

# Installing a Dev System based on Leaf

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## Introduction

The objective of the page is to create a walkthrough for

- How to install Leaf
- How to download repositories from leaf
- Ways in which one can download and build source (Yocto and Legato).

## PC Setup

<b>Distributor ID:</b> Ubuntu	<code>ashu@ashu-ThinkPad-T460:~/Desktop/Leaf/yocto\$ lscpu</code>
<b>Description:</b> Ubuntu 18.04.5	<code>Architecture: x86_64</code>
<b>LTSRelease:</b> 18.04	<code>CPU op-mode(s): 32-bit, 64-bit</code>
<b>Codename:</b> bionic	<code>Byte Order: Little Endian CPU(s): 4</code>
<b>Download link - <a href="https://releases.ubuntu.com/18.04/">https://releases.ubuntu.com/18.04/</a> (64 bit OS)</b>	<code>On-line CPU(s) list: 0-3 Thread(s) per core: 2 Core(s) per socket: 2</code>
	<code>Socket(s): 1 NUMA node(s): 1</code>
	<code>Vendor ID: GenuineIntel</code>
	<code>CPU family: 6 Model: 78</code>
	<code>Model name: Intel(R) Core(TM) i5-6200U CPU @ 2.30GHz</code>
	<code>Stepping: 3 CPU MHz: 500.000</code>
	<code>CPU max MHz: 2800,0000</code>
	<code>CPU min MHz: 400,0000</code>
	<code>BogoMIPS: 4800.00</code>
	<code>Virtualization: VT-x</code>
	<code>L1d cache: 32K</code>
	<code>L1i cache: 32K</code>
	<code>L2 cache: 256K</code>
	<code>L3 cache: 3072K</code>
	<code>NUMA node0 CPU(s): 0-3</code>

### Leaf Installation

- `wget https://downloads.sierrawireless.com/tools/leaf/leaf_latest.deb -O /tmp/leaf_latest.deb && sudo apt install /tmp/leaf_latest.deb`
- `mkdir ~/Leaf; cd ~/Leaf`

## Gerrit setup (To be able to play with source files)

Create ssh-keygen

- `ashu@ashu-ThinkPad-T460:~/Desktop/Leaf$ ssh-keygen`

Generating public/private rsa key pair.

Enter file in which to save the key (/home/ashu/.ssh/id\_rsa): /home/ashu/.ssh/id\_rsa

Enter passphrase (empty for no passphrase): // I Press Enter without any passkey, of course you can choose to enter your fav word here but do remember the word as it might be asked at later stages

Enter same passphrase again:

Your identification has been saved in /home/ashu/.ssh/id\_rsa.

Your public key has been saved in /home/ashu/.ssh/id\_rsa.pub.

The key fingerprint is:

SHA256:DQDdBX8UvddIPDry7hrvhvJGpljSYSPOI23z/LG0Ybk ashu@ashu-ThinkPad-T460

The key's randomart image is:

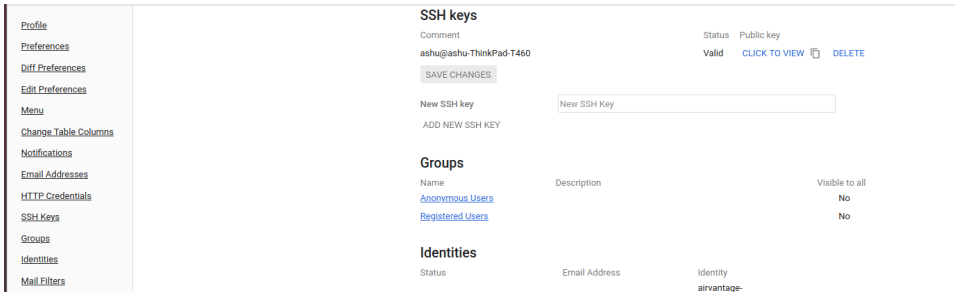
```

+---[RSA 2048]-----+
|  .o...o. oo . |
|   .... ..+ |
|   ...o+ |
|  .+ o+o.o |
|  +++ S+o .. |
| .Oo ..... |
| o* * ..o |
| oo*.ooo |
| .E +o=+ |

```

+----[SHA256]-----+

- Copy all the file contents of id\_rsa.pub found under (in my case) - /home/ashu/.ssh/id\_rsa.pub
- Open <https://gerrit.legato.io> with your SWI credentials and go to settings SSH keys Paste the contents in New SSH Key and press save



