QorIQ LS1043A APPLICATION SOLUTION KIT (IoT, NAS, RGW)

Nov. 16, 2016

ABSTRACT

- This session provides an introduction on how to develop end products using the Application Solution Kit (ASK) for QorIQ LS1043A processors.

AGENDA

- ASK Description
- ASK : IOT, BHR and NAS
- NXP OpenWRT project
- Summary

ASK DESCRIPTION

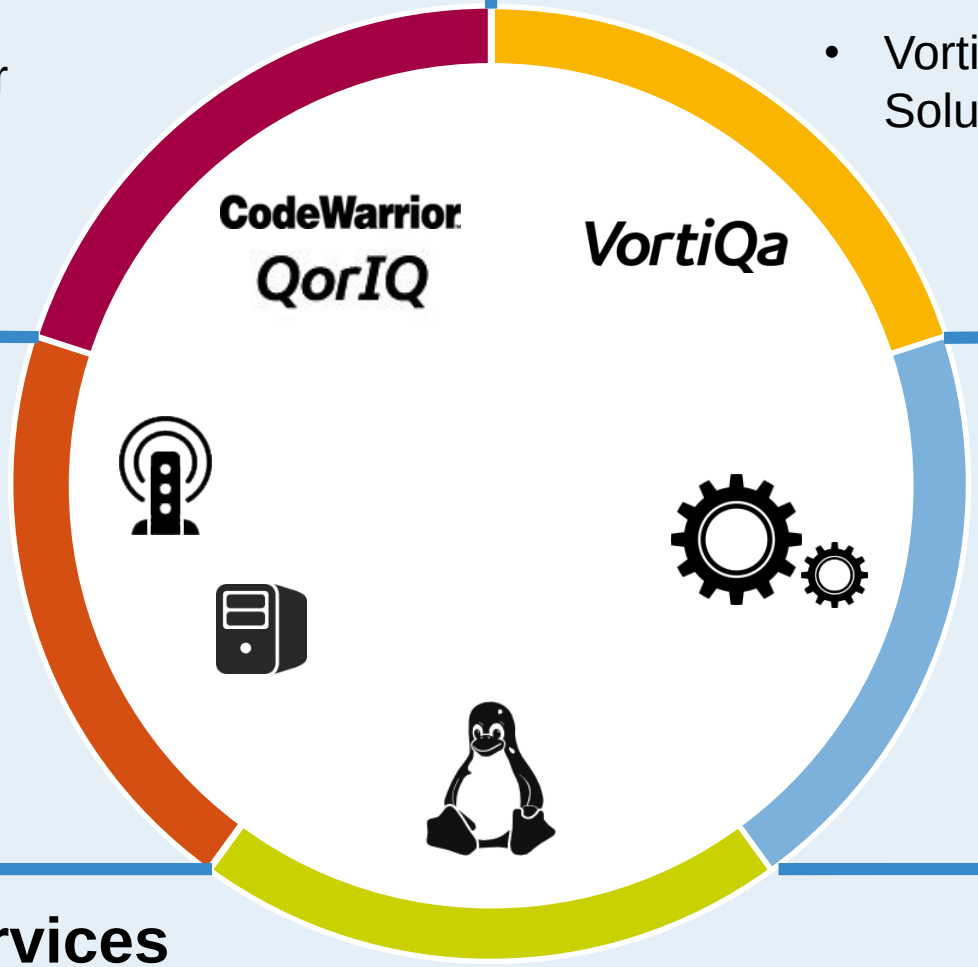
Software Products and Services

