

# A Smart Way to Manage Packages in Yocto Project

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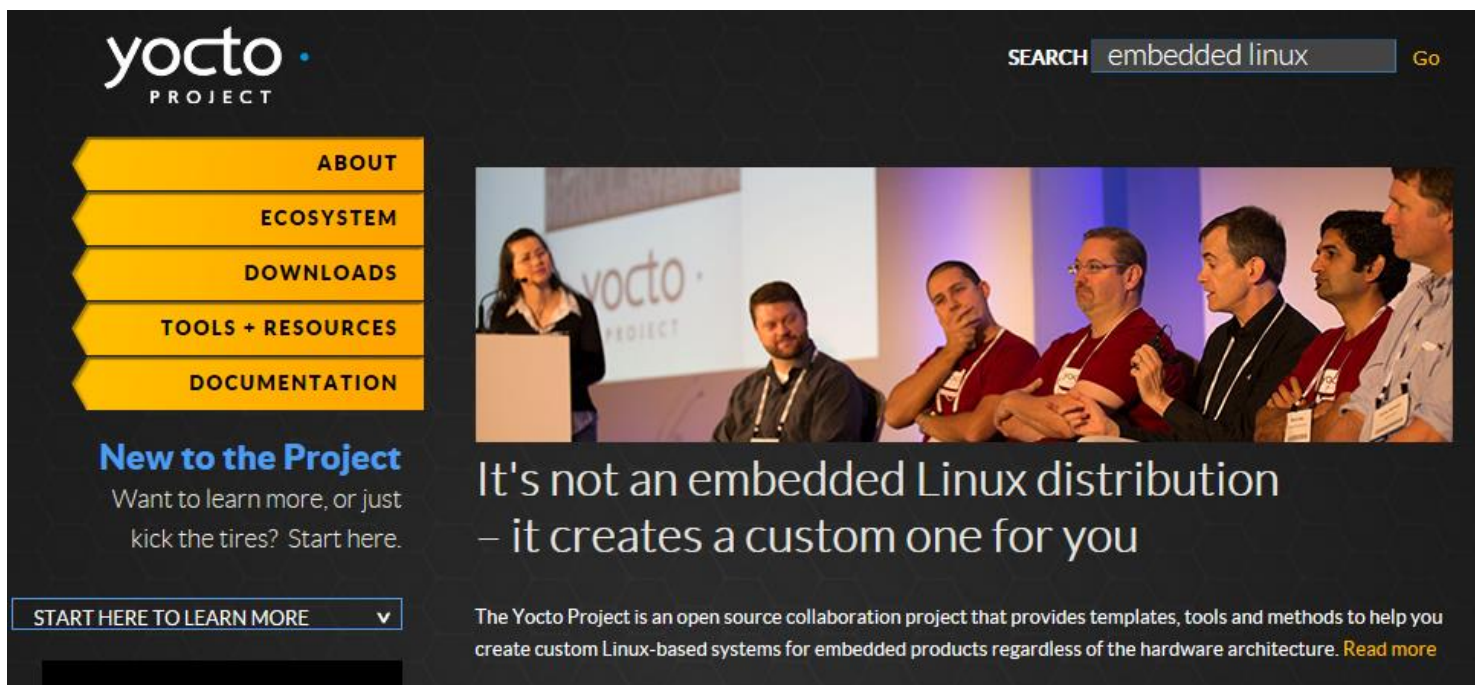
- Fan Xin, Fujitsu Computer Technologies Ltd.
- Embedded Linux Developer
- In-House Embedded Linux Distributor of Fujitsu
- Our Distribution includes LTSI Kernel and is built with Yocto Project
- Our Distribution is used for
  - IVI, Server System Controller, Storage System, Network Equipment, Printer, etc.



- Situation Analysis for Current Yocto Project
- Introduction of Smart2 Package Manager
- Package Manage Method in Yocto Project
- Next Step

# Situation Analysis for Current Yocto Project

# Current Situation of Yocto Project

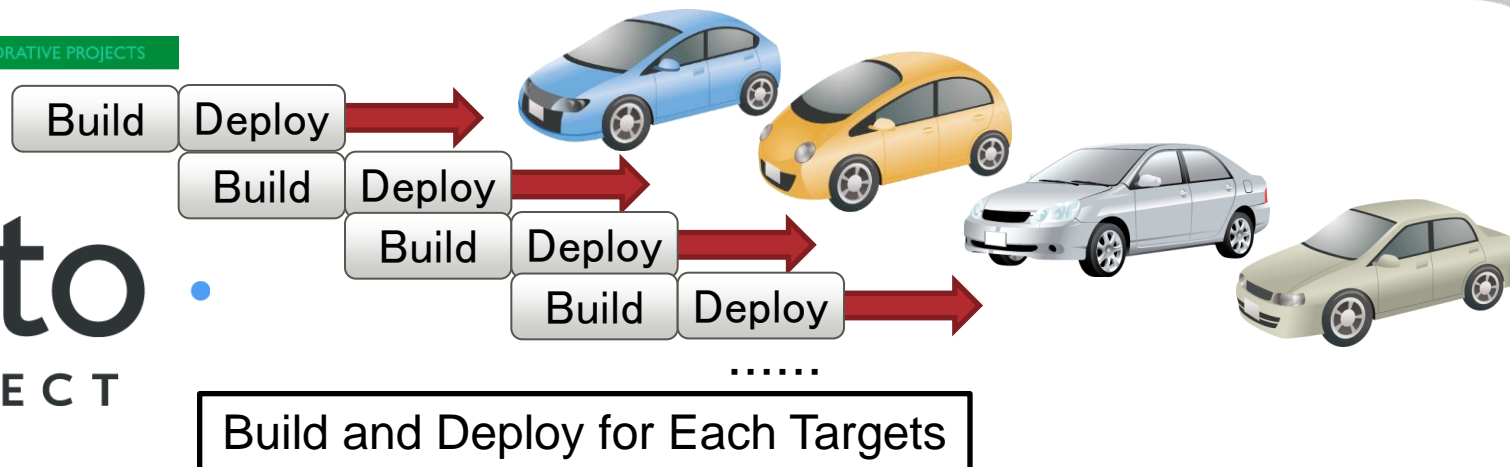


“ Yocto creates a **custom** one for you ”

The Yocto Project is an open source collaboration project that provides templates, tools and methods to help you create **custom** Linux-based systems for embedded products regardless of the hardware architecture.