## Browse & Installing packages using Leaf

- cd Leaf(Or whatever leaf workspace name you create in above section)
- leaf init
- leaf search wp75
- leaf setup -p swi-wp75\_3.0.0 (or any profile you wish to download the fw files and toolchain for..Its supposed to be the revision to which you wish to finally reach)
- leaf profile -v //To check the components of packages installed in your leaf environment

```

i ashu@ashu-ThinkPad-T460:~/Desktop/Leaf/legato-src/legato/build/wp750x$ leaf profile -v

Workspace: /home/ashu/Desktop/Leaf

Profile: SWI-WP75 [current] (sync)

Environment LEAF_PROFILE=SWI-WP75
LEGATO_SRC=tag

Packages Identifier Description

Included swi-wp75_3.0.0 SDK for WP75 (Release 17 + Legato 18.06.4)

Dependencies swi-cloneutils_4.2.200401
wp75-legato-src_18.06.4 Legato source code metadata and prerequisites
wp75-toolchain_SWI9X15Y_07.14.01.00-linux64 GCC cross compiler Toolchain for WP75
wp75-modem-image_17 Modem Firmware Image for WP75
wp75-linux-image_SWI9X15Y_07.14.01.00 Linux Image for WP75
swi-legato_1.4.191225 Settings for Legato

```

## Installing and Building Yocto source packages

There are below methods you can follow to install source and have your build environment in your recently created system as per above

### 1. **Leaf**

- a. leaf getsrc swi-linux

```

i Error Faced

Checking credentials...
adas@sierrawireless.com@gerrit.legato.io: Permission denied (publickey).

Solved: The username of gerit environment variable was set wrong by me...Set username as you see in https://gerrit.legato.io/settings/#Profile...Example in my case its adas.(Used the magic command line to replace the wrong username with correct one - leaf env user --set GERRIT_USER=adas)

```

- b. TIP: Do plan for some work in meantime or go grab a Good lunch as its gonna take time to download (Around 5 gigs)
- c. once downloaded disable the source - leaf getsrc swi-linux --disable
- d. leaf shell (issue it inside the leaf workspace directory)
- e. make

```

i Error-faced

You can also run generated qemu images with a command like 'runqemu qemux86'

Error: bash is not set as default provider for /bin/sh

      build is not guaranteed to work, aborting

Makefile:344: recipe for target 'image_bin' failed

make: *** [image_bin] Error 1

Solved: sudo dpkg-reconfigure dash press NO in GUI

```

```

i Error Faced

After Around 15% i encountered following error

ERROR: time-genoff-git-r0 do_fetch: Fetcher failure: Unable to find file file://time-genoff-bin.tar.bz2 anywhere. The paths that were searched were:
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/time-genoff/./././meta-swi-mdm9x28-bin/files/poky
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/time-genoff/time-genoff-git/poky
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/time-genoff/time-genoff/poky
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/time-genoff/files/poky
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/time-genoff/./././meta-swi-mdm9x28-bin/files/swi-mdm9x28
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/time-genoff/time-genoff-git/swi-mdm9x28

