



OpenPOWER™ Summit NA 2021

OCTOBER 28, 2021 | VIRTUAL EXPERIENCE

#OpenPOWERSummit

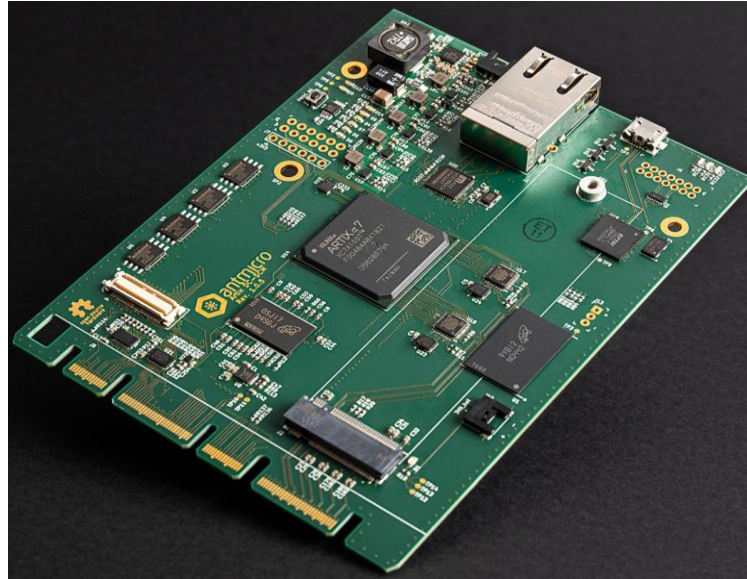
LibreBMC

Todd Rosedahl, IBM
Paul Mackerras, IBM
Michael Neuling, IBM

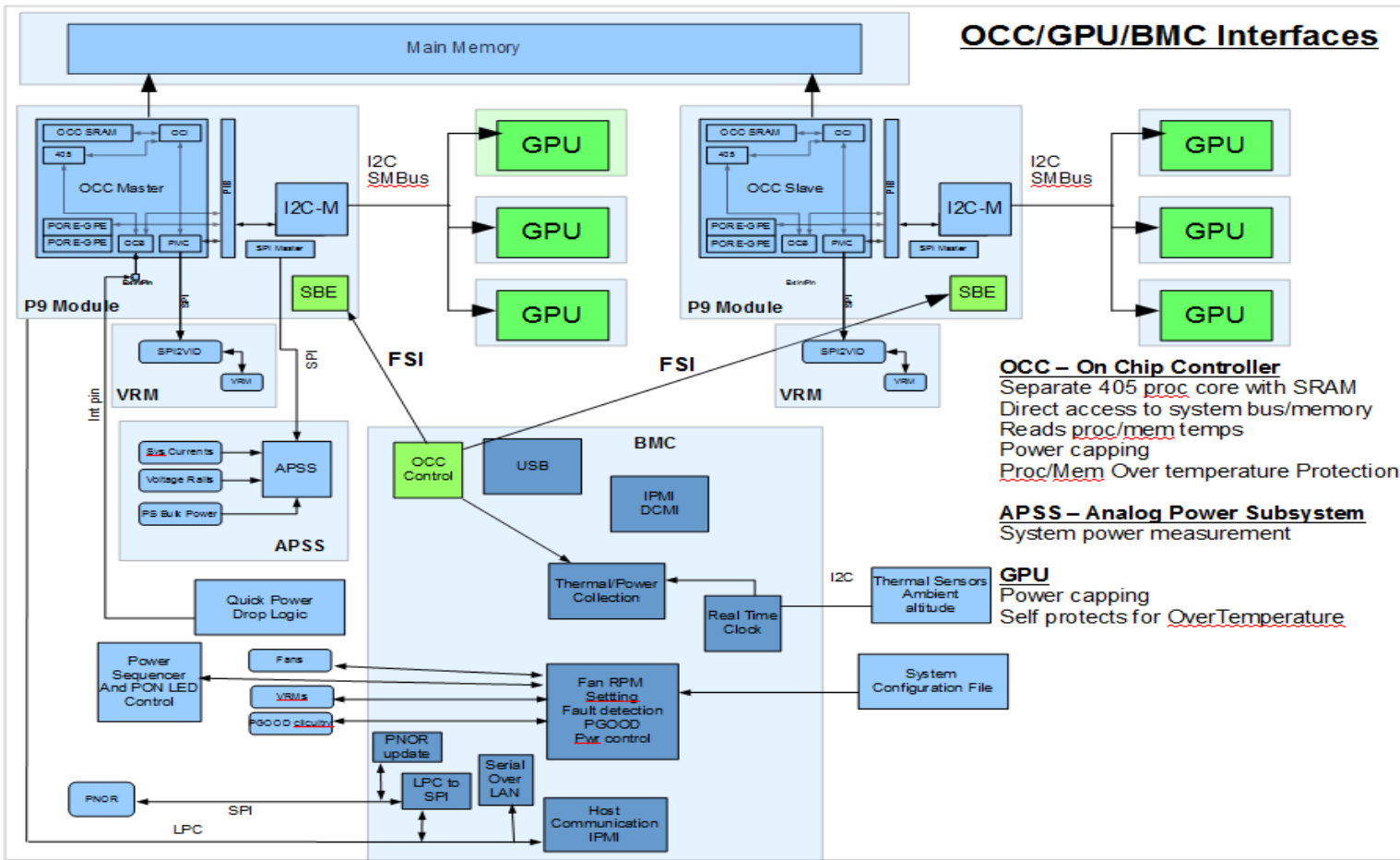


DC-SCM card – an open HW/SW BMC solution

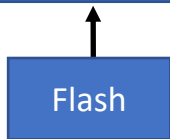
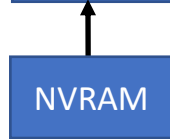
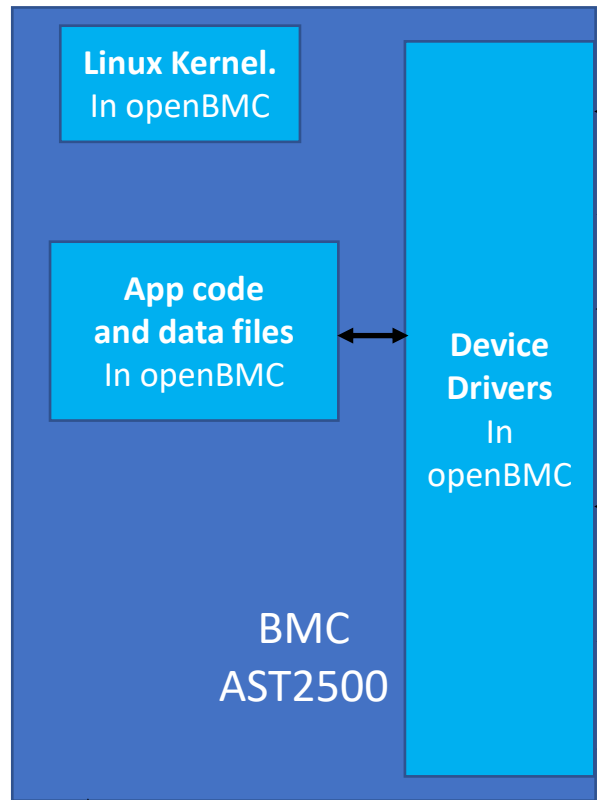
- Connects and boots an IBM AC922
 - Replaces the existing BMC card
- BMC is an FPGA
 - Open ISA (POWER ISA)
 - Open Core (microwatt)
 - Open Peripherals with Lite-X
 - OpenBMC firmware
- Uses the DC-SCM/DC-SCI standards
- Complete Openness for enhanced security – allows HW security patches in the field