Development Tools

- CodeWarrior

Runtime Products

- VortiQa Software Solutions



Solutions Reference

- IOT Gateway
- OpenWRT+

Integration Services

- Security Consulting
- Hardened Linux

Linux® Services

- Commercial Support
- Performance Tuning

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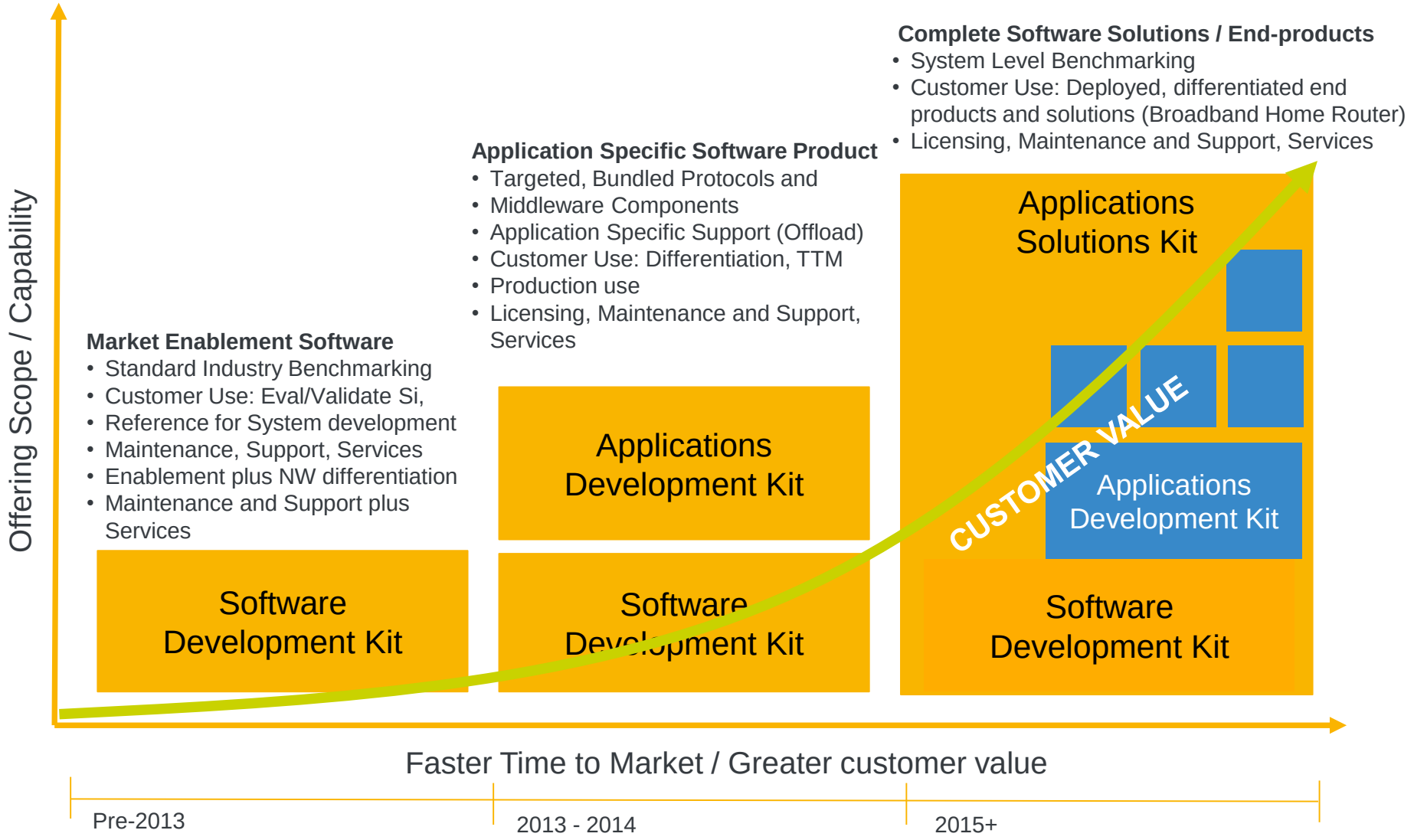
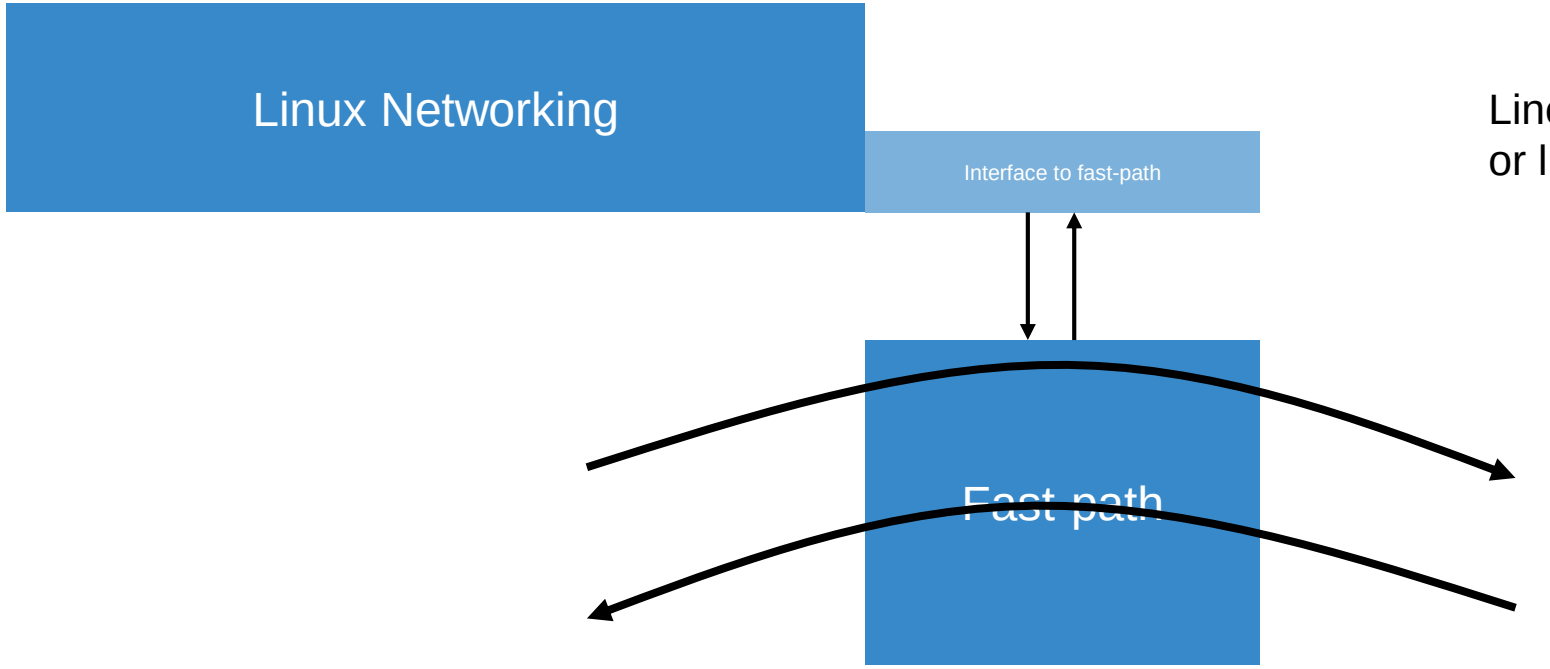
SDK vs. ADK vs. ASK