```

```
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/time-genoff/time-genoff
/swi-mdm9x28
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/time-genoff/files/swi-
mdm9x28
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/time-genoff/./././meta-
swi-mdm9x28-bin/files/armv7a
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/time-genoff/time-genoff-git
/armv7a
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/time-genoff/time-genoff
/armv7a
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/time-genoff/files/armv7a
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/time-genoff/./././meta-
swi-mdm9x28-bin/files/arm
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/time-genoff/time-genoff-git
/arm
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/time-genoff/time-genoff
/arm
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/time-genoff/files/arm
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/time-genoff/./././meta-
swi-mdm9x28-bin/files/
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/time-genoff/time-genoff-
git/
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/time-genoff/time-genoff/
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/time-genoff/files/
/home/ashu/Desktop/Leaf/swi-linux-src/build_bin/downloads
ERROR: time-genoff-git-r0 do_fetch: Fetcher failure for URL: 'file://time-genoff-bin.tar.bz2'. Unable to fetch URL from any
source.
ERROR: time-genoff-git-r0 do_fetch: Function failed: base_do_fetch
ERROR: Logfile of failure stored in: /home/ashu/Desktop/Leaf/swi-linux-src/build_bin/tmp/work/armv7a-neon-poky-linux-
gnueabi/time-genoff/git-r0/temp/log.do_fetch.30439
ERROR: Task (/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/time-
genoff/time-genoff_git.bb:do_fetch) failed with exit code '1'
WARNING: diag-git-r6 do_fetch: Failed to fetch URL file://diag-bin.tar.bz2, attempting MIRRORS if available
ERROR: diag-git-r6 do_fetch: Fetcher failure: Unable to find file file://diag-bin.tar.bz2 anywhere. The paths that were searched
were:
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/diag/./././meta-swi-
mdm9x28-bin/files/poky
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/diag/diag-git/poky
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/diag/diag/poky
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/diag/files/poky
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/diag/./././meta-swi-
mdm9x28-bin/files/swi-mdm9x28
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/diag/diag-git/swi-mdm9x28
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/diag/diag/swi-mdm9x28
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/diag/files/swi-mdm9x28
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/diag/./././meta-swi-
mdm9x28-bin/files/armv7a
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/diag/diag-git/armv7a
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/diag/diag/armv7a
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/diag/files/armv7a
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/diag/./././meta-swi-
mdm9x28-bin/files/arm
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/diag/diag-git/arm
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/diag/diag/arm
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/diag/files/arm
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/diag/./././meta-swi-
mdm9x28-bin/files/
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/diag/diag-git/
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/diag/diag/
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/diag/files/
/home/ashu/Desktop/Leaf/swi-linux-src/build_bin/downloads
ERROR: diag-git-r6 do_fetch: Fetcher failure for URL: 'file://diag-bin.tar.bz2'. Unable to fetch URL from any source.
ERROR: diag-git-r6 do_fetch: Function failed: base_do_fetch
ERROR: Logfile of failure stored in: /home/ashu/Desktop/Leaf/swi-linux-src/build_bin/tmp/work/armv7a-neon-poky-linux-
gnueabi/diag/git-r6/temp/log.do_fetch.30457
ERROR: Task (/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/diag/diag_
git.bb:do_fetch) failed with exit code '1'

NOTE: Tasks Summary: Attempted 650 tasks of which 0 didn't need to be rerun and 2 failed.

Summary: 2 tasks failed:
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/time-genoff/time-
genoff_git.bb:do_fetch
/home/ashu/Desktop/Leaf/swi-linux-src/meta-swi/./meta-swi-extras/meta-swi-mdm9x28-bin/recipes/diag/diag_git.bb:do_fetch
Summary: There were 59 WARNING messages shown.
Summary: There were 6 ERROR messages shown, returning a non-zero exit code.
Makefile:344: recipe for target 'image_bin' failed
make: *** [image_bin] Error 1
```

**Issue found:** Leaf error with profile 3.0.0(Jira to be raised) : The target environment in leaf was broken and was pointing to target as 9x28 instead of 9x15 ( Do this to find - grep -r "MACHINE =" build\_bin/conf/local.conf).

## 2. Downloading the source from source.sierrawireless and using leaf environment to build

- Use wget utility to download the required Yocto source inside leaf workspace ex - ashu@ashu-ThinkPad-T460:~/Desktop/Leaf\$ wget [http://downloads.sierrawireless.com/AirPrime/WPx5xx/Release17/Legato-Dist-Source-mdm9x15-SWI9X15Y\\_07.14.01.00.tar.bz2](http://downloads.sierrawireless.com/AirPrime/WPx5xx/Release17/Legato-Dist-Source-mdm9x15-SWI9X15Y_07.14.01.00.tar.bz2)
- tar xvf xxxxxx (replace xxx by the tar file downloaded for ex here - [Legato-Dist-Source-mdm9x15-SWI9X15Y\\_07.14.01.00.tar.bz2](#))
- cd into yocto
- make (You can choose to do make either inside leaf shell or not and as the Yocto extracted package above contains the toolchain in it, does not matter if you dont call it inside Leaf shell)
- Yippie** after waiting for close to 4 hours