# Advantage of Current Yocto Project

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## ■ Flexibility

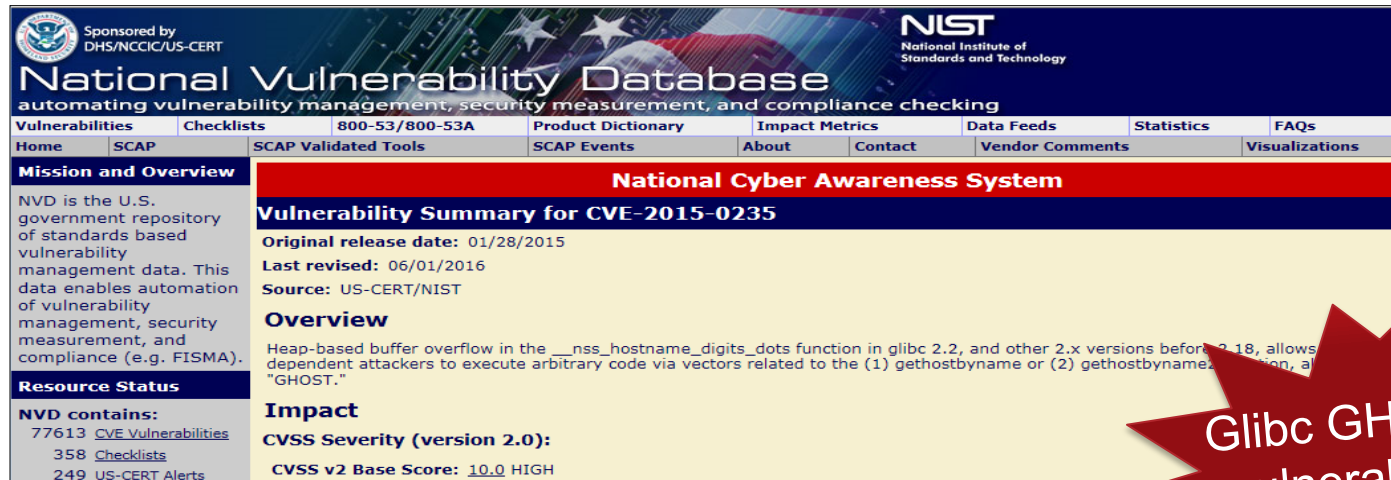
- Flexible to select package before building

## ■ Efficiency

- Create root file system by simple commands

## ■ Optimization

- Easy to optimize for each target



**National Vulnerability Database**  
automating vulnerability management, security measurement, and compliance checking

**NIST**  
National Institute of Standards and Technology

**800-53/800-53A**

**Product Dictionary**

**Impact Metrics**

**Data Feeds**

**Statistics**

**FAQs**

**Home** **SCAP** **SCAP Validated Tools** **SCAP Events** **About** **Contact** **Vendor Comments** **Visualizations**

**Mission and Overview**

NVD is the U.S. government repository of standards based vulnerability management data. This data enables automation of vulnerability management, security measurement, and compliance (e.g. FISMA).

**Resource Status**

**NVD contains:**

- 77613 [CVE Vulnerabilities](#)
- 358 [Checklists](#)
- 249 [US-CERT Alerts](#)

**National Cyber Awareness System**

**Vulnerability Summary for CVE-2015-0235**

**Original release date:** 01/28/2015

**Last revised:** 06/01/2016

**Source:** US-CERT/NIST

**Overview**

Heap-based buffer overflow in the `__nss_hostname_digits_dots` function in glibc 2.2, and other 2.x versions before 2.18, allows dependent attackers to execute arbitrary code via vectors related to the (1) `gethostbyname` or (2) `gethostbyname_r` function, also known as "GHOST."

**Impact**

**CVSS Severity (version 2.0):**

**CVSS v2 Base Score:** 10.0 HIGH

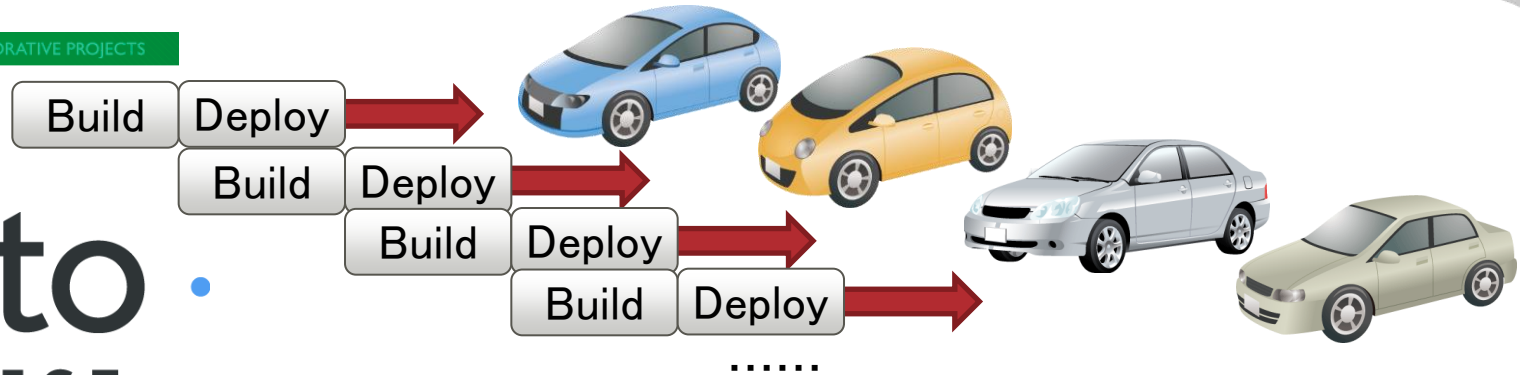
- glibc public critical security flaw called "GHOST". This vulnerability should be fixed in all targets immediately.
- For each kind of target, the glibc package has to be rebuilt and deployed.

