Welcome
SFO17 - Connect 22

LEG
Server

LHG
DIGITAL HOME

LITE
IoT/EMBEDDED

KYLIN

NXP

XILINX
Engineering Highlights - a few of many

- OPTEE.org
- 17.08 ERP
- LITE IoT/EMBEDDED
- LwM2M
- Zephyr™
- DeveloperCloud
- openHPC
- Linaro Downloads
  linaro.org/downloads
It’s not just Linux ...
I skate to where the puck is going to be, not where it has been

Wayne Gretzky
Where is Open Source going?

Analytics
Artificial Intelligence
Automation
Automotive
Containers & Microservices
Internet of Things
Machine Learning
OpenStack
Public and Private clouds
RESTful APIs
Security
AI
Machine Learning

Open Source Software

- Machine Learning
- Computer Vision

- Dlib
- TensorFlow
- OpenCV
- Caffe
- Torch

Hardware & APIs

- CPU, GPU, FPGA
- Dedicated AI/ML accelerators/IP blocks
Face Recognition on HiKey
AI, Skynet and WW3

“Artificial intelligence is the future, not only for Russia, but for all humankind. It comes with colossal opportunities, but also threats that are difficult to predict. Whoever becomes the leader in this sphere will become the ruler of the world,”

Vladimir Putin, 1 Sep 2017

Elon Musk

China, Russia, soon all countries w strong computer science. Competition for AI superiority at national level most likely cause of WW3 imo.

2:33 AM - 4 Sep 2017
Automotive
Reference Hardware Concept

USB 2.0 x 6 HD Cameras
LIDAR/Ultrasonic
GPS, Car Control bus
HDMI Touch Screen, Storage
SoC-Independent processing complex for vision, ADAS, IVI ... for example
  ● multicore A73/A53 SoC with GPU
  ● 24 core A53 SoC
  ● SoC + AI HW acceleration
Automotive and Open Source

OTA Managed Containers
- e.g. AGL Linux
- Vision processing
- AI/Machine learning

Safe, OTA Updatable minimal Linux

Certifiable uKernel/Hypervisor e.g. seL4

Secure, Trusted Firmware

Arm, SoC Vendors, Automotive companies and supply chain

Secure OTA updatable Linux-based Platform Software

Enable the community
ADAS, AI, Autonomous Driving
Enable/Maintain key Safety Interfaces
Proof of Concept Proposal

Gumstix Aerocore 2 for 96Boards
PX4 and CANbus

Qualcomm DragonBoard 410C
Display & Camera
Sample of New Boards

**Consumer Edition**

<table>
<thead>
<tr>
<th>HiKey 960</th>
<th>Orange Pi i96</th>
<th>Uranus</th>
</tr>
</thead>
<tbody>
<tr>
<td>4x Cortex-A73</td>
<td>RDA Cortex-A5</td>
<td>TI CC3220 M4</td>
</tr>
<tr>
<td>4x Cortex-A53</td>
<td>256MB RAM</td>
<td>256KB RAM</td>
</tr>
<tr>
<td>Mali-G71 MP8</td>
<td>512MB Flash</td>
<td>1MB Flash</td>
</tr>
<tr>
<td>3GB LPDDR4 RAM</td>
<td>WiFi, BT</td>
<td>WiFi</td>
</tr>
<tr>
<td>32GB UFS 2.0 flash</td>
<td>CSI Camera</td>
<td>$9</td>
</tr>
<tr>
<td>USB 3.0, HDMI, mini-PCIe</td>
<td>WiFi, BT</td>
<td></td>
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</tbody>
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**IoT Edition**

**Secure96**

STM Cortex-M4
128KB SRAM
512KB Flash
SensorHub & LEDs
1Mbit Flash
Crypto ECC/SHA
TCG 2.0 TPM

**Mezzanines**
Arm Platforms for Developers

- **FVP**
- **Cloud**
- **Storage**
- **Device**

**Foundation**

- **Base**
- **System Guidance**

**DeveloperCloud**

[www.linaro.cloud](http://www.linaro.cloud)

**Upstream software support**

- 24x A53 1GHz cores @ 5W
- LPDDR4, PCIe G2
- microATX 96Boards EE
- GIGABYTE
- socionext
Open Source Software Platforms
Minimal
Secure
OTA Updatable
<table>
<thead>
<tr>
<th>micro-Services</th>
<th>Zephyr</th>
<th>Bootloader</th>
</tr>
</thead>
<tbody>
<tr>
<td>MQTT</td>
<td>HTTP</td>
<td>CoAP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LWM2M Thread</td>
</tr>
<tr>
<td>TLS/DTLS</td>
<td></td>
<td>IPv4/v6 TCP/UDP</td>
</tr>
<tr>
<td>IPv6 6LoWPAN</td>
<td></td>
<td>Secure OTA Updater</td>
</tr>
<tr>
<td>Secure OTA Updater</td>
<td>Zephyr Kernel</td>
<td>Ethernet, WiFi, BLE, 802.15.4, LoRa, NB-IoT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MCUBoot Secure Bootloader</td>
</tr>
</tbody>
</table>
Linux microPlatform

Runtime & Container microServices

Upstream-tracking Linux kernel

Firmware

Optional Distro

- Minimal Core Services
- Container Management/Runtime
- Cloud microServices
- Secure OTA updates

OpenEmbedded
- Unified multi-SoC Kernel

Optional HyperVisor

- Firmware - UEFI, Security, Updater

Security
- OP-TEE
The Code

github.com/linaro-technologies

The Documentation

ltd-docs.readthedocs.org
End to End Arm Demo - Device to Cloud

96Boards Nitrogen

BLE-mesh

Gateway/Bridge
HiKey & Raspberry Pi 3

mcuBoot & OTA update

Zephyr™

mLwM2M

MQTT

openembedded
docker
freeboard

SoftBank IoT DM

SB Cloud

Alibaba Cloud

LAVA+64

DeveloperCloud

www.linaro.cloud

hawkBit

docker

LESHAN
Collaborative Upstream Engineering

Downstream microPlatforms

Linaro

OPEN SOURCE FOUNDRIES
Growing the Linaro Ecosystem

Associate Program
Open to OEMs/ODMs/Service Providers/Universities
Participate and provide input to Linaro
Email: associates@linaro.org
Enjoy SFO17