### Success

```
ashu@ashu-ThinkPad-T460:~/Desktop/Leaf/yocto$ make
Makefile:57: "Legato: build disabled since '/home/ashu/Desktop/Leaf/yocto/legato/' does not exist"
"meta-swi/build.sh" -p poky/ -o meta-openembedded/ -l meta-swi -x "kernel" -j 9 -t 9 -M -a "MANGO_WIFI_REPO="
/home/ashu/Desktop/Leaf/yocto/mangOH/WiFi" -m swi-mdm9x15 -a KBRANCH_DEFAULT_MDM9X15=standard/swi-
mdm9x15-yocto-wpx5xx -a KMETA_DEFAULT_MDM9X15=meta-yocto-1.7-ref -b build_bin -q
Poky dir: /home/ashu/Desktop/Leaf/yocto/poky
OE meta: /home/ashu/Desktop/Leaf/yocto/meta-openembedded
SWI meta dir: /home/ashu/Desktop/Leaf/yocto/meta-swi
Linux repo dir: /home/ashu/Desktop/Leaf/yocto/kernel
Number of make threads 9
Number of bitbake tasks 9
With mangOH
Extra options added - MANGO_WIFI_REPO=/home/ashu/Desktop/Leaf/yocto/mangOH/WiFi
SWI machine: swi-mdm9x15
Extra options added - KBRANCH_DEFAULT_MDM9X15=standard/swi-mdm9x15-yocto-wpx5xx
Extra options added - KMETA_DEFAULT_MDM9X15=meta-yocto-1.7-ref
Build dir: /home/ashu/Desktop/Leaf/yocto/build_bin
Enable Qualcomm Proprietary bin
You had no conf/local.conf file. This configuration file has therefore been
created for you with some default values. You may wish to edit it to, for
example, select a different MACHINE (target hardware). See conf/local.conf
for more information as common configuration options are commented.
```

You had no conf/bblayers.conf file. This configuration file has therefore been created for you with some default values. To add additional metadata layers into your configuration please add entries to conf/bblayers.conf.

The Yocto Project has extensive documentation about OE including a reference manual which can be found at:

<http://yoctoproject.org/documentation>

For more information about OpenEmbedded see their website:

<http://www.openembedded.org/>

### Shell environment set up for builds. ###

You can now run 'bitbake <target>'

Common targets are:  
core-image-minimal  
core-image-sato  
meta-toolchain  
meta-ide-support