# Case Study

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yocto  
PROJECT



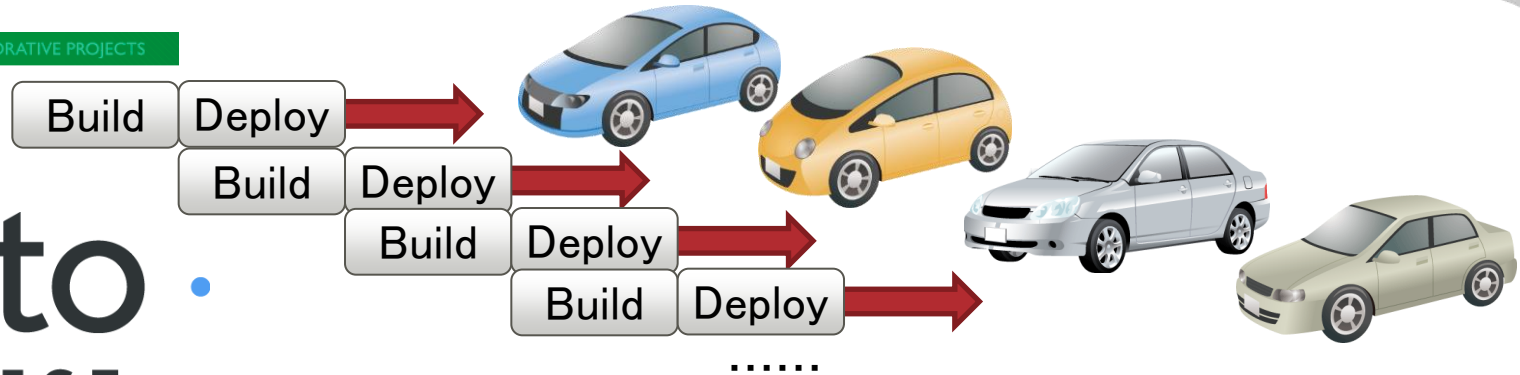
Rebuild and Redeploy for Each Targets **immediately!**

## What should you do?



# Case Study

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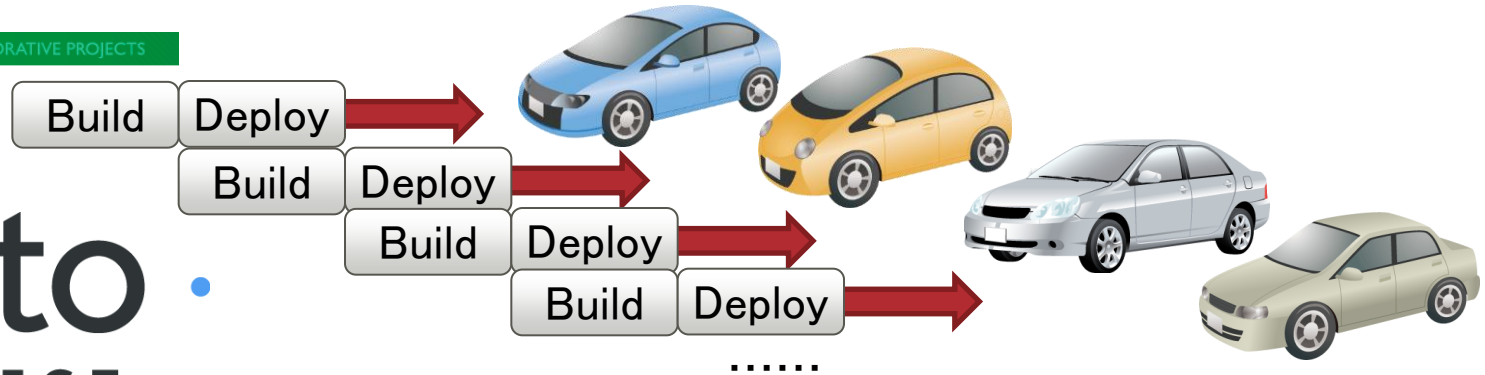
Rebuild and Redeploy for Each Targets **immediately!**

**Buy Fujitsu Servers**



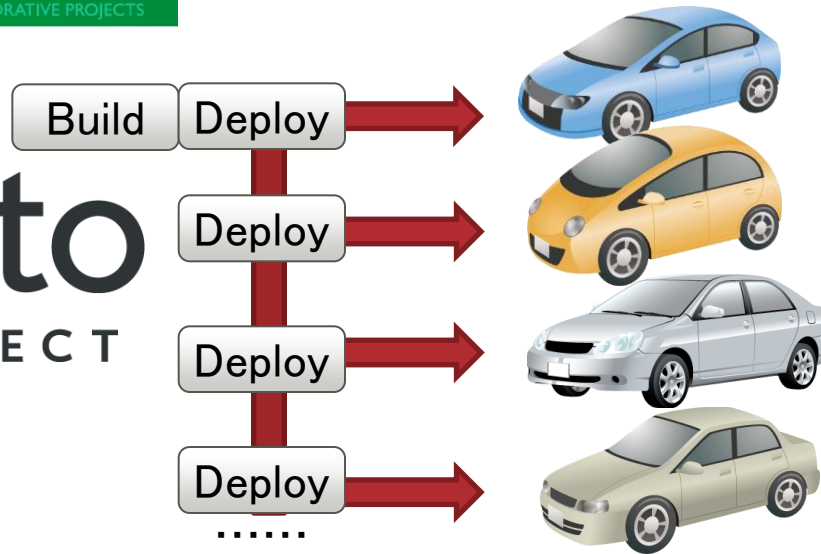
# Case Study

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Rebuild and Redeploy for Each Targets **immediately!**