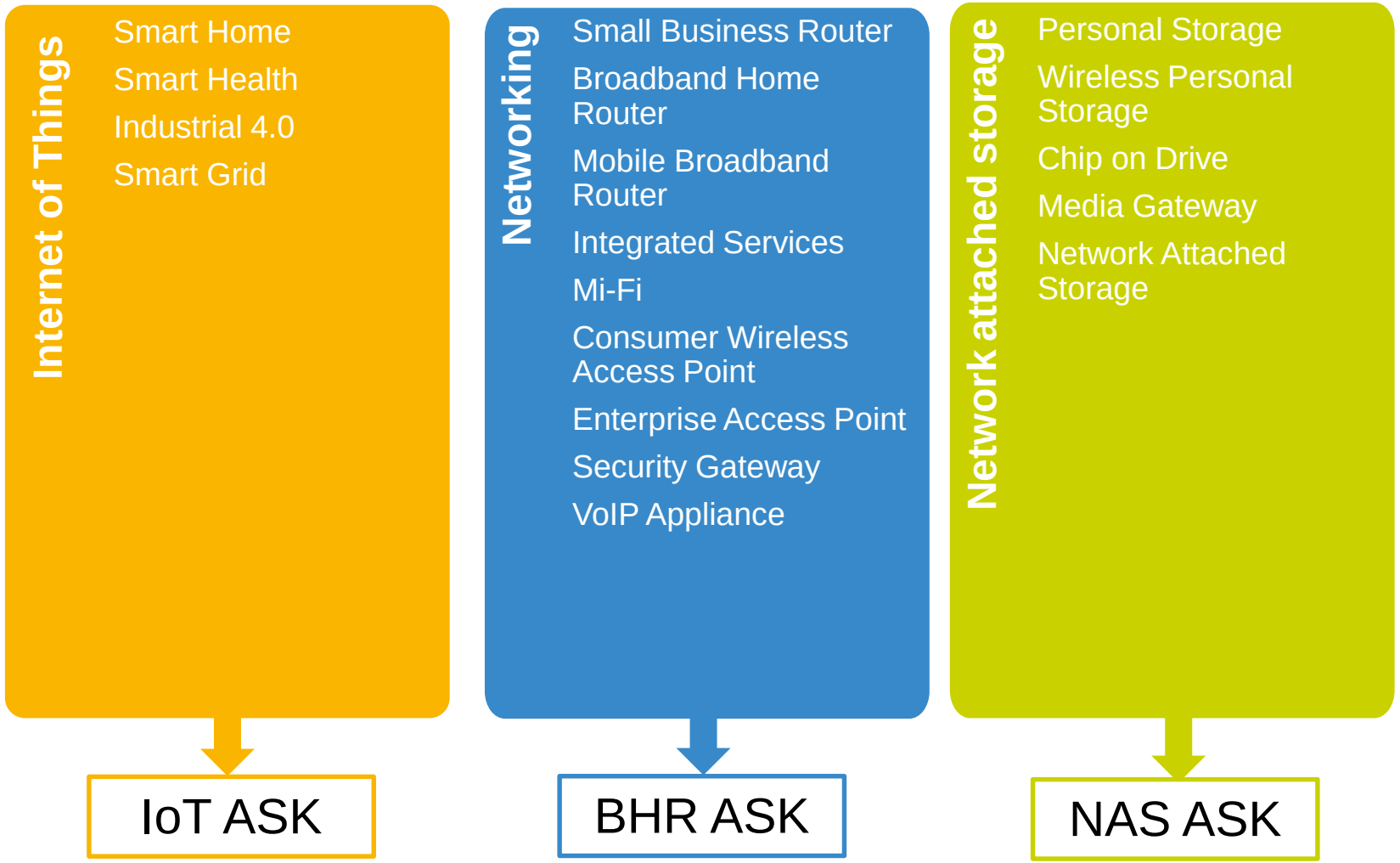
Why Use the ASK

- Production-tested targeted packages
  - Can give a real head-start on end-product
- Gives access to BHR and NAS Fast Path, VoIP binaries and supporting software