You can also run generated qemu images with a command like 'runqemu qemux86'

```
+ layer: meta-swi/meta-swi-mdm9xxx
-> /home/ashu/Desktop/Leaf/yocto/meta-swi/meta-swi-mdm9xxx
+ layer: meta-swi/meta-swi-mdm9x15
-> /home/ashu/Desktop/Leaf/yocto/meta-swi/meta-swi-mdm9x15
+ layer: meta-swi/common
-> /home/ashu/Desktop/Leaf/yocto/meta-swi/common
+ layer: meta-oe
-> /home/ashu/Desktop/Leaf/yocto/meta-openembedded/meta-oe
+ layer: meta-networking
-> /home/ashu/Desktop/Leaf/yocto/meta-openembedded/meta-networking
+ layer: meta-python
-> /home/ashu/Desktop/Leaf/yocto/meta-openembedded/meta-python
+ layer: meta-swi-extras/common
-> /home/ashu/Desktop/Leaf/yocto/meta-swi/./meta-swi-extras/common
+ layer: meta-swi-extras/meta-swi-mdm9x15
-> /home/ashu/Desktop/Leaf/yocto/meta-swi/./meta-swi-extras/meta-swi-mdm9x15
+ layer: meta-mangoh
```

```

-> /home/ashu/Desktop/Leaf/yocto/meta-swi/./meta-mangoh
+ layer: meta-swi-extras/meta-swi-mdm9xxx-bin
-> /home/ashu/Desktop/Leaf/yocto/meta-swi/./meta-swi-extras/meta-swi-mdm9xxx-bin
+ layer: meta-swi-extras/meta-swi-mdm9x15-bin
-> /home/ashu/Desktop/Leaf/yocto/meta-swi/./meta-swi-extras/meta-swi-mdm9x15-bin
Yocto machine: swi-mdm9x15
Adding option LEGATO_BUILD with value false
Adding option IMA_BUILD with value false
Adding option IMA_CONFIG with value
Adding option IMA_LOCAL_CA_X509 with value
Adding option IMA_PRIV_KEY with value
Adding option IMA_PUB_CERT with value
Adding option IMA_KERNEL_CMDLINE_OPTIONS with value
Adding option ENABLE_IMA with value 0
Adding option IMA_PUBLIC_CERT with value
Adding option IMA_PRIVATE_KEY with value
Adding option IMA_SMACK with value
Disabling QCA9377 support...
Adding option ENABLE_QCA9377 with value 0
Adding option ROOTFS_VERSION with value
Adding option MANGOH_WIFI_REPO with value /home/ashu/Desktop/Leaf/yocto/mangOH/WiFi
Adding option KBRANCH_DEFAULT_MDM9X15 with value standard/swi-mdm9x15-yocto-wpx5xx
Adding option KMETA_DEFAULT_MDM9X15 with value meta-yocto-1.7-ref
Adding option EXT_SWI_IMG with value false
Adding option INITRAMFS_IMAGE_BUNDLE with value 1
Adding option INITRAMFS_IMAGE with value mdm9x15-image-initramfs
Adding option FIRMWARE_PATH with value
Adding option PACKAGECONFIG_remove with value gnutls
Build image of minimal rootfs (for swi-mdm9x15).
WARNING: Host distribution "Ubuntu-18.04" has not been validated with this version of the build system; you may possibly
experience unexpected failures. It is recommended that you use a tested distribution.
WARNING: /home/ashu/Desktop/Leaf/yocto/meta-swi/meta-swi-mdm9xxx/recipes-kernel/embms-kernel/embms-kernel_git.bb:
Unable to get checksum for embms-kernel SRC_URI entry embms_kernel: file could not be found
Parsing recipes: 100%
#####
#####| Time: 0:01:36
Parsing of 1911 .bb files complete (0 cached, 1911 parsed). 2621 targets, 372 skipped, 0 masked, 0 errors.
WARNING: No bb files matched BBFILE_PATTERN_sw_i-mdm9xxx-bin '^/home/ashu/Desktop/Leaf/yocto/meta-swi/./meta-
swi-extras/meta-swi-mdm9xxx-bin/'
WARNING: No bb files matched BBFILE_PATTERN_sw_i-mdm9xxx-bin '^/home/ashu/Desktop/Leaf/yocto/meta-swi/./meta-
swi-extras/meta-swi-mdm9xxx-bin/'
NOTE: Resolving any missing task queue dependencies

Build Configuration:
BB_VERSION      = "1.32.0"
BUILD_SYS       = "x86_64-linux"
NATIVELSBSTRING = "Ubuntu-18.04"
TARGET_SYS      = "arm-poky-linux-gnueabi"
MACHINE         = "swi-mdm9x15"
DISTRO          = "poky-swi-ext"
DISTRO_VERSION  = "2.2.3"
TUNE_FEATURES   = "arm armv7a vfp neon"
TARGET_FPU      = "softfp"
meta
meta-poky
meta-yocto-bsp  = "HEAD:e6aadcc2a04ae4e85b1cb00c5c9ce1c0f76ee871"
meta-mangoh    = "HEAD:ae9a318c00ab1a232203e257b5f6849824c67149"
meta-python
meta-networking
meta-oe        = "HEAD:b40116cf457b88a2db14b86fda9627fb34d56ae6"
common
meta-swi-mdm9xxx
meta-swi-mdm9x15 = "HEAD:19cbb3607b635d7086bd80a2662d1d9b929028c"
meta-swi-mdm9xxx-bin
meta-swi-mdm9x15-bin
meta-swi-mdm9x15
meta-swi-mdm9xxx-bin
meta-swi-mdm9x15-bin
common        = "HEAD:4f585ea5a8949b79b566860a667d1f082aafec0"

NOTE: Fetching univariate binary shim from http://downloads.yoctoproject.org/releases/univariate/1.7/x86\_64-nativesdk-libc.tar.bz2;sha256sum=ed033c868b87852b07957a4400f3b744c00aef5d6470346ea1a59b6d3e03075e
Initialising tasks: 100%
#####
#####| Time: 0:00:06
NOTE: Executing SetScene Tasks
NOTE: Executing RunQueue Tasks
WARNING: w18xx-firmware-r8.a9.14-r4+gitrAUTOINC+2568d8f61f do_populate_lic: w18xx-firmware: No generic license file
exists for: TI-TSPA in any provider