LINUX FOUNDATION COLLABORATIVE PROJECTS



**Build Once, Deploy Anywhere**

**[github.com/ubinux/smart2](https://github.com/ubinux/smart2)**

# Introduction of Smart2 Package Manager

- Aim to create smart and portable algorithms for solving adequately the problem of managing software upgrading and installation.
- License: GPL-2.0
- Original Smart started on May 2004, and version 1.0 was released on Aug 2008. After released 1.5 on Sep 2014, the community became inactive.
- Add new features into Smart, Smart2 will release soon!

- Have Text-GUI make it easy to use
- Dependence relationship solved automatically
- Select include GPL-3.0 or exclude GPL-3.0 packages
- Select individual packages
- Select whether install the dev, dbg, locale, doc, ptest packages

**[github.com/ubinux/smart2](https://github.com/ubinux/smart2)**

## ■ Install toolchain

```
$ ./libc-x86-meta-toolchain-i586-toolchain.sh
```

## ■ Initial environment

```
$ . /opt/environment-setup-core2-64-linux
```

We use this script to finish the environment initialization,  
such as environment variable setting

## ■ Install package into root file system

### ■ Command line interface

```
$ smart --data-dir=${rootfs-dir}/var/lib/smart install
```

### ■ Graphical interface

```
$ smart --data-dir=${rootfs-dir}/var/lib/smart --interface=tgui
```



Smart2 package manager uses the following commands to manage packages.

Usage: smart command

- Install package commands

- install, remove...

- Query package commands

- search, query...

- Setup repository commands

- config, priority, update ...

Run “smart command –help ” for more information

# Select install type

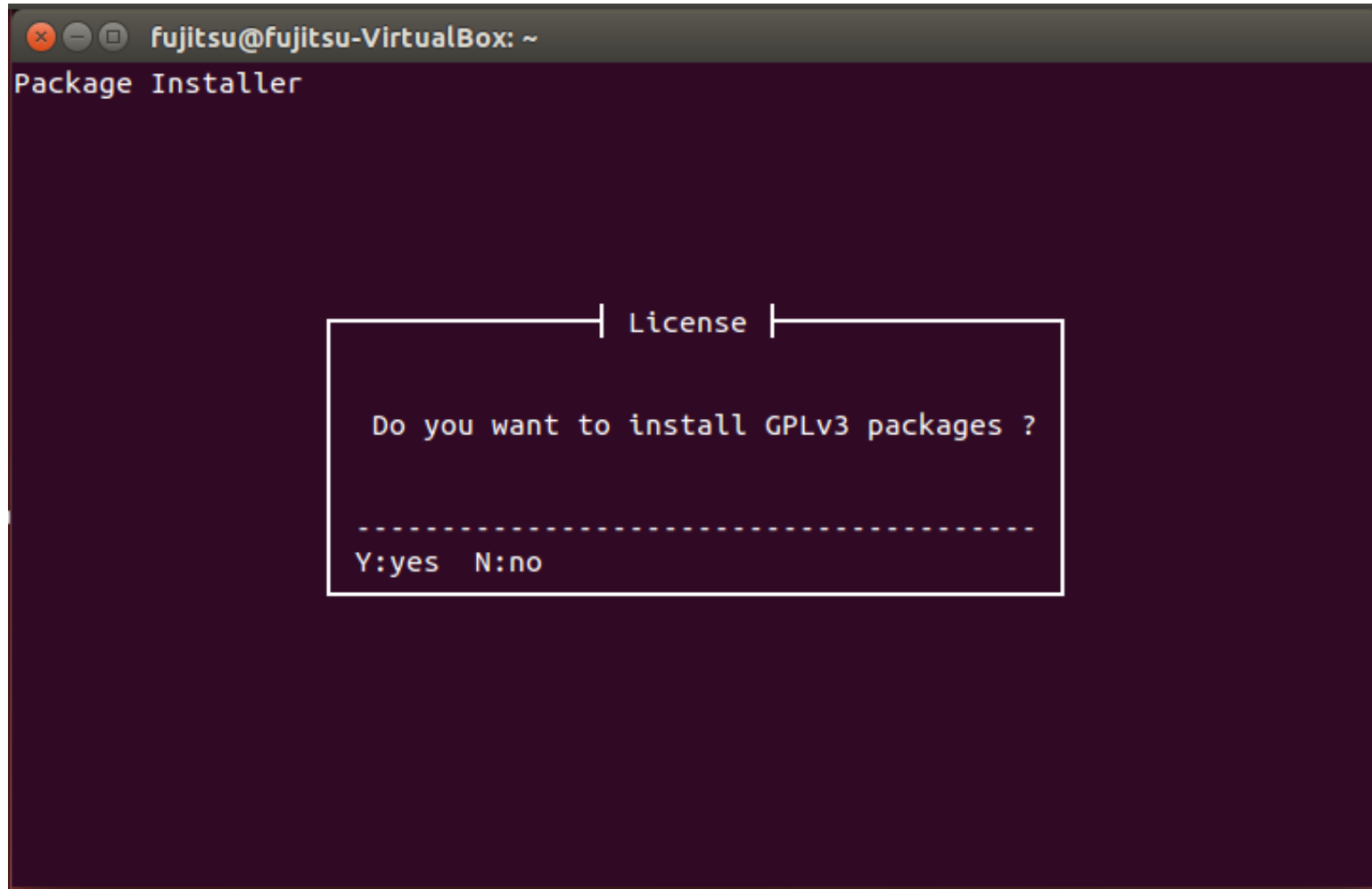
```
root@fujitsu-VirtualBox: /home/fujitsu
Package Installer

|-----| Select install type |-----|

install all
Busybox base
customize

-----
SPACE/ENTER:select  I:Info  X:eXit
```

