

# illumos at 6

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illumos

# What does illumos give you?

- ZFS
- Dtrace
- Crossbow (network virtualization)
- Zones (aka containers)
- FMA (fault management)
- SMF



# illumos pre-history

- SunOS 4 was a BSD derivative
  - 4.3BSD to be precise
- 1988 AT&T announce System V Release 4 (aka SVR4)
- This was SunOS 5.0 aka Solaris 2.0
  - SunOS 4.x marketed as Solaris 1



# Solaris 2.1 through 2.6

- SunOS 5.x was the core of Solaris 2.x
- SPARC & x86 kernel codebases merged
- Engineering processes matured
  - Quality Death Spiral
  - Dogfooding – jurassic
- Some of the bad SysV stuff ripped out
  - Overall steady improvement



# Solaris 7 through 10

- Sun “Marketing” step in to rebrand
- Solaris 7 was 64-bit on SPARC
- SunOS 5.x was the core of Solaris X
- Solaris 9 had a (temporary) loss on x86
- Solaris 10 introduced amd64 support
  - And a whole lot else



# OpenSolaris

- 2005 saw most of SunOS open-sourced
  - And other parts of the codebase
  - OEM and some hardware missed out
- MPL-like CDDL – weak copyleft
- Sun Marketing hadn't a clue what to do
- Community gathered
  - Despite Sun's efforts to disrupt it



# Oracle

- Early 2009, takeover rumours surface
- Late 2009, Oracle beat out IBM
- Many engineers hoped Oracle would fix the marketing missteps and keep the good bits
- Didn't quite work out that way



# !OpenSolaris

- No announcements, no nothing
- Solaris closed off
- Community was ready
  - Garrett D'Amore created the illumos fork of ON
  - OpenIndiana replaced the OpenSolaris distro
- Initial hope of a RedHat/CentOS/Fedora model
  - Soon clear that the split was total





# illumos

- “Solarish” often used to describe common capabilities and philosophy of both forks
- The illumos-gate contains kernel, libraries (most), and commands (most)
- Falls between FreeBSD (self-contained) and Linux (kernel-only)



# Not self-contained

- GCC (4.4.4-il4)
- Java
- Python
- Perl
- OpenSSL
- zlib
- libXML2
- sqlite
- NSS/NSPR
- Apache
- CUPS



# Distributions

- illumos is not useful on its own, you need more
  - Even to make it boot, as a rule
- Just like Linux, distributions vary by
  - Packaging
  - Intended market
  - And personal preference



# OpenIndiana

- <https://www.openindiana.org>
- Most direct descendant of OpenSolaris
- Tracks Oracle's userland sources
- “Hipster” - current development branch
  - ~rolling release



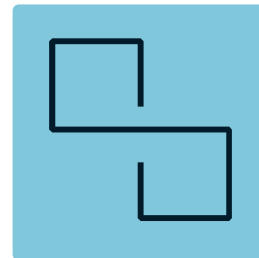
# OmniOS

- <http://omnios.omniti.com>
- Pure server, fairly minimalist
  - KYSTY – keep your s\*\*\* to yourself
- Commercial support available
- Also available on AWS



# SmartOS

- <https://smartos.org>
- Hypervisor, aimed at cloud deployments
  - From Joyent, now under Triton brand
- Ported KVM to illumos
- Brought back LX zones
  - Linux syscall emulation



SmartOS

# DilOS

- <http://www.dilos.org>
  - Courtesy of Igor Kozhukhov
- SPARC and x86
- Debian packaging
- Separate illumos fork
- Brings Xen back (domU and dom0)



# Tribblix

- <http://www.tribblix.org>
  - Courtesy of Peter Tribble
- Retro style, modern components
- SVR4 packaging
- Multiple zone variations
- Pure illumos-gate, not a fork
- SPARC and x86





# XStreamOS

- From Sonicle <http://www.sonicle.com>
  - Courtesy Gabriele Bulfon
- Desktop and server variants
- Designed for their services



# Appliance Distros

- Not all distros are for end users
- NexentaStor – Networked storage appliance
  - ZFS, NFS, CIFS, COMSTAR
- Delphix – Database storage appliance
  - ZFS → OpenZFS
- Multiple other storage vendors use illumos
  - Because of ZFS



# Recent Progress

- New Boot Loader
  - Work by Toomas Soome
  - Replaces old grub (0.97)
  - Inherited from FreeBSD
  - Fits well with ZFS and Boot Environments
  - Transition “interesting”
  - Already in OpenIndiana, Tribblix
  - Coming in OmniOS r151022



# Recent Progress

- SunSSH retired
  - Replaced with OpenSSH
- ASLR and exploit mitigation
  - PIE coming along soon
- Build with newer 3<sup>rd</sup>-party tools
  - Python 2.7, Java 8
  - Necessary as distros ship different versions



# Recent progress

- USB3 support
  - Contributed by Joyent
  - Removes a long-term irritant
- NVMe support
- Saner user defaults
- diskinfo utility
  - Helpful for scripting and installers



# Using illumos

- Download and run (physical or virtual)
  - Most distros offer a live image
- Try OmniOS on AWS
- Use Joyent's cloud
- Some “cloud” providers work fine
  - Look for “custom iso” support
  - Vultr, Bytemark, others



# Building illumos

- Must be running illumos
  - OpenIndiana, OmniOS, Tribblix
- Follow the instructions
  - <https://wiki.illumos.org/display/illumos/How+To+Build+illumos>
- Yes, it's a bit fiddly
- Result is
  - Proto area – populated filesystem
  - Packages – for use by IPS



# Helping illumos

- Use a distro
- If you're a user
  - Report issues back
  - Tell “suppliers” you use illumos
- If you're a developer
  - Build and test on illumos
  - Will find portability/standards issues





# Contributing

- OpenZFS use Github PRs
- illumos is . . . arcane
- Changes must be
  - Tested
  - Reviewed
  - Follow the RTI process
  - Fortunately, “shrink to fit” is in play



# No Formal Organization

- We lack, but need to mature into:
  - Bounties
  - Governance
  - Ownership
  - Marketing
  - Legal presence
  - Policies (harassment, formal code of conduct)



Questions?



# Thank You!

[www.illumos.org](http://www.illumos.org)

[src.illumos.org](http://src.illumos.org)

#illumos

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