.
Stallman introduces the General Public License and "Copyleft"

Goal to produce one license to be used for any project, making it possible for many projects to share code

Copyleft is the arrangement whereby SW or artistic work may be used, modified and distributed freely on condition anything derived from it is bound by the same condition

Microsoft is the first of the Big Three computer giants to foresee the real competition would be in software, not hardware

Bill Gates foresees software as the future

1980s
The 80s see the migration of software development from the halls of academia to business. Two distinct philosophies are set: Richard Stallman leads the Free Software movement and other companies lead the charge for proprietary software.
Information Highway, Profits and Pragmatism

The 90s see the launch of Linux, the WWW and Apache Web Server. The Linux developer is the MVP of the time, as developers iterate and build saleable software and services for an expanding computer user base and ever more sophisticated web services. Influencers realize “free software” is a term that turns off businesses and VCs. They rebrand to “Open Source” to define the way of working—and make room for open and proprietary software to co-exist.
The web begins. Computers are increasingly ubiquitous—though usage is still highly functional until the World Wide Web is introduced in 1991.

The Internet comes home. Internet culture begins to take shape as ISP providers proliferate—making the Internet accessible and evolving the use of the computer from purely functional to informational, educational and entertainment.

At time the WWW is introduced, Linus Torvalds creates the kernel to complete the operating system started by GNU. Linux is launched in 1991 as the first free, open operating system. It is the first alternative to expensive proprietary hardware/software Unix based machines.

1990s COMMERCIALIZATION

Linus Torvalds
Apache births the tech boom.

The Cathedral and the Bazaar 1997; a watershed moment. Struggle closed and open approaches to sw design.

Netscape goes open source 1998. Mozilla project debundling OS & webbrowsers.

The Open Source Initiative is a collaboration between VCs and tech entrepreneurs creating a more pragmatic approach to developing. It allows for the co-existence of open and proprietary software.

“Open Source” is coined.

1990s

**COMMERCIALIZATION**

Big business meets OS and RedHat goes public (1999).
- Compaq, IBM, Novell, Oracle, and SAP announce equity investments in Red Hat, raising $7 million dollars.
- In 1999, RedHat is the first Linux-based company to go public, achieving 300% gains on the first day of trading and legitimizing Linux in the commercial space.
- Linux effectively permits the decoupling of hardware and software at scale, allowing anyone from the software professional to the hobbyists to build their own functioning personal computer.
By the end of the decade, over 50% of US households have a personal computer. While the front end, the hardware, remains proprietary; the back end is built on open source software. Programmers are now career developers and Open source culture has evolved from private club to business reality.
Boom, Bust and Business

Open Source is a key foundation for rapid tech development and economic growth. As consumer adoption advances, so does innovation in software development.
People are increasingly connected to their technology. PDAs become ubiquitous. Within the decade, Smartphones will take over.

Beginning of the app economy

OS cottage industry begins.

In 2005, Linus Torvalds launches Git, a version control system for tracking changes in computer files, like code. With the launch of GitHub in 2008, a centralized web-based hosting service enabled more code sharing and collaboration.

2000s PROLIFERATION

Bill Gates
The courts pave the way
A lawsuit against IBM and Linux is dismissed, and large enterprises are able to use Open Source without legal concerns.

Choosing sides
In contrast, some tech giants embrace open-source and the approach to development.

Another challenger is born...
In 2008, Google launches Android, which becomes pivotal in the explosion of the App economy.

Microsoft doubles down

A challenger is born
In 2006, precursor for AWS is formed, built upon XEN and Linux.

...and another.
In 2009, Sun Microsystems, the primary Unix player of the time, is effectively beaten out by Linux. Oracle buys out what’s left of Sun Microsystems, and with it, Java. Oracle is an Open Source player.

2000s PROLIFERATION
In 10 years, Red Hat and Linux effectively outperformed Unix software. **Open source is the new foundation for developers** and the launch of GitHub accelerates innovation and collaboration.
Mainstream

Technology is integrated into every corner of life as gadgets, data and UIs abound. IoT is an expanding reality, and the need for extensible applications and scalable, rapid-response computing power gives rise to the cloud. Open Source becomes an always-on way of working for developers.
- Open source is the glue allowing diversity in software and hardware, linking up ecosystems together.

Tech is everywhere

Devs born in the cloud

The cloud is everywhere

Microsoft dips a toe in open source

Today

MAINSTREAM

Satya Nadella
Microsoft warms up

In 2010 Microsoft launches Windows Azure – rebrands to Microsoft Azure in 2014

Azure + Linux = love

John Gossman, Azure distinguished engineer joins the Linux foundation board

Open Invention Network
Github
CNCF
>50% Linux VM’s in Azure

Microsoft embraces open source

2016 – Microsoft loves Linux as official statement

Today
MAINSTREAM
About Contributing

~5K employees
Are good for > 2 Million commits

>8K Non-Microsoft OSS Projects are worked on by employees

We collaborate with the CNCF, CF, Linux Foundation, .Net Foundation, and more

Don’t develop stuff and throw it back over the wall, but work together.

Community.