# Choice to select GPLv3 packages



A terminal window titled 'fujitsu@fujitsu-VirtualBox: ~' with the subtitle 'Package Installer'. The window has a dark purple background. A white rectangular box is centered on the screen, containing the text 'License' at the top, followed by 'Do you want to install GPLv3 packages ?' and a dashed line. Below the dashed line, the text 'Y:yes N:no' is displayed.

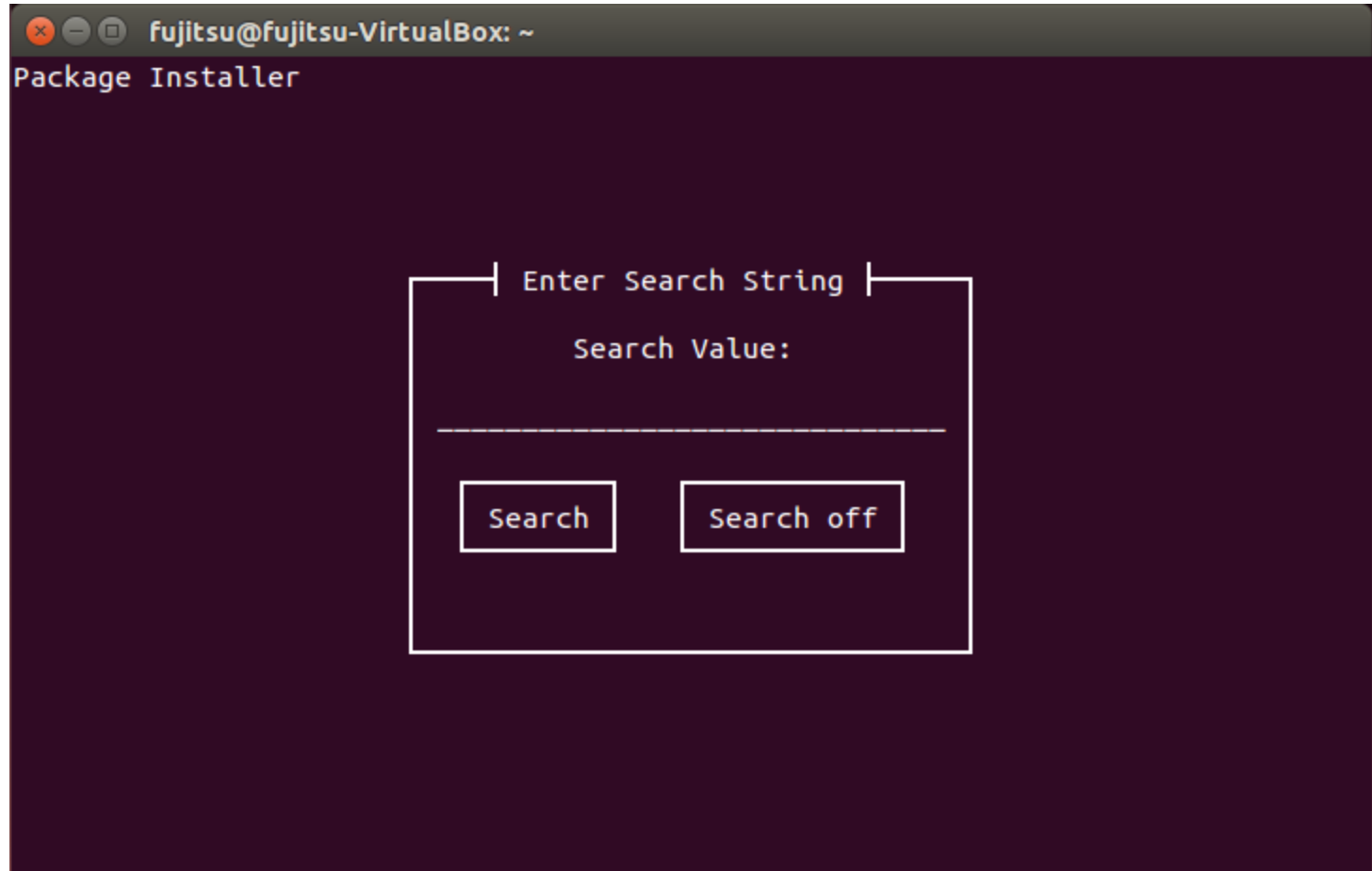
```
fujitsu@fujitsu-VirtualBox: ~  
Package Installer  
  
License  
Do you want to install GPLv3 packages ?  
-----  
Y:yes N:no
```

# Select packages

```
root@fujitsu-VirtualBox: /home/fujitsu
Package Installer

|----- Select package -----|
[ ] bzip2-staticdev
[ ] bzip2-ptest
[ ] bzip2-dev
[ ] bzip2
[ ] byacc-dev
[ ] byacc
[*] busybox-udhcpd
[*] busybox-udhcp
[*] busybox-syslog
[*] busybox-ptest
[*] busybox-hwclock
[*] busybox-httpd
[*] busybox-dev
-----
All Package [6613]    Installed Packages [0] Selected Packages [8]
-----
SPACE/ENTER:select/unselect  R:seaRch N:Next  B:Back  I:Info  X:exit
```