```

```
WARNING: busybox-1.24.1-r0 do_package_qa: QA Issue: busybox: /busybox/etc/udhcpd.conf is owned by uid 1000, which is the same as the user running bitbake. This may be due to host contamination
busybox: /busybox/etc/init.d/udhcpd is owned by uid 1000, which is the same as the user running bitbake. This may be due to host contamination [host-user-contaminated]
WARNING: mdm9x15-image-minimal-1.0-r0.0 do_rootfs: The license listed TI-TSPA was not in the licenses collected for recipe wl18xx-firmware
WARNING: mdm9x15-image-minimal-1.0-r0.0 do_rootfs: [log_check] mdm9x15-image-minimal: found 1 warning message in the logfile:
[log_check] WARNING: The license listed TI-TSPA was not in the licenses collected for recipe wl18xx-firmware

NOTE: Tasks Summary: Attempted 2627 tasks of which 13 didn't need to be rerun and all succeeded.

Summary: There were 8 WARNING messages shown
```

## Installing and Building Legato source packages

There are below methods you can follow to install source and have your build environment in your recently created system as per above

### 1. **Leaf**

- a. leaf getsrc swi-legato
- b. once downloaded disable the source - leaf getsrc swi-legato --disable
- c. leaf shell (issue it inside the leaf workspace directory)
- d. make wp750x (exact target name to use can be found here - <https://docs.legato.io/latest/basicBuildMake.html>) Ex- (Ish:SWI-WP75)  
ashu@ashu-ThinkPad-T460:~/Desktop/Leaf/legato-src/legato\$ make wp750x



#### **Error-faced**

```
checking for unistd.h... yes
checking whether byte ordering is bigendian... unknown
configure: error: unknown endianness
presetting ac_cv_c_bigendian=no (or yes) will help
[310/816] Compiling C source
ninja: build stopped: subcommand failed.
Makefile:518: recipe for target 'system_wp750x' failed
make: *** [system_wp750x] Error 1
```

**Solved:** leaf env user --set ac\_cv\_c\_bigendian=yes

- f. Finally after waiting for a while , my Legato build is okay
- g. **Yippie**

**i Success**

```
[816/816] Packaging system
mv build/wp750x/wifi.wp750x.update \
  build/wp750x/system.wp750x.update
if [ 0 -eq 1 ]; then \
  mv build/wp750x/wifi.wp750x.signed.update \
    build/wp750x/system.wp750x.signed.update ; \
fi
systemd -s wp750x build/wp750x/system.wp750x.update build/wp750x
Unpacking build/wp750x/system.wp750x.update ...
Preparing staging directory build/wp750x/_staging_system.wp750x.update
Creating images from directory build/wp750x/_staging_system.wp750x.update
Using fakeroot /home/ashu/.leaf/wp75-toolchain_SWI9X15Y_07.14.01.00-linux64/sysroots/x86_64-pokysdk-linux/usr/bin
/fakeroot ...
-t wp750x -d build/wp750x/_staging_system.wp750x.update -o build/wp750x -s
Target: wp750x
Input: /home/ashu/Desktop/Leaf/legato-src/legato/build/wp750x/_staging_system.wp750x.update
Output: /home/ashu/Desktop/Leaf/legato-src/legato/build/wp750x
Version: 18.06.4 3d4deb10 ashu-ThinkPad-T460 2020/10/14 21:38:59
Stripping /home/ashu/Desktop/Leaf/legato-src/legato/build/wp750x/_staging_system.wp750x.update/system/bin/startSystem
Stripping /home/ashu/Desktop/Leaf/legato-src/legato/build/wp750x/_staging_system.wp750x.update/system/lib/libjansson.so
Stripping /home/ashu/Desktop/Leaf/legato-src/legato/build/wp750x/_staging_system.wp750x.update/system/modules/spisvc.
ko
Stripping /home/ashu/Desktop/Leaf/legato-src/legato/build/wp750x/_staging_system.wp750x.update/apps
/df078fee14df5b931f560ea2f14518b2/read-only/lib/libtinycbor.so.0
Stripping /home/ashu/Desktop/Leaf/legato-src/legato/build/wp750x/_staging_system.wp750x.update/apps
/df078fee14df5b931f560ea2f14518b2/read-only/lib/libwakaama.so
Stripping /home/ashu/Desktop/Leaf/legato-src/legato/build/wp750x/_staging_system.wp750x.update/apps
/df078fee14df5b931f560ea2f14518b2/read-only/lib/liblwmm2mcore.so
wp750x: Generating the framework image (squashfs.ubi)
wp750x: Generating the framework image (squashfs)
wp750x: Generating the framework cwe (squashfs.ubi)
# Check PA libraries.
checkpa wp750x || true
Checking PAs
Analyzing libComponent_le_pa_dcs.so (ELF 32-bit LSB shared object, ARM, EABI5 version 1 (SYSV), dynamically linked,
BuildID[sha1]=7670ce359b03d26806effd342444ca3306ad7c63, stripped)
# Link legato R/W images to default legato images
(cd build/wp750x; \
  for f in legato.*; do \
    ln -sf $f `echo $f | sed 's/legato/legato_rw/'; \
done)
```

## 2. Downloading the source from legato.io and using leaf environment to build

- To be tested (As above step using Leaf is already a success hence was too Lazy , "Why to complicate things if things are easier alternatives".)