AC922 BMC Block Diagram



Architecture – IBM AC922



**BMC Card
"Boxelder"**

FSI

LPC

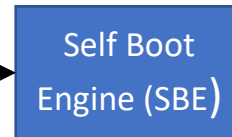
I2C

I2C

I2C

GPIO

**Molex 240
Pin connector**



Mem

IO

Power Supplies

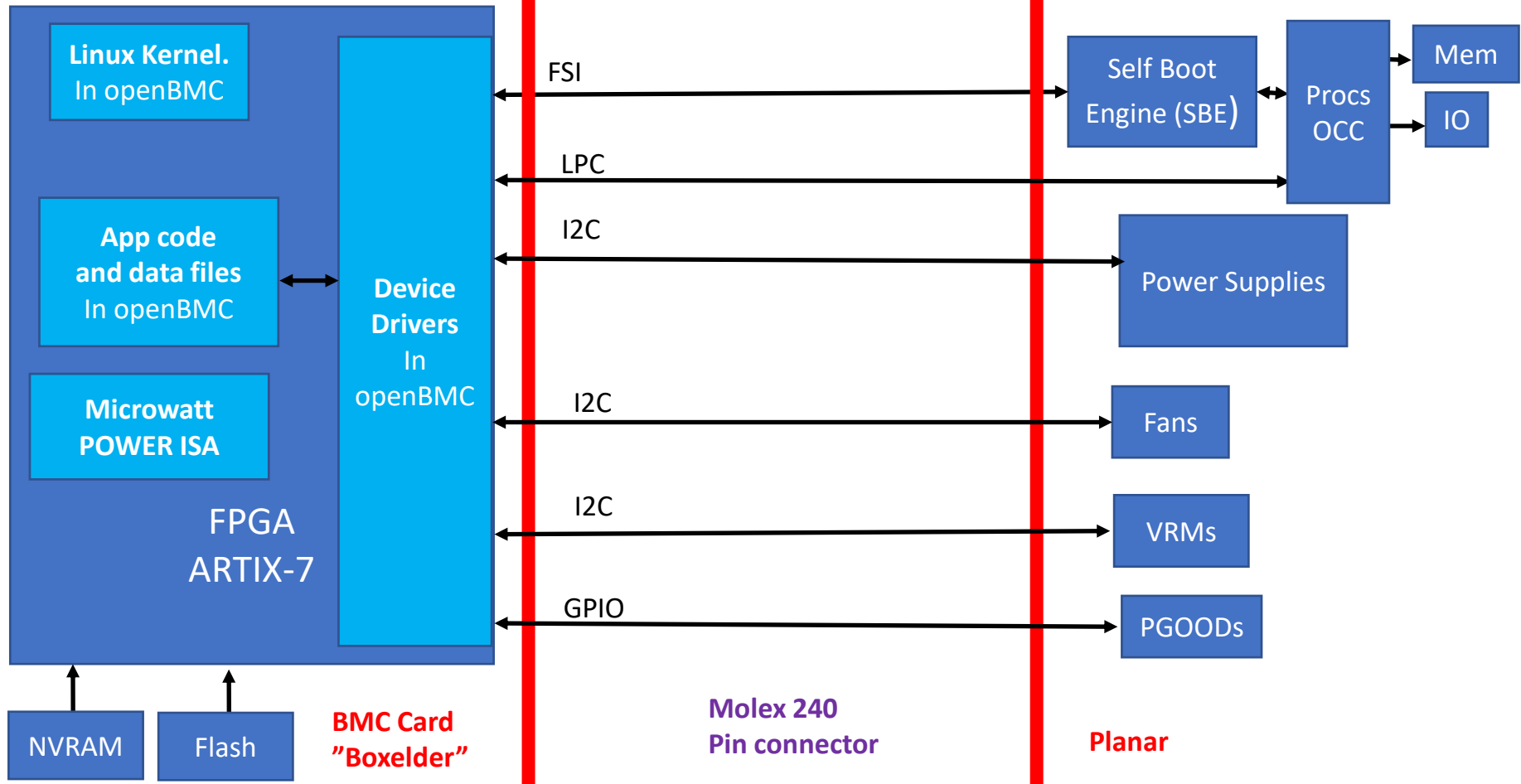
Fans

VRMs

PGOODs

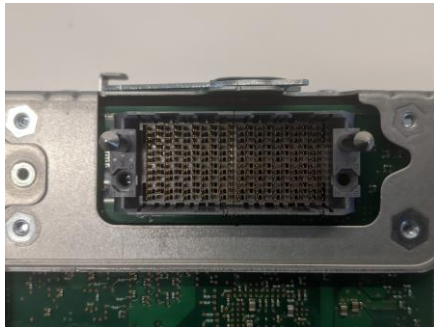
Planar

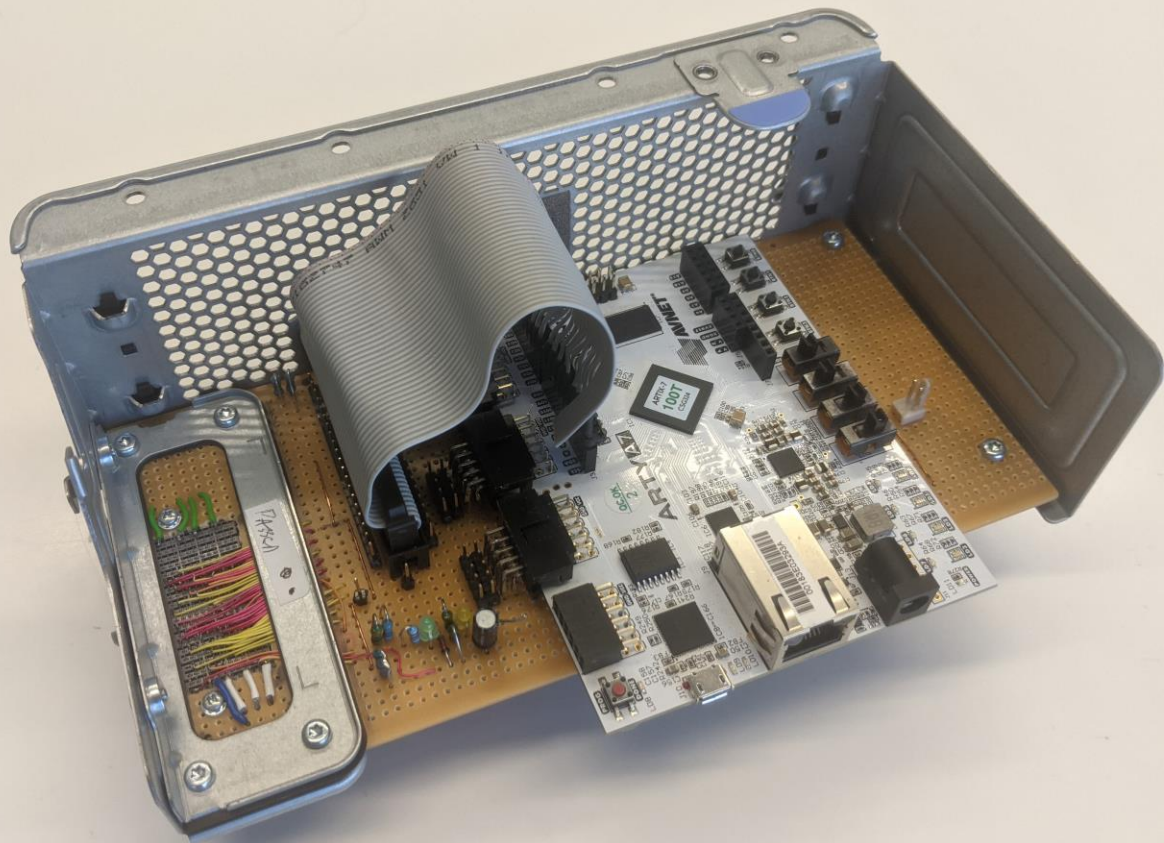
Architecture – IBM AC922 – “BoxArty”