# Search package



# Choice to select special type packages

```
fujitsu@fujitsu-VirtualBox: ~  
Package Installer  
  
| customize special type packages |  
|  
| locale [ ] |  
| dev [ ] |  
| doc [ ] |  
| dbg [ ] |  
| staticdev [ ] |  
| ptest [ ] |  
|  
|-----|  
| SPACE/ENTER:select/unselect  N:Next  B:Back  I:Info  X:eXit |  
|
```

# Select special type packages

```
fujitsu@fujitsu-VirtualBox: ~  
Package Installer  
  
Select debuginfo package  
  
[ ] zip-debug  
[ ] zabbix-debug  
[ ] xz-debug  
[ ] xwud-debug  
[ ] xwininfo-debug  
[ ] xwd-debug  
[ ] xvinfo-debug  
[ ] xtrans-debug  
[ ] xterm-debug  
[ ] xstdcmap-debug  
[ ] xsetroot-debug  
[ ] xsetmode-debug  
[ ] xset-debug  
  
-----  
All Package [792]    Installed Packages [1] Selected Packages [0]  
-----  
SPACE/ENTER:select/unselect  N:Next  B:Back  I:Info  X:eXit
```

# GPLv3 Dependence Relationship

```
fujitsu@fujitsu-VirtualBox: ~  
Package Installer  
  
| GPLv3 that be depended |  
libdw1  
ed  
python-psycpg2  
libqt3supporte4  
qt4-embedded-demos-doc  
binutils  
qt4-embedded-plugin-imageformat-jpeg  
libqtcoree4  
less  
qt4-embedded-examples  
qt4-embedded-fonts-pfa  
qt4-embedded-plugin-script-dbus  
qt4-embedded-conf  
-----  
These GPLv3 packages are depended,do you want to install them? (y/n)
```



# Dependence Relationship (openssl)

```
fujitsu@fujitsu-VirtualBox: ~
fujitsu@fujitsu-VirtualBox:~$ smart --rootfs-dir=/home/fujitsu/work/smart-rootfs
-arm-0713 --interface=tgui
inter TguiInteractiveInterface
interfaces->tgui->interface.py __init__()
TguiInteractiveInterface -> run
Updating cache... ##### [100%]

The install information was logged in smart.error and smart.log.
fujitsu@fujitsu-VirtualBox:~$ smart --rootfs-dir=/home/fujitsu/work/smart-rootfs
-arm-0713 --interface=tgui
inter TguiInteractiveInterface
interfaces->tgui->interface.py __init__()
TguiInteractiveInterface -> run
Updating cache... ##### [100%]
Committing transaction...
Preparing... ##### [ 0%]
  1:Installing openssl-conf ##### [ 20%]
  2:Installing libc6 ##### [ 40%]
  3:Installing libcrypto1.0.0 ##### [ 60%]
  4:Installing libssl1.0.0 ##### [ 80%]
  5:Installing openssl ##### [100%]
```

# Installing

```
root@fujitsu-VirtualBox: /home/fujitsu
491:Installing gconf-locale-.. ##### [ 7%]
492:Installing glibc-charmap.. ##### [ 7%]
493:Installing mc-locale-wa ##### [ 7%]
494:Installing binutils-loc.. ##### [ 7%]
495:Installing glibc-charmap.. ##### [ 7%]
496:Installing glibc-binaries ##### [ 7%]
497:Installing findutils-loc.. ##### [ 7%]
498:Installing python-smartp.. ##### [ 7%]
499:Installing flex-locale-tr ##### [ 7%]
500:Installing libpopt-local.. ##### [ 7%]
501:Installing indent-locale.. ##### [ 7%]
502:Installing binutils-loc.. ##### [ 7%]
503:Installing sed-locale-ro ##### [ 7%]
504:Installing cracklib-loc.. ##### [ 7%]
505:Installing psmisc-locale.. ##### [ 7%]
506:Installing gtk+-locale-cs ##### [ 7%]
507:Installing networkmanage.. ##### [ 7%]
508:Installing tar-locale-de ##### [ 7%]
509:Installing libglib-2.0-l.. ##### [ 7%]
510:Installing tzdata-atlantic ##### [ 7%]
511:Installing libatk-1.0-lo.. ##### [ 7%]
512:Installing imsettings-lo.. ##### [ 7%]
513:Installing kbd-locale-el ##### [ 7%]
```