>19K devs from over 3,700 companies contributed
Linux on Azure growth & momentum

~50% Azure VMs running Linux

60% of solutions in Azure Marketplace Linux based

Strategic partnerships with OSS providers
Azure Container Ecosystem

**Azure services**
- SQL Database
- Redis Cache
- CosmosDB
- And more!

**Partner services**
- OpenShift
- Pivotal Cloud Foundry
- Docker Enterprise Edition
- Mesosphere DC/OS

**Azure Container Service (AKS)**

**Service Fabric**

**Batch**

**Virtual kubelet**

**Azure Container Instances (ACI)**

**Azure Virtual Machines**

**Virtual Machine Scale Sets (VMSS)**

**Azure Container Registry (ACR)**

**App Service**

---

**OSBA**

---

**IaaS**

---

**PaaS**

---

**Azure**
Our approach to open source in the cloud

---

Enable
open source use cases in the cloud

Integrate
open source technologies in our platform

Release
innovative technologies as open source

Contribute
to the open source ecosystem
Azure + OSS: where we invest

<table>
<thead>
<tr>
<th>Language</th>
<th>Python</th>
<th>nodeJS</th>
<th>Java</th>
</tr>
</thead>
<tbody>
<tr>
<td>Platform</td>
<td>Red Hat</td>
<td>Pivotal</td>
<td></td>
</tr>
<tr>
<td>Data</td>
<td>Hadoop</td>
<td>MySQL</td>
<td>DATASTAX</td>
</tr>
<tr>
<td>DevOps</td>
<td>Ansible</td>
<td>Chef</td>
<td></td>
</tr>
<tr>
<td>Infrastructure</td>
<td>Linux</td>
<td>moby project</td>
<td></td>
</tr>
</tbody>
</table>
Judge us by the actions we have taken in the recent past, our actions today and in the future

— Satya Nadella, CEO of Microsoft
The global aviation industry relies on independent services provider Lufthansa Technik for advanced MRO (maintenance, repair, and overhaul) services for aircraft. The company developed AVIATAR—a digital platform that enables data-driven operational excellence for airlines, MRO providers, and lessors—using Red Hat and other open-source software like Cloudera. When Lufthansa Technik wanted to move AVIATAR to the cloud, the company chose Microsoft Azure for its robust and flexible infrastructure capabilities and its network of worldwide datacenters. The result: A solution that helps airlines not only cut costs but also increase aircraft reliability, making air travel smoother and safer for their passengers.

“With Microsoft Azure, we get an open and flexible cloud infrastructure that supports our Red Hat ecosystem and helps us deliver superior products to our customers.”

http://videos.microsoft.com/customer-stories/watch/Sn6ZbVtFHvfAGcChwKiuDg?
Stronger together

Extended Partnership

- The native availability of Red Hat solutions on Microsoft Azure
- Integrated enterprise-grade support spanning hybrid environments, from the datacenter to Azure
- Continued alignment on additional hybrid platforms
- Closer integration between the Red Hat and Microsoft technologies and ecosystems including Developer Toolchains, Databases, and Container Platforms
- Launch of Azure Red Hat Openshift
Microsoft + Red Hat partnership

- **Red Hat Enterprise Linux in Azure**
  - Cost savings and operational efficiency gained from using consistent/standard OS platforms across your hybrid infrastructures
  - Integrated support for RHEL in the Azure Marketplace
  - Red Hat subscription flexibility/portability

- **Red Hat OpenShift Container Platform in Azure**
  - Easily build, deploy, and manage modern container-based apps
  - Technology that enables digital transformation and application modernization
  - Consistent application platform for hybrid cloud infrastructures
  - Fully managed Red Hat OpenShift service

- **SQL Server on Red Hat Enterprise Linux**
  - Industry-leading, most-secure data platform on a leading OS and cloud platform
  - Optimize with a modern data platform

- **Red Hat Enterprise Linux for SAP Solutions in Azure**
  - Most-powerful and scalable cloud for SAP HANA
  - Deep partnership among SAP, Microsoft and Red Hat
  - First-class hybrid support experience for Red Hat on Azure
  - Integrated management portal experience

---

Hybrid application framework  Hybrid cloud storage  Hybrid cloud management
Azure Red Hat OpenShift
Fully managed Red Hat OpenShift service

Jointly engineered, operated, and supported by both Microsoft and Red Hat with an integrated support experience

- Enterprise-grade operations, security and compliance. Deploy your business-critical apps with confidence with an industry-leading SLA of 99.9% availability.

- Empowering developers to innovate. Promote developer productivity with built-in CI/CD pipelines, then easily connect your applications to hundreds of Azure services such as MySQL, PostgreSQL, Redis, Cosmos DB, and more.

- Scale on your terms. Start a highly available cluster with four application nodes in a few minutes, then scale as your application demand changes; plus, get your choice of standard, high-memory, or high-CPU application nodes.

Build, deploy and scale apps with confidence
In just minutes, deploy enterprise-grade Red Hat OpenShift clusters on Azure
Microsoft – Red Hat
Stronger Together

René Moddejongen
Bus. Group Lead Open Source

Nick Trogh
Azure Developer Technical Lead