## Extracting the required elements to install on system

- Extract the yocto image
  - cd in to the directory where images are generated post building yocto in above steps (For ex in my pc environment) - cd /home/ashu/Desktop/Leaf/yocto/build\_bin/tmp/deploy/images/swi-mdm9x15/
  - yocto image for your system shall be like "**yocto\_wp85.cwe**"
- Extract the Legato image
  - cd in to the directory where images are generated post building legato in above steps (For ex in my pc environment) - cd /home/ashu/Desktop/Leaf/legato-src/legato/build/wp750x/
  - Legato image for your system will be like "**legato.cwe**"
- Extract the FW image
  - cd in to the directory where images are generated post building legato in above steps (For ex in my pc environment) - cd /home/ashu/Desktop/Leaf/leaf-data/current/wp75-modem-image/
  - FW only image for your system will be like "**9999999\_9904559\_SWI9X15Y\_07.14.01.00\_00\_GENERIC\_001.042\_000.spk**"

## Building a single concatenated image

- cd into your leaf workspace
- leaf shell
- swicwe -o Release17\_wp75.spk -c 9999999\_9904559\_SWI9X15Y\_07.14.01.00\_00\_GENERIC\_001.042\_000.spk legato.cwe yocto\_wp85.cwe (Point to relevant directories where you have extracted the binaries in previous step)





### swicwe result

input image type is SPKG

input image type is APPL

input image type is APPL

Parsing input file 9999999\_9904559\_SWI9X15Y\_07.14.01.00\_00\_GENERIC\_001.042\_000.spk

Type	Size(Exclude Header)	Product	Compress	Version
*SPKG	24701831	9X15 0		9999999_9904559_SWI9X15Y_07.14.01.00_00_GENERIC_001.042_000
*BOOT	647352	Y912 0		SWI9X15Y_07.14.01.00 595652d jenkins 2018/10/26 15:04:14
SBL1	118524	9X15 0		SWI9X15Y_07.14.01.00 595652d jenkins 2018/10/26 15:04:14
QRPM	104672	9X15 0		SWI9X15Y_07.14.01.00 595652d jenkins 2018/10/26 15:04:14
SBL2	422956	9X15 0		SWI9X15Y_07.14.01.00 595652d jenkins 2018/10/26 08:48:35
*MODM	24009634	Y912 0		SWI9X15Y_07.14.01.00 595652d jenkins 2018/10/26 15:04:14
DSP1	1861297	9X15 1		SWI9X15Y_07.14.01.00 595652d jenkins 2018/10/26 15:04:14
DSP2	19786305	9X15 1		SWI9X15Y_07.14.01.00 595652d jenkins 2018/10/26 08:34:29
DSP3	2360832	9X15 1		SWI9X15Y_07.14.01.00 595652d jenkins 2018/10/26 15:04:14
*FILE	43645	9X15 0		9999999_9904559_SWI9X15Y_07.14.01.00_00_GENERIC_001.042_000

Parsed image is SPKG, finding components

Found BOOT component

Found MODM component

Found FILE component

Parsing input file legato.cwe

Type	Size(Exclude Header)	Product	Compress	Version
*APPL	4325776	Y912 0		18.06.4 3d4deb10 ashu-ThinkPad-T460 2020/10/14 21:38:59
USER	4325376	9X15 0		18.06.4 3d4deb10 ashu-ThinkPad-T460 2020/10/14 21:38:59

Parsed image is Legato/Linux

Parsing input file yocto\_wp85.cwe

Type	Size(Exclude Header)	Product	Compress	Version
*APPL	22333508	Y912 0		Thu Oct 15 00:47:17 CEST 2020
SYST	18124573	9X15 1		Thu Oct 15 00:47:17 CEST 2020
APPS	4208135	9X15 1		3.14.29ltsi-yocto-standard 2020/10/15 00:45:17

Parsed image is Legato/Linux

Concatenating images

CWE Header Generator 3.01. Copyright Sierra Wireless, Inc., 2012

Output CWE Header File /tmp/temp.mbn.hdr

Image size 0x30fb87b, crc32 0xa0d198b0

- Finally we will have an image will be created concatenating all the 3 binaries (FW,Yocto,Legato)
  - Release17\_wp75.spk of size 51362315 Bytes.