Line-rate throughput with little or limited additional CPU load

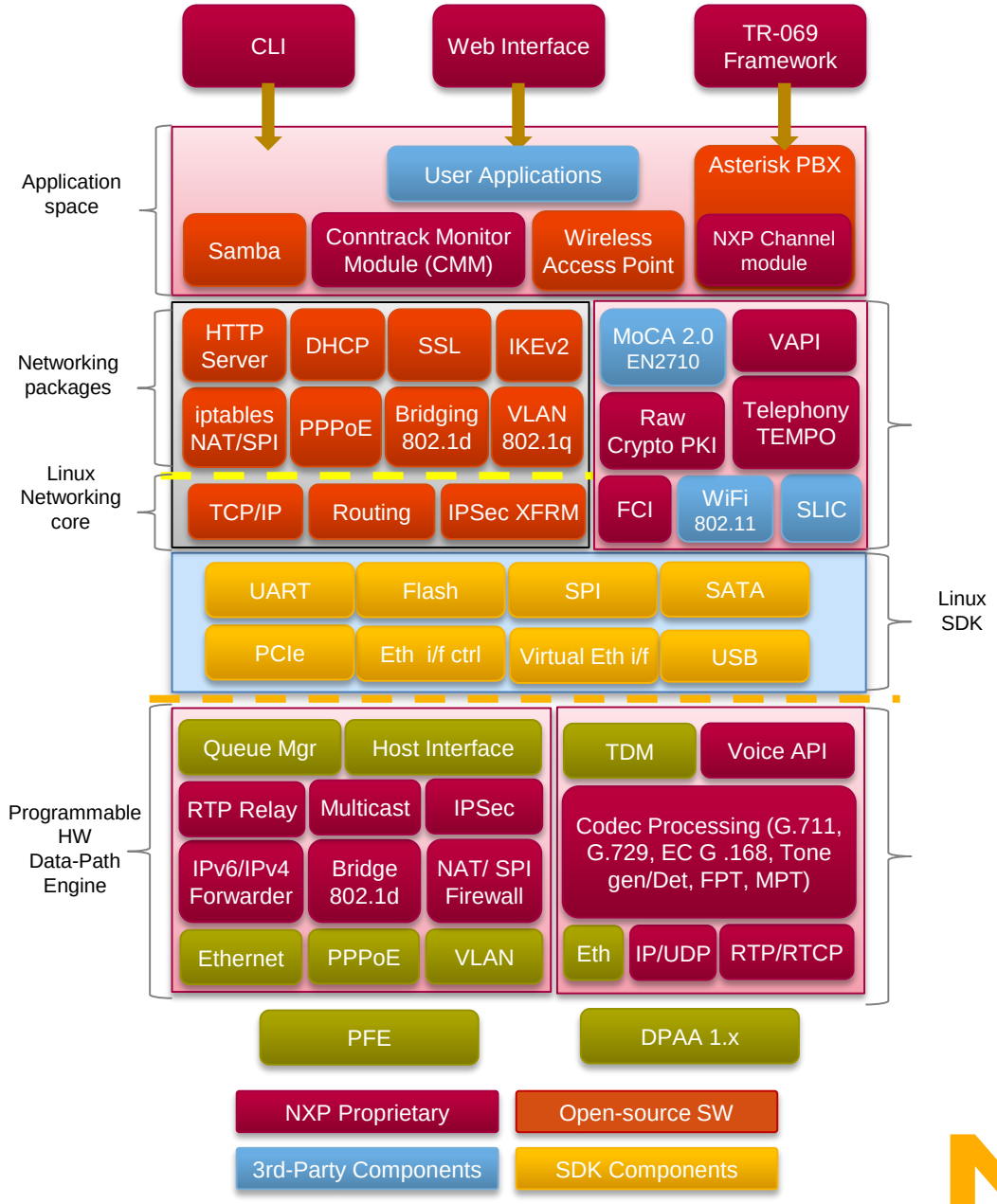
Application Solution Kits (ASK) – LS1



BHR Application Solution Kit

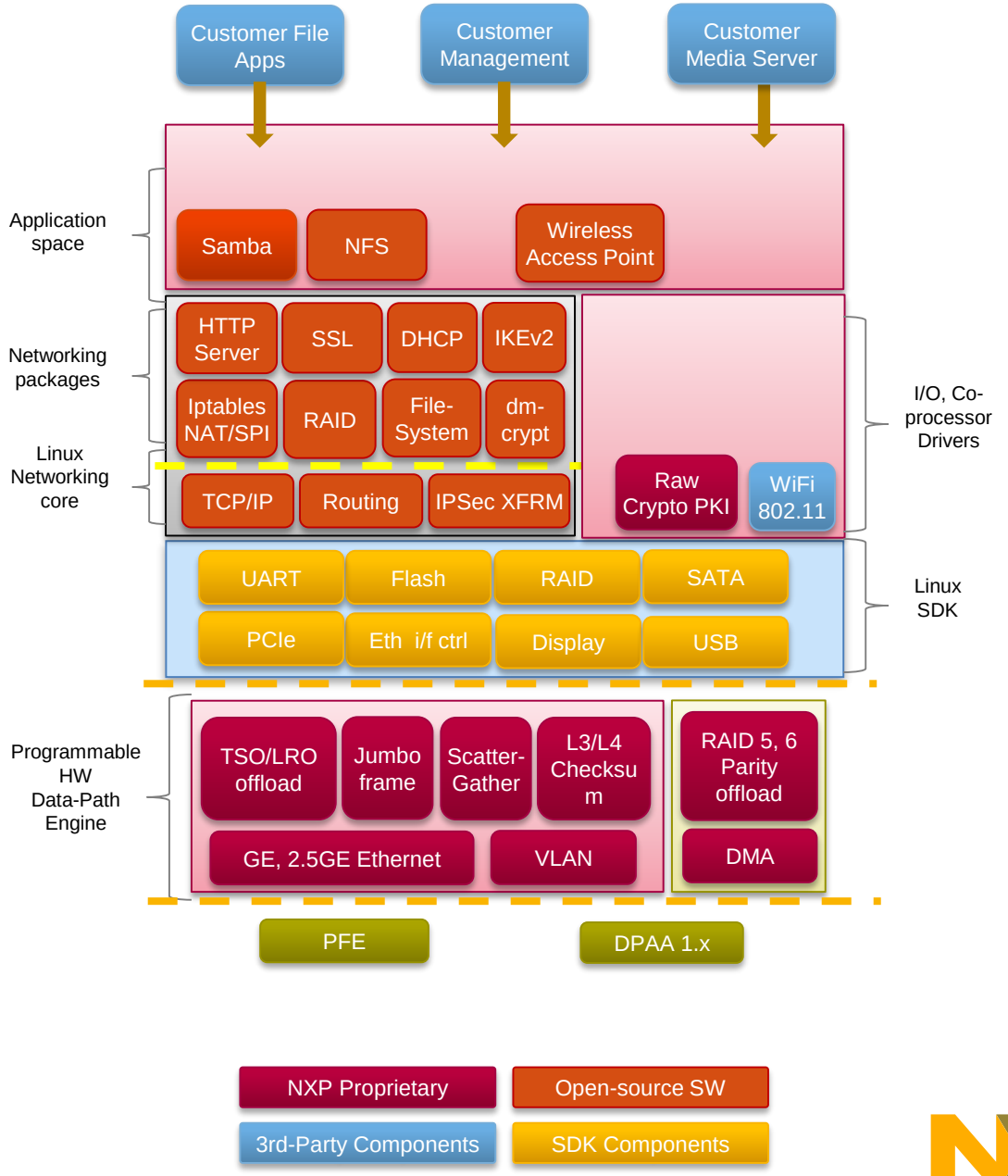
- Turnkey Market Specific Solutions
  - Application, Middleware and SDK integration
  - Full-featured and optimized
  - Deployable directly or via ODM partners
  - Systems Integration and Customization

- Target Markets
  - Multi-Service Gateways
  - Enterprise/Access Gateways
  - WLAN Access-points
  - Consumer/Prosumer NAS
  - Intelligent NIC adapters
  - IoT Gateways