# Created Root Filesystem

```
fujitsu@fujitsu-VirtualBox: ~/work/smart-rootfs-arm-071302
fujitsu@fujitsu-VirtualBox:~/work/smart-rootfs-arm-071302$ ls
bin  etc  lib  linuxrc  oe_install  sbin  srv  usr  var
fujitsu@fujitsu-VirtualBox:~/work/smart-rootfs-arm-071302$ ls -R
.:
bin  etc  lib  linuxrc  oe_install  sbin  srv  usr  var

./bin:
ash          cp           egrep        ipcalc       mount        rmdir        tar
busybox      cpio         false        kill         mv           run-parts   touch
busybox.nosuid date         fatattr      ln           netstat      sed          true
busybox.suid dd           fgrep        login        pidof        sh           umount
cat          df           getopt       ls           ping         sleep        uname
chattr       dmesg        grep         mkdir        ping6        stat         usleep
chgrp        dnsdomainname gunzip       mknod        ps           stty        vi
chmod        dumpkmap     gzip         mktemp       pwd          su           watch
chown        echo         hostname     more         rm           sync        zcat

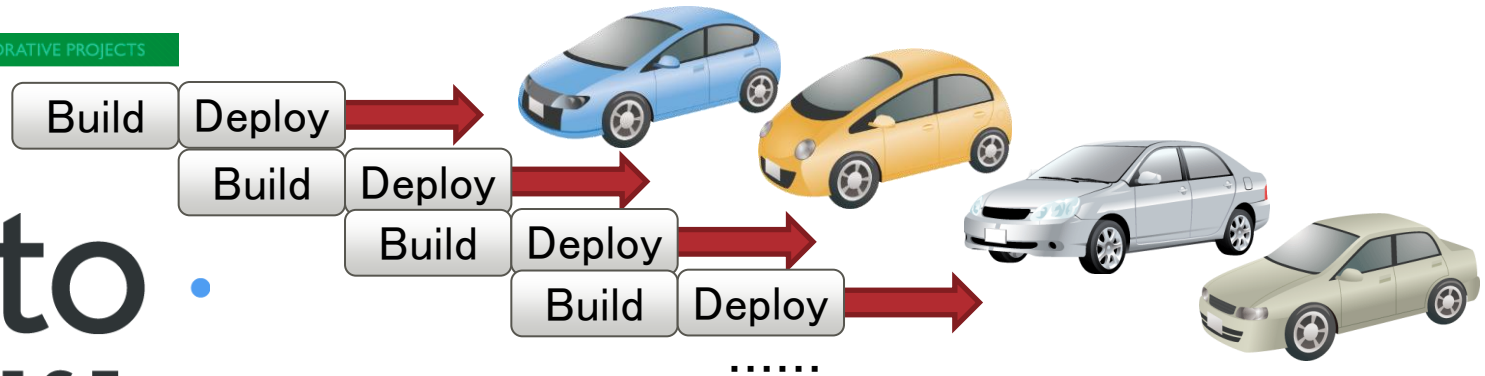
./etc:
busybox.links.nosuid  ld.so.conf          syslog-startup.conf.busybox
busybox.links.suid   passwd              syslog.conf
default              rpm-postinsts       syslog.conf.busybox
init.d               syslog-startup.conf udhcpc.d

./etc/default:
```

# Package Manage Method in Yocto Project

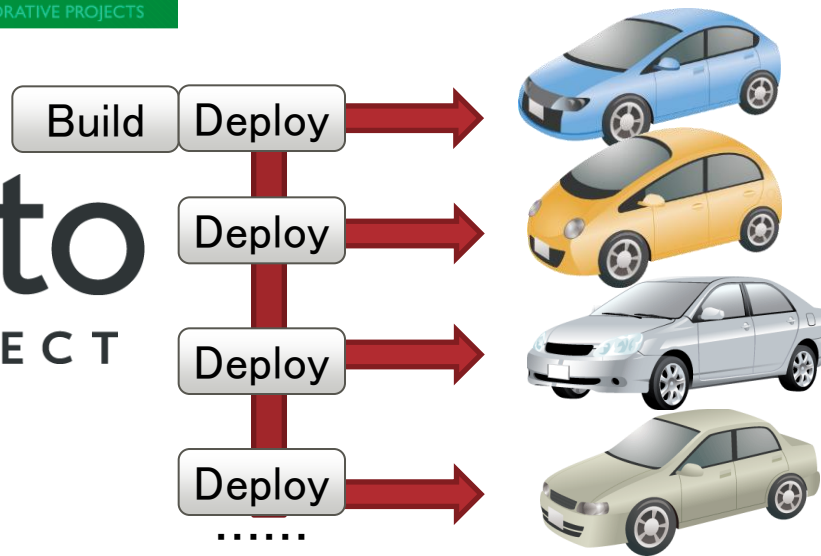
# Consider Method

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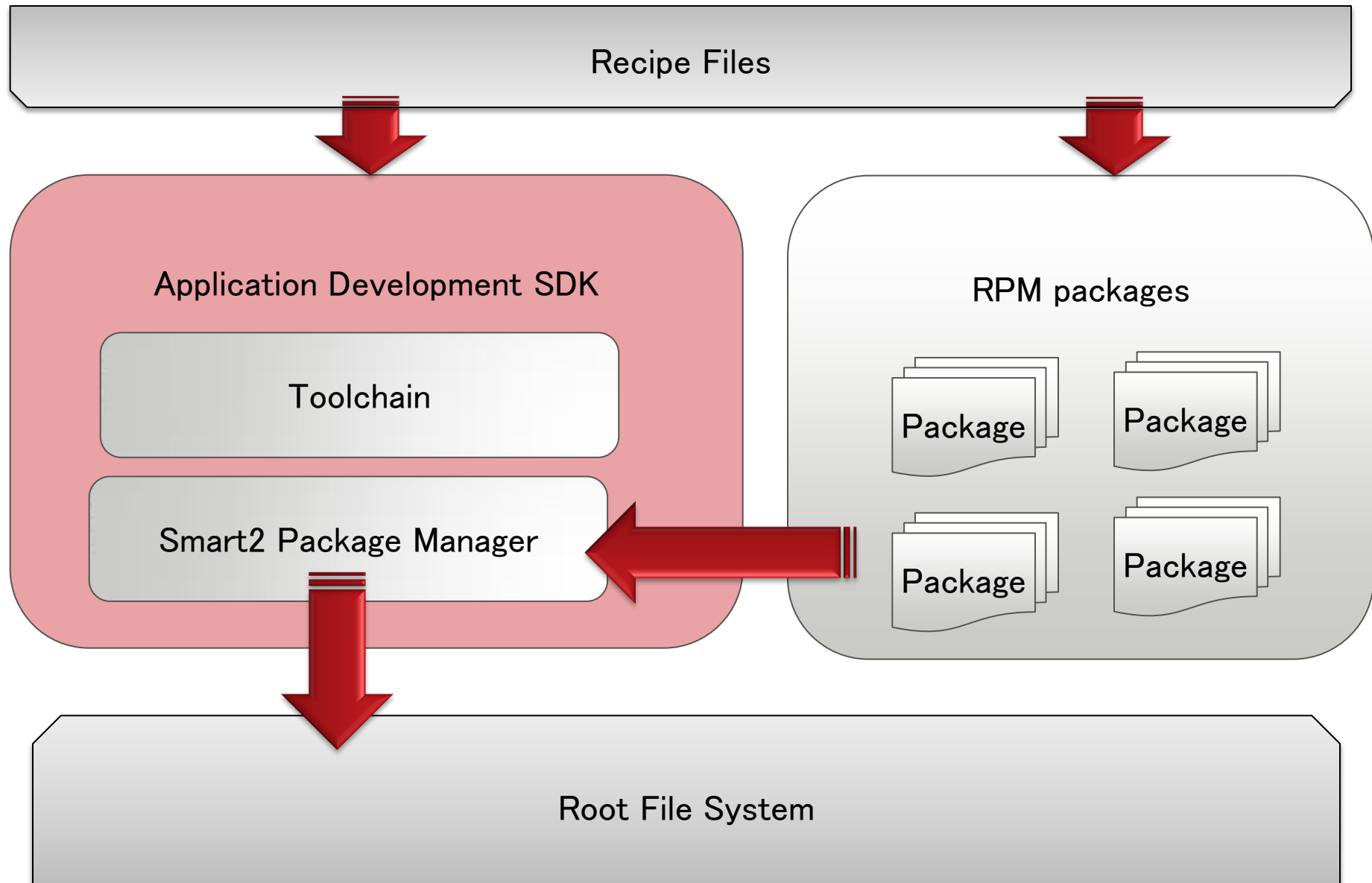
Recipe based management