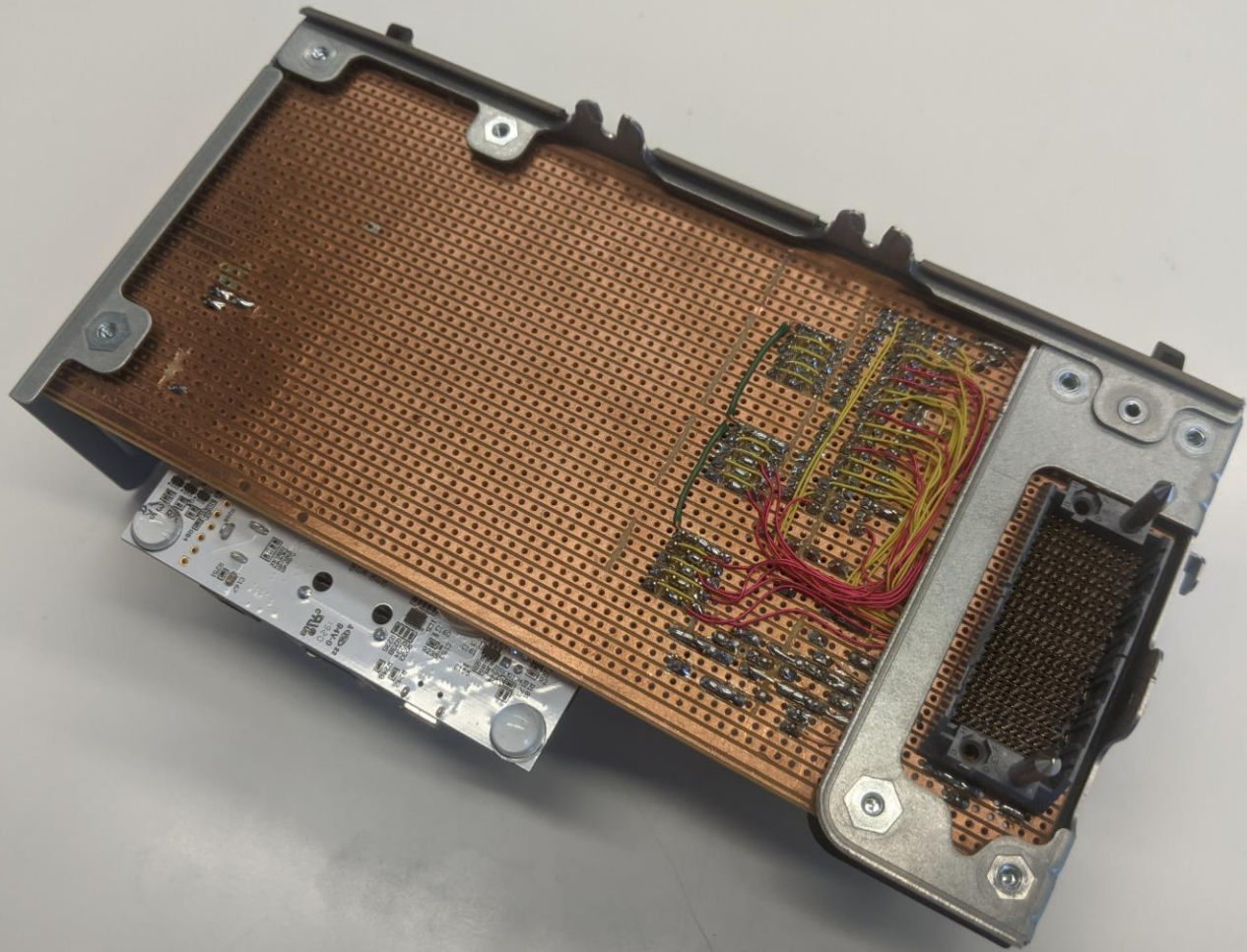


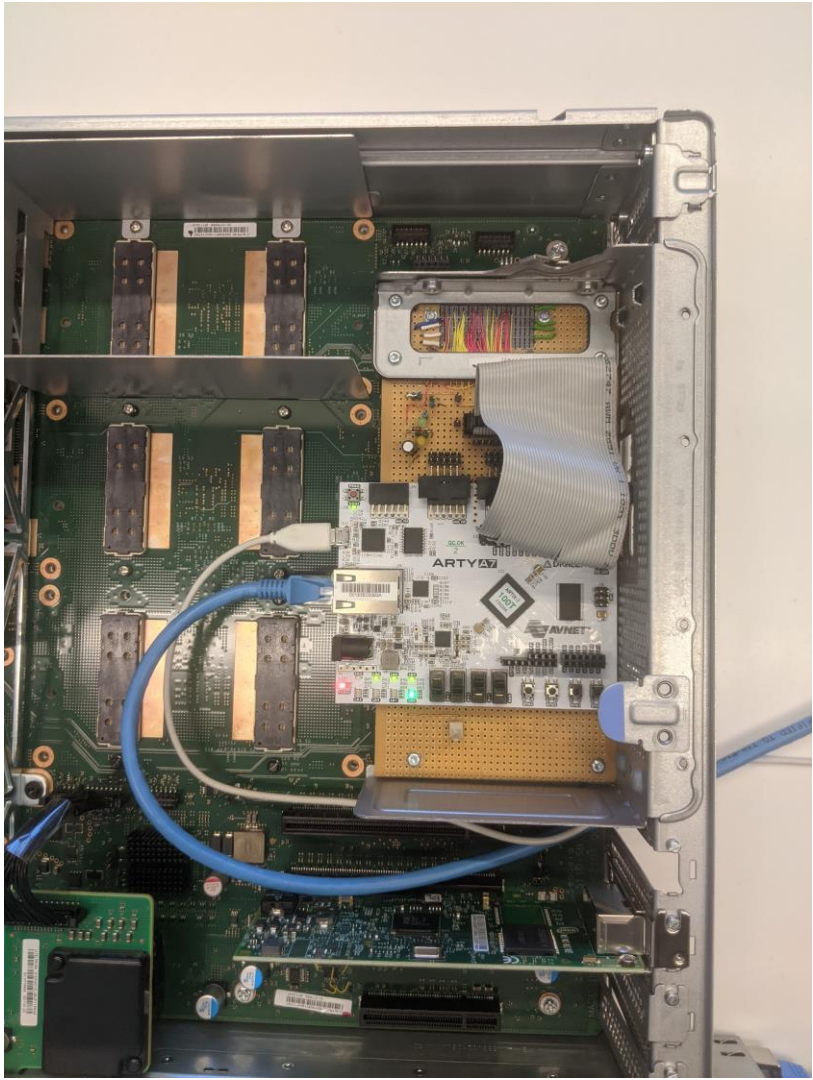
P9 Witherspoon/AC922

- Witherspoon has a plugin BMC card called **Boxelder**
- Main board is called Sequoia or Redbud
- Connected via Molex 240pin connector







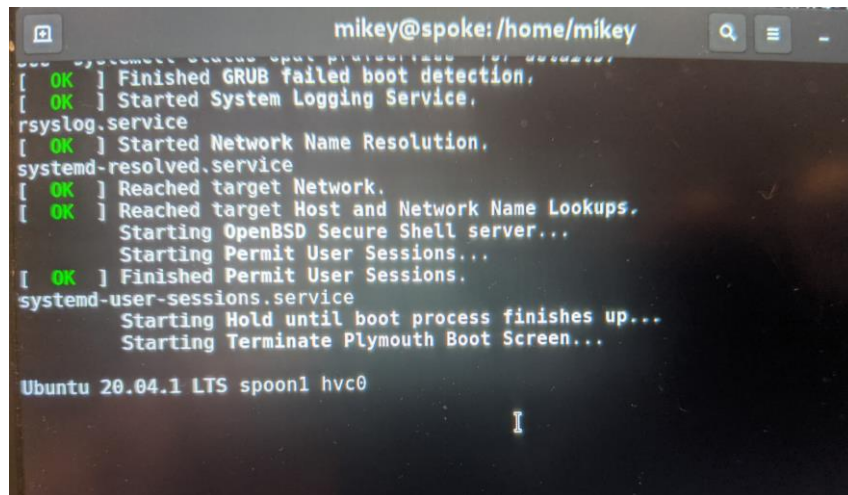


Software details

- Linux kernel running on microwatt
