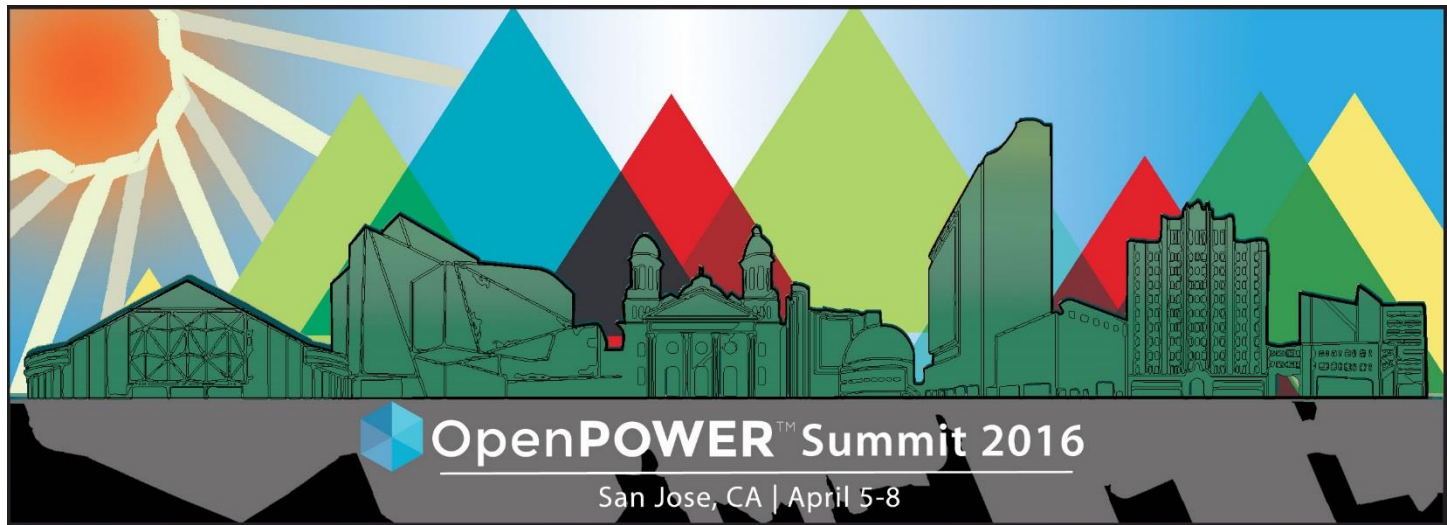




# OpenPOWER Firmware Development, Testing, Community and Compliance

Stewart Smith, OPAL Architect @ IBM

## Revolutionizing the Datacenter



Join the Conversation #OpenPOWERSummit

## Who am I?

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- Stewart Smith
- OPAL Architect @ IBM
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## What is OpenPOWER Firmware?

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- <https://www.github.com/open-power>
  - Especially op-build project, ties it all together
- See my linux.conf.au 2016 talk
  - Adventures in OpenPOWER Firmware
  - <https://www.youtube.com/watch?v=a4XGvssR-ag>

## What is OpenPOWER Firmware?

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- Basic boot process
  1. Self Boot Engine (SBE)
  2. HostBoot
  3. OCC
  4. SkiBoot (OPAL)
  5. Linux / Petitboot
  6. Operating System

WOW, That's a **LOT**!

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- Yes, it's a lot.
- ~600k unique LOC
- ~24 **million** LOC from elsewhere (e.g. Linux, toolchain, libc, ncruses, lvm, busybox etc)
- A **LOT** of things happen before your computer is a computer

How do we maintain that?

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- Only maintain what we have to
- Take everything else from upstream

## What we have to

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- **POWER specific**
  - Hostboot
  - OCC
  - Skiboot (OPAL)
- **Generic**
  - Petitboot
  - Op-build (our build infrastructure)
  - Flash manipulation utilities

## What we don't

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- Linux
  - Use upstream
- Userspace for petitboot
  - Get it from buildroot
- Build tooling
  - Use buildroot
- Contributions upstream **first**
  - We'll keep a local patch if we **have** to



## Development Processes & Communities

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- **Hostboot**
  - Github issues / pull requests
  - Most development done internally
  - Often developed internally before chip exists
- **OCC**
  - Dev done internally
  - Lengthy (internal) qualification process before release
- **Skiboot**
  - Mailing list: [skiboot@lists.ozlabs.org](mailto:skiboot@lists.ozlabs.org) + patchwork
- **Petitboot**
  - Mailing list: [petitboot@lists.ozlabs.org](mailto:petitboot@lists.ozlabs.org) + patchwork

## Op-build development process

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- Op-build brings everything together
- Github Issues and pull requests
- Mailing list: [openpower-firmware@lists.ozlabs.org](mailto:openpower-firmware@lists.ozlabs.org)

## Other Projects

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- We interact with upstream:
  - Linux
  - Buildroot
  - Toolchain
  - POWER specific userspace
  - Other userspace components

## Welcoming Newcomers

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- Join the mailing list!
- [openpower-firmware@lists.ozlabs.org](mailto:openpower-firmware@lists.ozlabs.org)
- <https://lists.ozlabs.org/listinfo/openpower-firmware>

## Compliance

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- Get a time machine to see Sandy's talk yesterday!
- Hardware vs firmware compliance
- Does the hardware work?
- Does the firmware set up the hardware correctly?
- Are the boot and runtime firmware interfaces compatible?

## Exerciser

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- .... news coming ....

## Firmware & Hardware

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- [github.com/open-power/op-test-framework](https://github.com/open-power/op-test-framework)
  - Attempt to have **one** test runner
- Internal tests
  - Historical test infrastructure inside IBM
- Open Source test suites
  - KVM tests
  - Linux Test project
  - Often used and maintained by IBM test teams
- Active work in integrating everything into op-test-framework

# OPAL

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- OpenPower Abstraction Layer
- Firmware API (OPAL)
  - Ensure existing and future Operating Systems **work**
  - <https://github.com/open-power/skiboot/doc/opal-api/>
- Boot interface (petitboot)
  - Including petitboot plugins
  - <https://github.com/open-power/doc/opal/>



## Now and Future

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- OpenPOWER Ready
- OPAL Conformance / Compliance ?
  - Test suite
  - Statement

Thank you

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- Questions?
- Contact me!
  - [stewart@linux.vnet.ibm.com](mailto:stewart@linux.vnet.ibm.com)
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