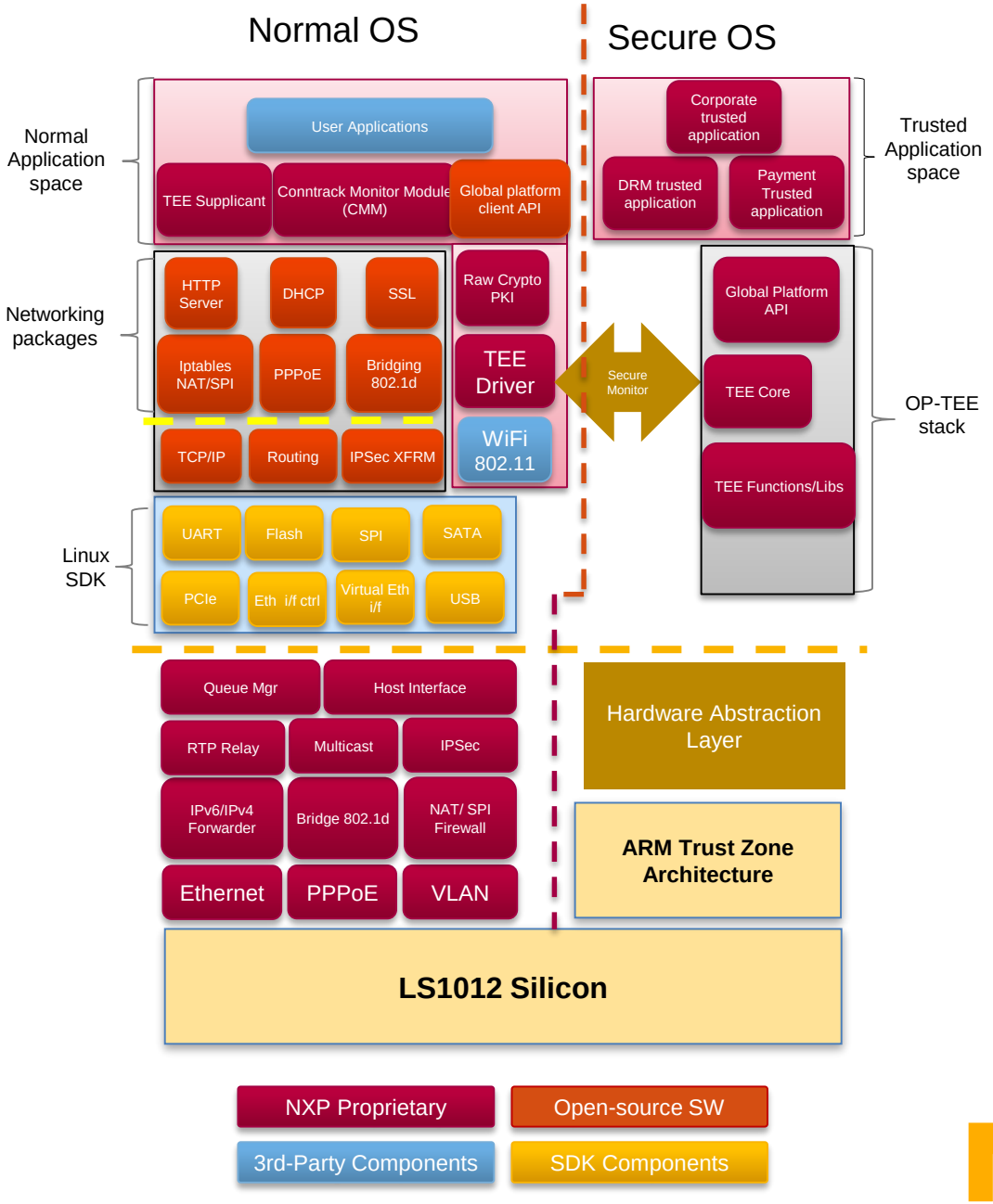
Consumer NAS ASK

- Key Highlights
  - HW offload delivers best-in-class NAS performance
  - Rich set of RAID & file-system support
  - Secure storage and secure access of data
  - Optional VPU(ZN200) integration for hardware transcoding – delivers up to 4 simultaneous HD channels
  - Offloads
    - LRO/TSO, Jumbo-frame, checksum
    - RAID parity calculation, DMA
  - Highly optimized storage stack
    - Samba, NFS, HTTP, SSL
    - RAID 0, 1, 5, 6, JBOD support



IoT ASK (Available in Q32016)

- ARM Trustzone® execution environment
- SEC engine with symmetric and asymmetric crypto support
- Full-featured Op TEE stack
  - Secure OS
  - Secure key management
  - Global platform API support
- Networking and upper application layers
  - Feature rich and optimized networking stack
  - Optional Pre integrated Partner OSGi and JVM layers for quick Time to Market



NXP OpenWRT Project

NPX OpenWRT Project

Target :