- Bit banging kernel drivers:
 - FSI
 - I2C
- Fan controllers via I2C
- PDBG:
 - CFAM
 - SCOMs
- LPC:
 - Host console – 16550 UART
 - Host firmware via LPC FW/IPMI BT – being upstreamed

Status:

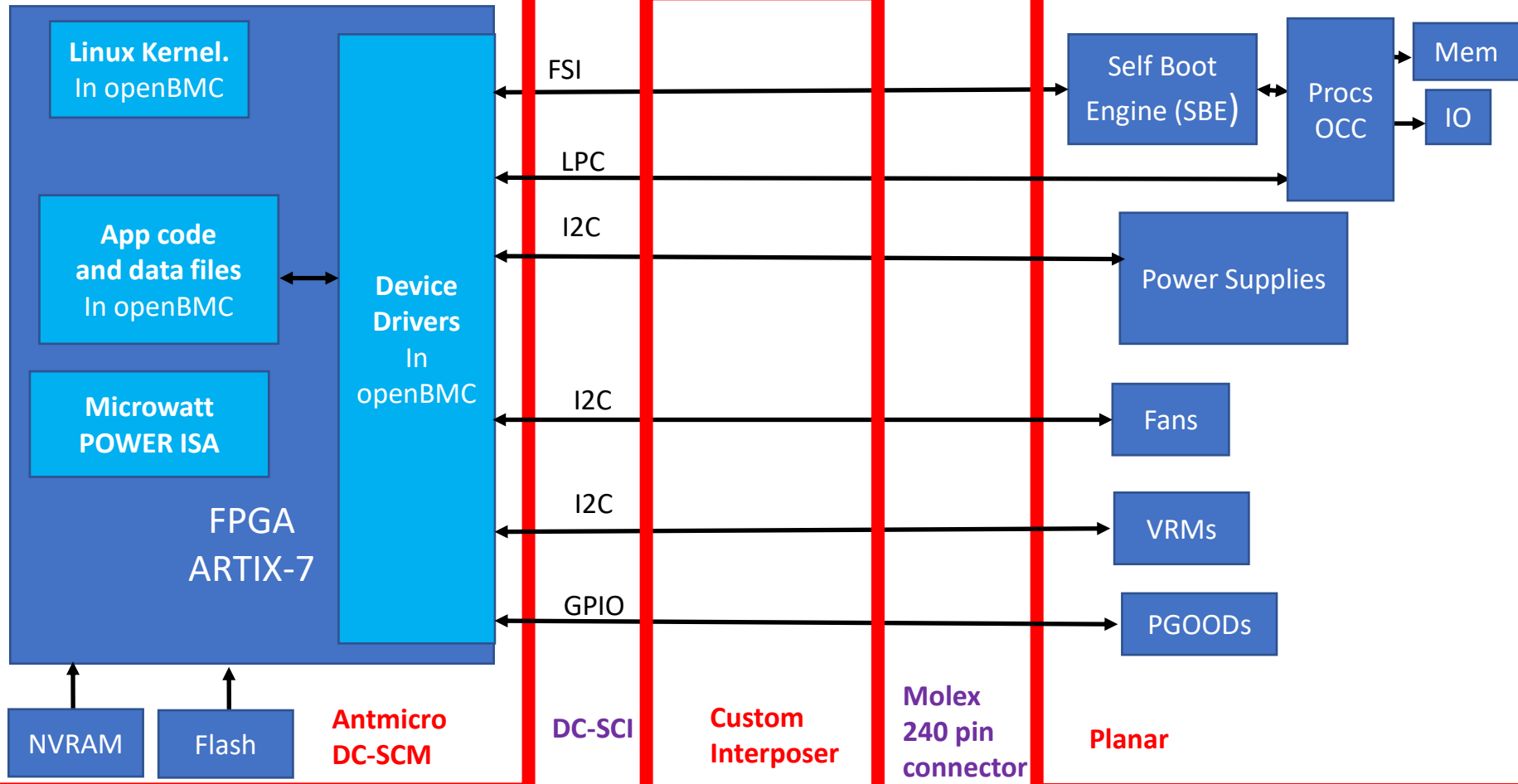
- Fans can be controlled
- Boots Vanilla Host Firmware!
 - SBE -> Hostboot -> OPAL -> Petitboot -> Ubuntu OS