## Flashing your system with newly built Yocto and Legato

- Previous version installed in WP75 under test was Release 14 containing Legato 16 and details as below



### Pre Installation

```
fwupdate query
Connecting to service ...
Firmware Version: SWI9X15Y_07.12.09.00 r34123 CARMD-EV-FRMWR1 2017/04/26 23:34:19
Bootloader Version: SWI9X15Y_07.12.09.00 r34123 CARMD-EV-FRMWR1 2017/04/26 23:34:19
Linux Version: 3.14.29ltsi-961ca71325_ab5094eade #2 PREEMPT Thu Apr 27 02:17:10 PDT 2017
```

```
root@swi-mdm9x15:~# legato version
16.10.3_7776bb75a488e0db67b0d24975b46dd0
```

```
root@swi-mdm9x15:~# cm info
Device: WP7502
IMEI: 357851070037606
FSN: P3704500720410
Firmware: SWI9X15Y_07.12.09.00 r34123 CARMD-EV-FRMWR1 2017/04/26 23:34:19
Bootloader: SWI9X15Y_07.12.09.00 r34123 CARMD-EV-FRMWR1 2017/04/26 23:34:19
prildPn: 9906352
prildRev: 01.04
skuld: 1103114
```

- Post Installation of out newly created Release17\_wp75.spk in previous step, we reach the desired verion i.e Release 17 with below details



### Post Installation

```
root@swi-mdm9x15:~# legato
version

18.06.4
_1562eb6465ad4f01249fd12c4147915f
```

```
root@swi-mdm9x15:~# fwupdate
query

Connecting to service
...

Firmware Version: SWI9X15Y_07.14.01.00 595652d jenkins 2018/10/26 08:34:
29

Bootloader Version: SWI9X15Y_07.14.01.00 595652d jenkins 2018/10/26 08:48:
35

Linux Version: 3.14.29ltsi-yocto-standard #2 PREEMPT Thu Oct 15 00:44:31 CEST
2020
```

```
root@swi-mdm9x15:~# cm
info

Device:          WP7502

IMEI:            357851070037606

IMEISV:          30

FSN:             P3704500720410

Firmware Version: SWI9X15Y_07.14.01.00 595652d jenkins 2018/10/26 08:34:
29

Bootloader Version: SWI9X15Y_07.14.01.00 595652d jenkins 2018/10/26 08:48:
35

[ 72.152357] qup_i2c qup_i2c.0: QUP: I2C status flags :0x1300c8, irq:
187

[ 72.158003] qup_i2c qup_i2c.0: I2C slave addr:0x3a not
connected
```

MCU  
Version: 001.011

PRI Part Number  
(PN): 9906352

PRI  
Revision: 01.04

Carrier PRI  
Name: GENERIC

Carrier PRI Revision: 001.042  
\_000

SKU: 1103114

Last Reset  
Cause: Unknown

Resets Count: Expected: 0 Unexpected:  
0

root@swi-mdm9x15:~# app  
status

[running]  
atAirVantage

[running]  
atQmiLinker

[running]  
atService

[running]  
audioService

[running]  
avcCompat

[running]  
avcService

[running]  
cellNetService

[running]  
dataConnectionService

[running]  
fwupdateService

[running]  
gpioService

[running]  
modemService

```
[running]
portService

[running]
positioningService

[running]
powerMgr

[running]
qmiAirVantage

[running]
secStore

[stopped]
smsInboxService

[stopped]
spiService

[stopped]
tools

[stopped]
voiceCallService

[stopped]
wifi

[stopped]
wifiApTest

[stopped]
wifiClientTest

[running]
wifiService

[stopped]
wifiWebAp

root@swi-mdm9x15:~# legato
status

Systems
installed:

 3 [good] <--
current

Legato framework is
running.

root@swi-mdm9x15:~#
```

**"Patience and perseverance have a magical effect before which difficulties disappear and obstacles vanish"**

Thanks for reading