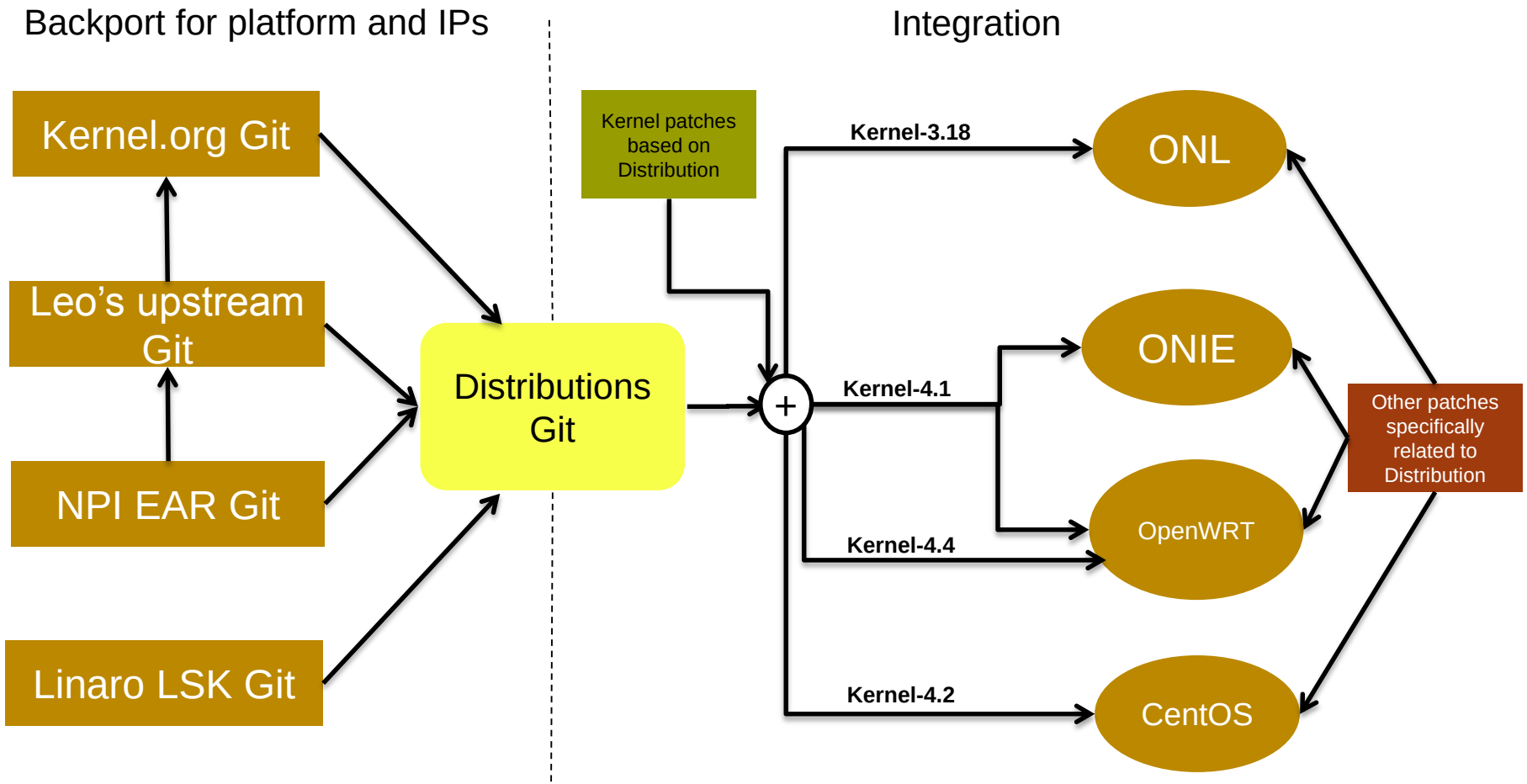
Push LS1043A, LS1012A, LS1046A and LS1028A support to OpenWRT community in both 32bit and 64bit modes

- Silicon: LS1043A, LS1012A, LS1046A in 2016, LS1028A in 2017+
- Board: RDB board
- Required Kernel version: V4.4
  - V4.4 for 32bit and 64bit kernel.
- Referenced Kernel version: 4.4 & 4.1
- U-boot version: 2016. 01 from SDK2.0 or EAR releases
- Tool-chain: AArch32/AArch64 Tool chain from OpenWRT

Feature list (Typical features used by OpenWRT)

- Platform support
- DDR Memory
- Serial Console support
- 1G/10G network port.
- USB host.
- SDIO driver
- PCIe Host bus.
- IFC NOR.
- IFC NAND.
- GPIO
- I2C
- Reset

General Process for Release of Distributions



The OpenWRT support process will align with the process for release of Distributions.

Preliminary Schedule for OpenWRT

ID	Task Name	Date
1	Submit LS1043A 32bit support to OpenWRT	The middle of July, 2016
2	Submit LS1043A 64bit support to OpenWRT	The middle of Aug, 2016
3	Submit LS1012A 64bit support to OpenWRT	The middle of Sep, 2016
4	Submit LS1012A 32bit support to OpenWRT	The beginning of Oct, 2016
5	Submit LS1046A 64bit support to OpenWRT	The end of October,2016
6	Submit LS1046A 32bit support to OpenWRT	The middle of November, 2016
7	Feedback handle and discussion with community	Until the end of march, 2017

Note: LS1028A 32bit support will align the ARMv8 32bit release.