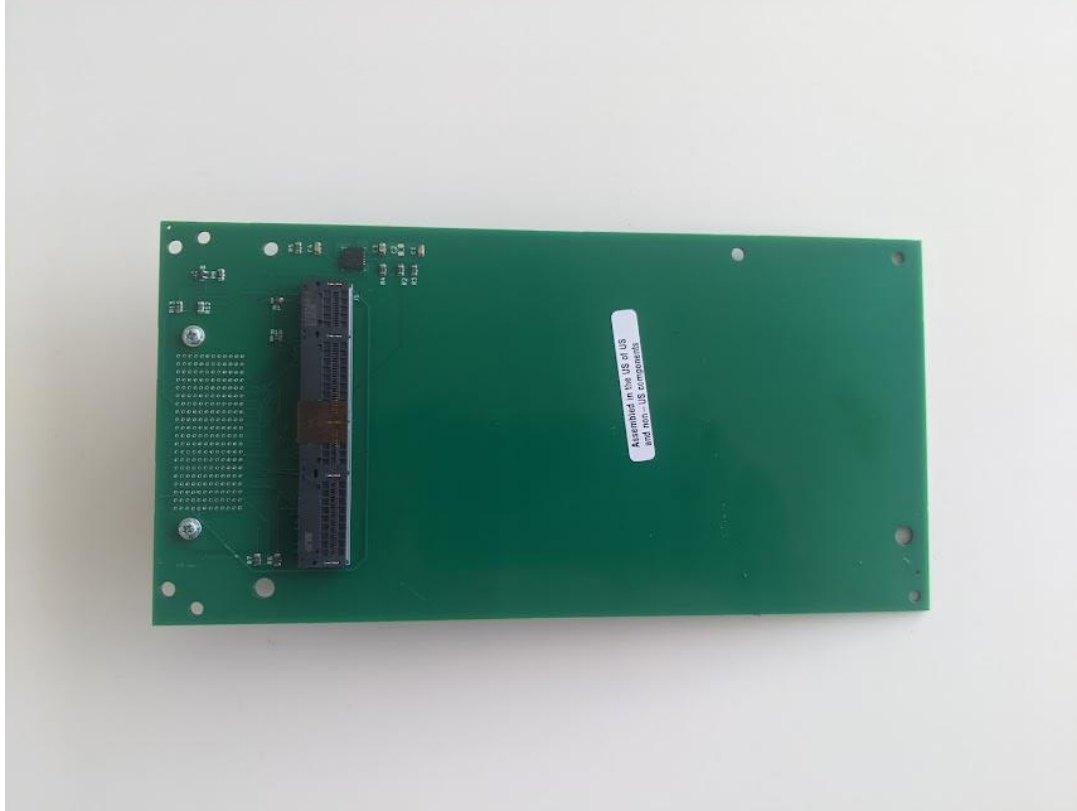
```
mikey@spoke: /home/mikey
[ OK ] Finished GRUB failed boot detection,
[ OK ] Started System Logging Service,
rsyslog.service
[ OK ] Started Network Name Resolution,
systemd-resolved.service
[ OK ] Reached target Network.
[ OK ] Reached target Host and Network Name Lookups.
Starting OpenBSD Secure Shell server...
Starting Permit User Sessions...
[ OK ] Finished Permit User Sessions.
systemd-user-sessions.service
Starting Hold until boot process finishes up...
Starting Terminate Plymouth Boot Screen...

Ubuntu 20.04.1 LTS spoon1 hvc0
```