Download OpenWRT sources

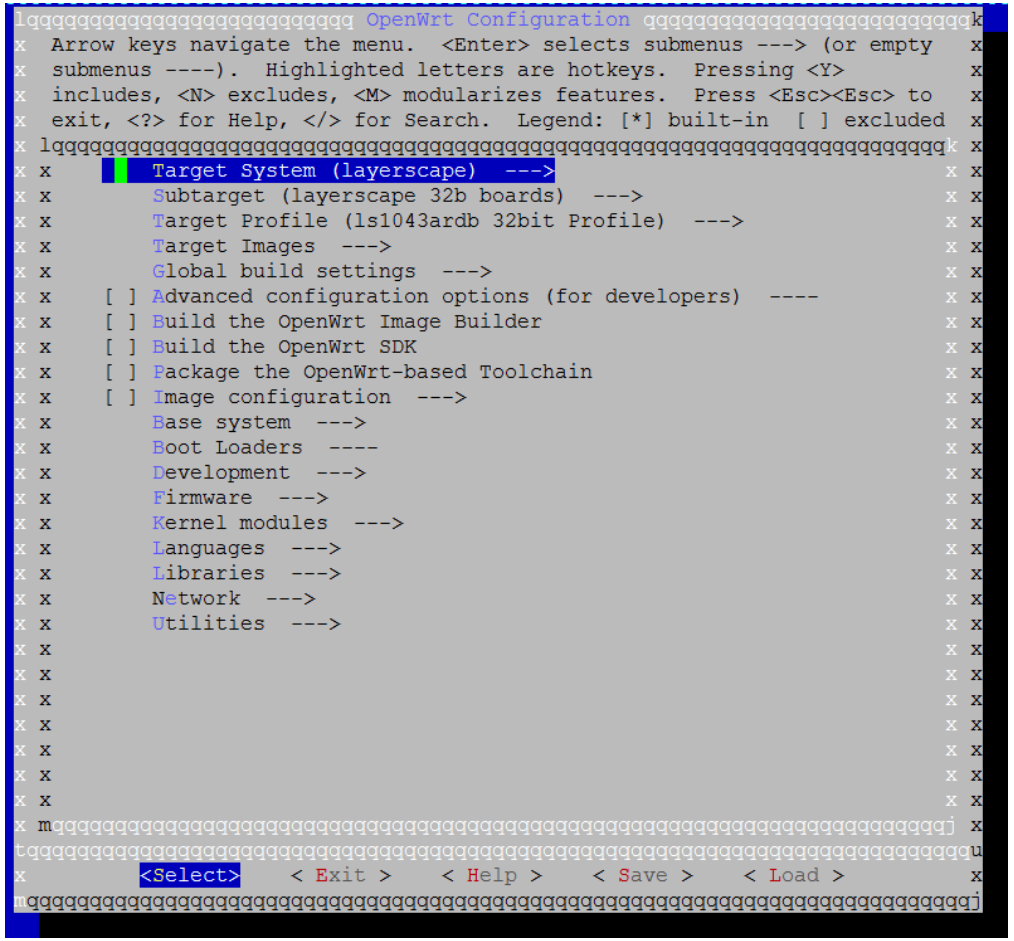
- Use git tool
  - git# git clone https://github.com/fsl-jyt/openwrt.git
  - git# cd openwrt
  - openwrt# ls ; list openwrt directories
  - openwrt# git branch –a ; display all branches

```
openwrt# git branch -a
 master
* patchv4
 remotes/origin/HEAD -> origin/master
remotes/origin/attitude_adjustment
 remotes/origin/barrier_breaker
remotes/origin/chaos_calmer
remotes/origin/ls1012ardb-ear1
 remotes/origin/master
 remotes/origin/patchv1
 remotes/origin/patchv2
remotes/origin/patchv3
remotes/origin/patchv4
openwrt#
```