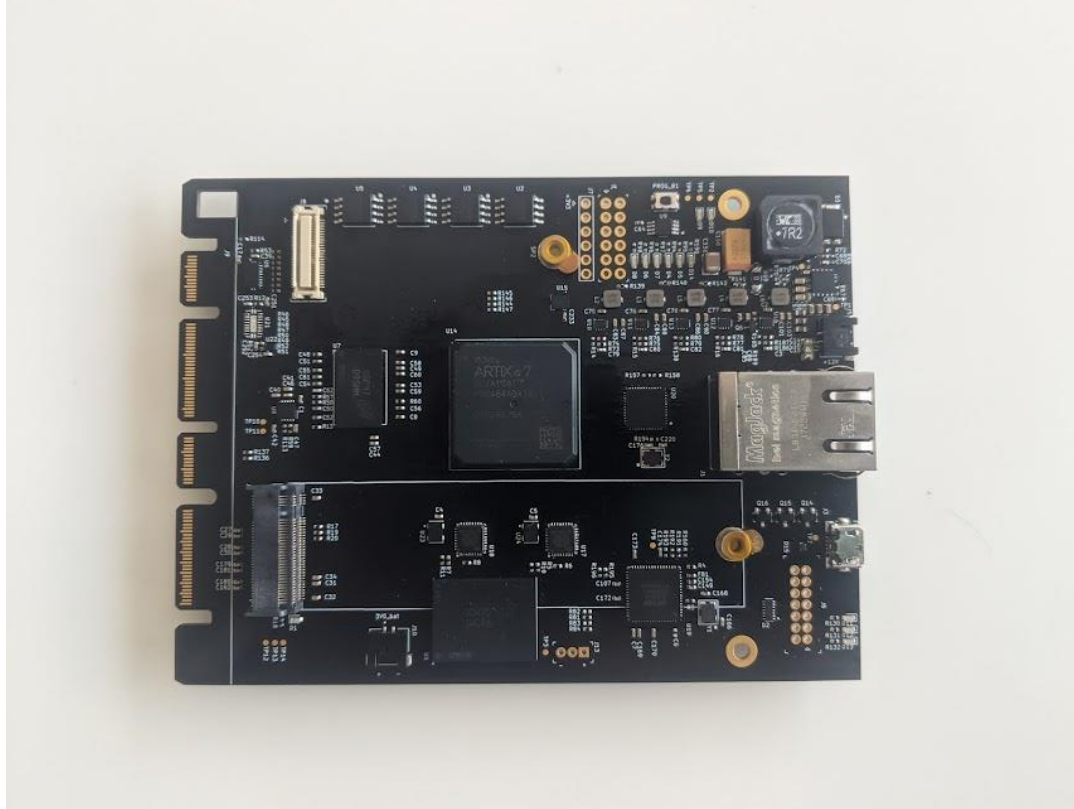
Architecture – IBM AC922 – Antmicro DC-SCM



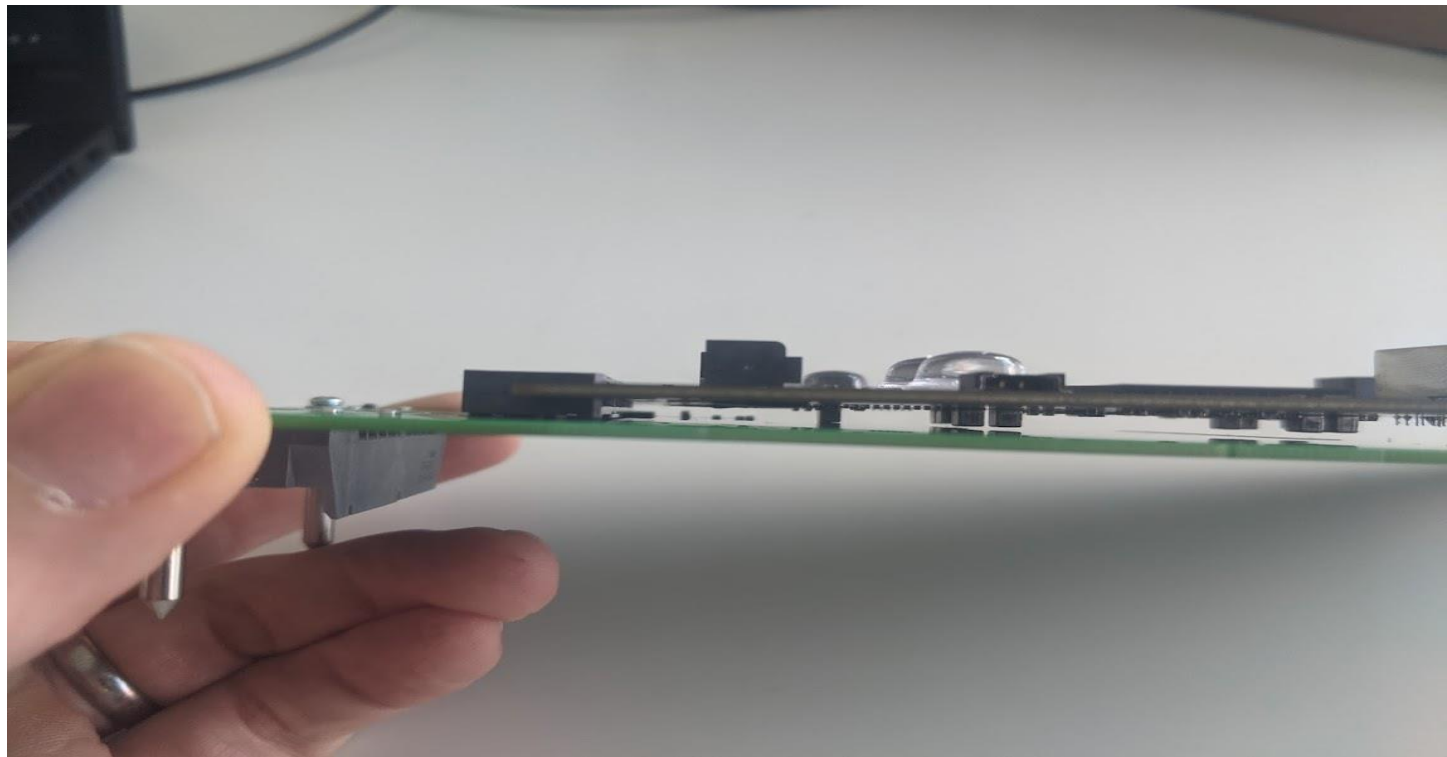
Interposer Card



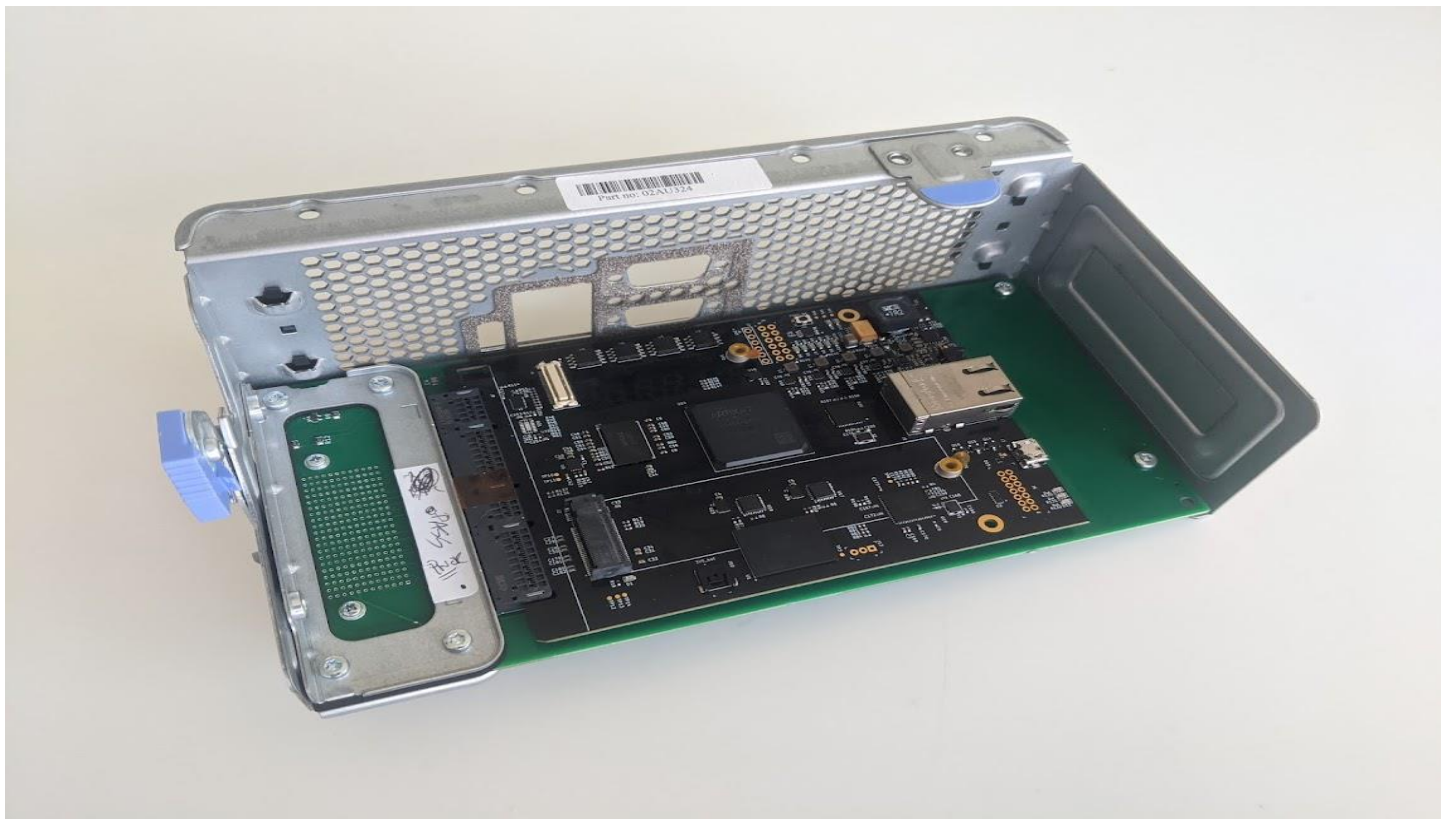
DC-SCM Card



Connected!



Installed in Carrier



Fully installed in AC922



What's Next

- Bringup on DC-SCM card – currently ongoing
- OpenBMC software stack – Add full support
- FPGA Gateware
 - Add full support
 - Performance/Size Improvements
- Upstream and CI incorporation
- Make this a viable BMC production replacement

Join us!

- Get in on the action: <https://openpower.foundation/groups/librebmc/>
 - The forum and all information is free and completely open to all
- We meet every other week. One European time slot(10am Central) and one Australian (5pm Central)
 - Agendas and recordings are made public
- Timeline for Product/Facility Availability
 - You can buy your own AC922 now: <https://www-store.shop.ibm.com/shops/ips/product/server-18335-model-gth>
- DC-SCM link: <https://www.opencompute.org/documents/ocp-dc-scm-spec-rev-1-0-pdf>
- Lite-X link: <https://github.com/enjoy-digital/litex>
- Open POWER ISA link: <https://openpowerfoundation.org/tag/power-isa/>
- Microwatt link: https://en.wikipedia.org/wiki/OpenPOWER_Microwatt
- FPGA Benchmark:
https://docs.google.com/document/d/1Z_FAfFPszk8nreLSvssLmDGayXmF4hmf6R8fMxUEZPM/edit

Thank you!



DC-SCM with LibreBMC and OpenBMC – IBM AC922