  - openwrt# git checkout –b patchv4 origin/patchv4

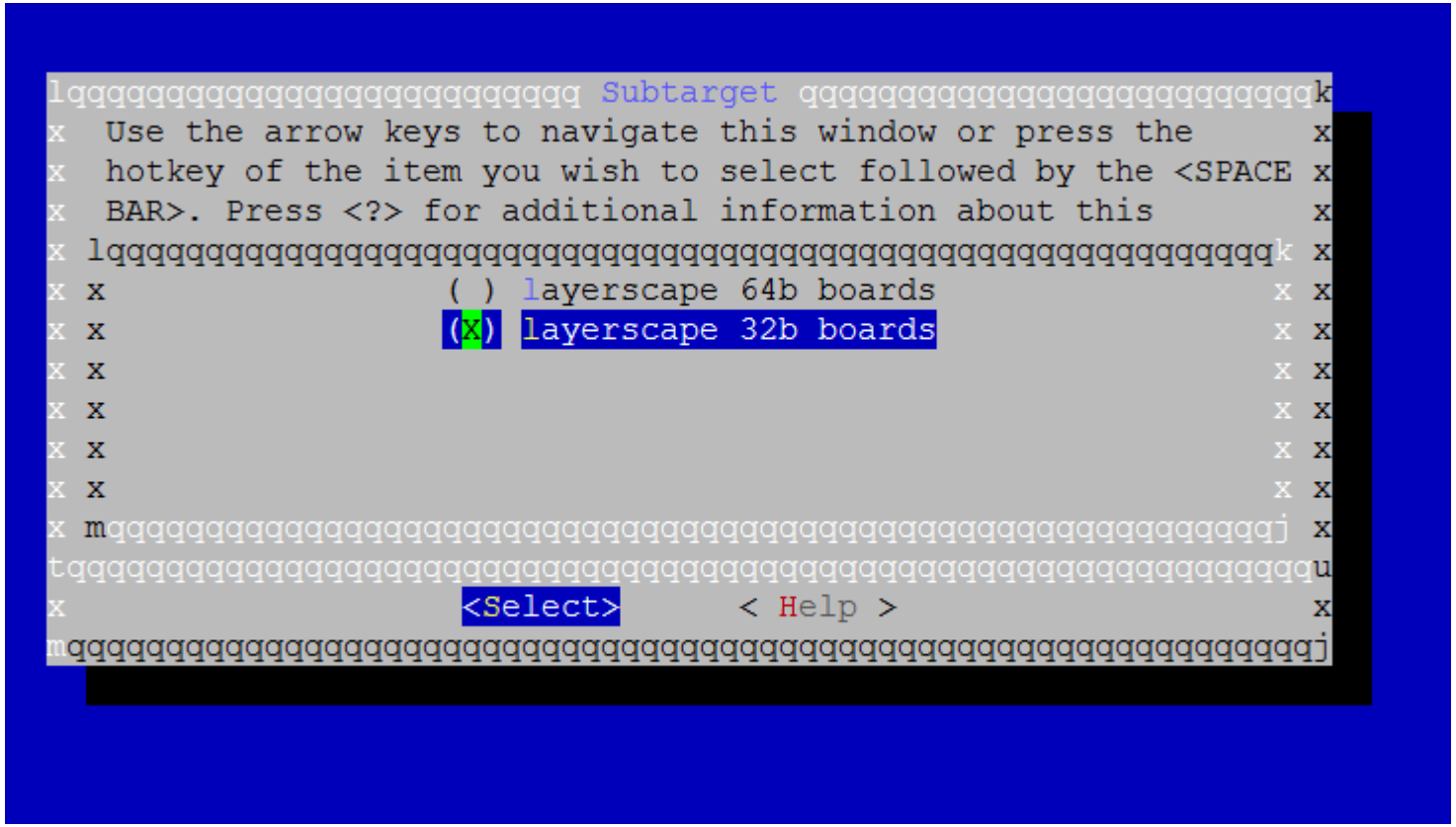
Config OpenWRT

- Openwrt# make menuconfig



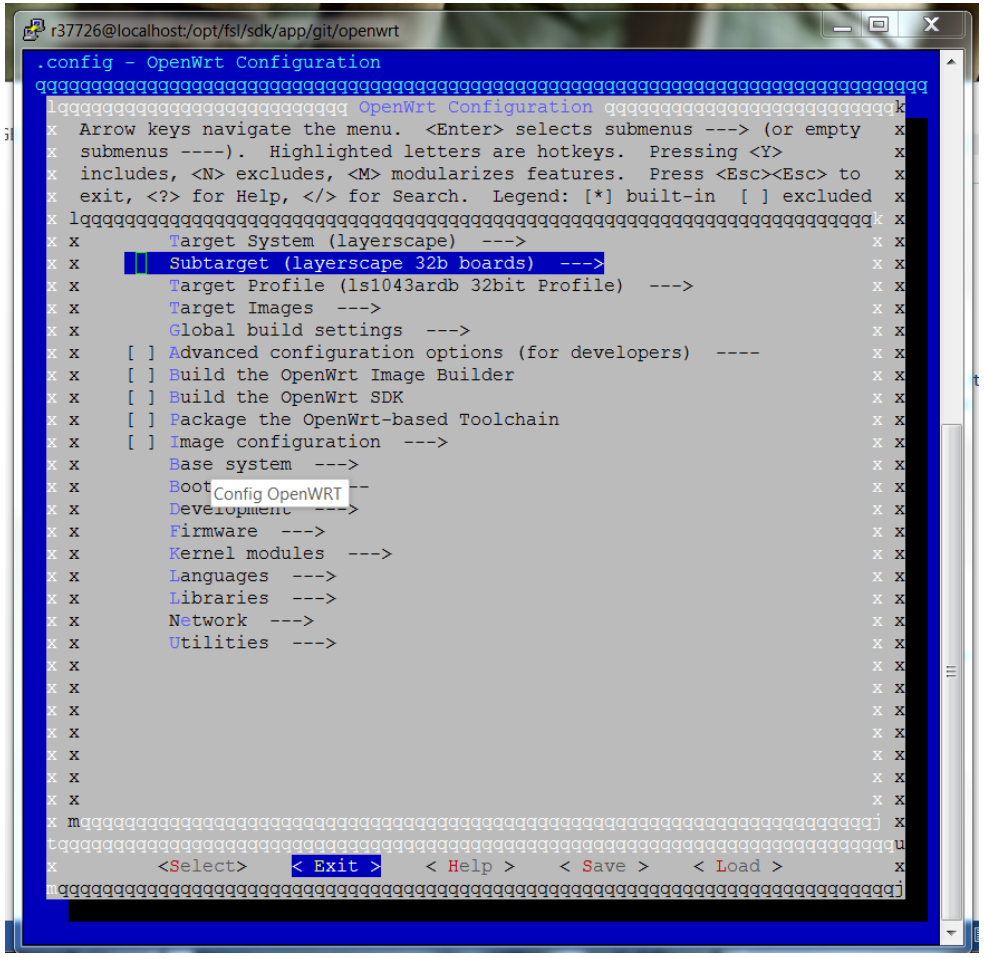
Config OpenWRT

- (in “make menuconfig”)
  - select “Subtarget (Layersacpe xx boards)



Config OpenWRT

- (in make menuconfig) Exit -> save



Build openwrt images

openwrt# make

```
make[1] world
make[2] target/compile
make[3] -C target/linux compile
make[2] package/cleanup
make[2] package/compile
make[3] -C package/libs/toolchain compile
make[3] -C package/libs/libnl-tiny compile
make[3] -C package/libs/libjson-c compile
make[3] -C package/utils/lua compile
make[3] -C package/libs/libubox compile
make[3] -C package/system/ubus compile
make[3] -C package/system/uci compile
make[3] -C package/network/config/netifd compile
make[3] -C package/system/ubox compile
make[3] -C package/libs/lzo compile
make[3] -C package/libs/zlib compile
…
```

Openwrt build_dir

```
openwrt# ls ./build_dir/target-arm_cortex-a9_musl-1.1.15_eabi/
        busybox-1.24.2          lzo-2.09            ubox-2016-07-19
        dropbear-2016.74        mbedtls-1.3.17      ubus-2016-07-02
        fstools-2016-07-24      mbedtls-2.3.0       uci-2016-07-04.1
        host                    netifd-2016-06-06   uclient-2016-01-28
        json-c-0.12             opkg-unsigned       usign-2016-07-04
        jsonfilter-2016-07-02   procd-2016-07-29
        ustream-ssl-polarssl
        libnl-tiny-0.1          root-layerscape     util-linux-2.28
        libubox-2016-07-29      stamp               zlib-1.2.8
        linux-layerscape_32b    toolchain
        lua-5.1.5               ubi-utils-1.5.1

openwrt#
```

Openwrt image location

- Linux image

  build_dir/target-arm_cortex-a9_musl-1.1.15_eabi/linux-layerscape_32b/Image

- Root file system : Squashfs

  bin/layerscape/openwrt-layerscape-32b-ls1043ardb-32bit-squashfs-firmware.bin

Summary

- NXP provides ASK to deliver commercial softwaware, support, services and solutions.
- ASK for LS1 includes IOT ASK, BHR ASK and NAS ASK. .
- NXP pushes LS1043A, LS1012A, LS1046A and LS1028A support to OpenWRT community in both 64b and 32b modes.
- LS1043A 64b/32b support to OpenWRT was uploaded as the planned schedule.

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