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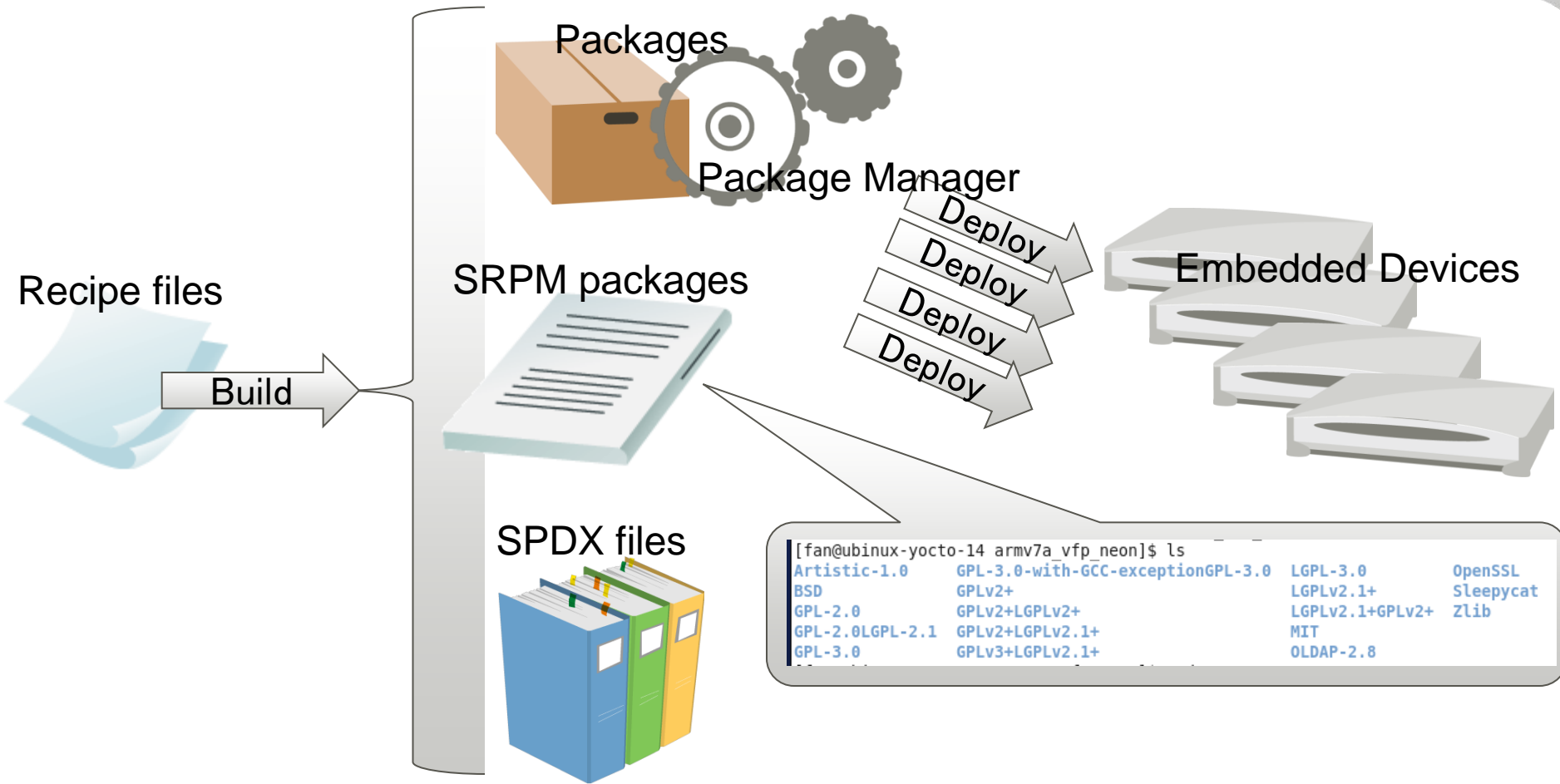
Package based management

# Workflow



# Next Step

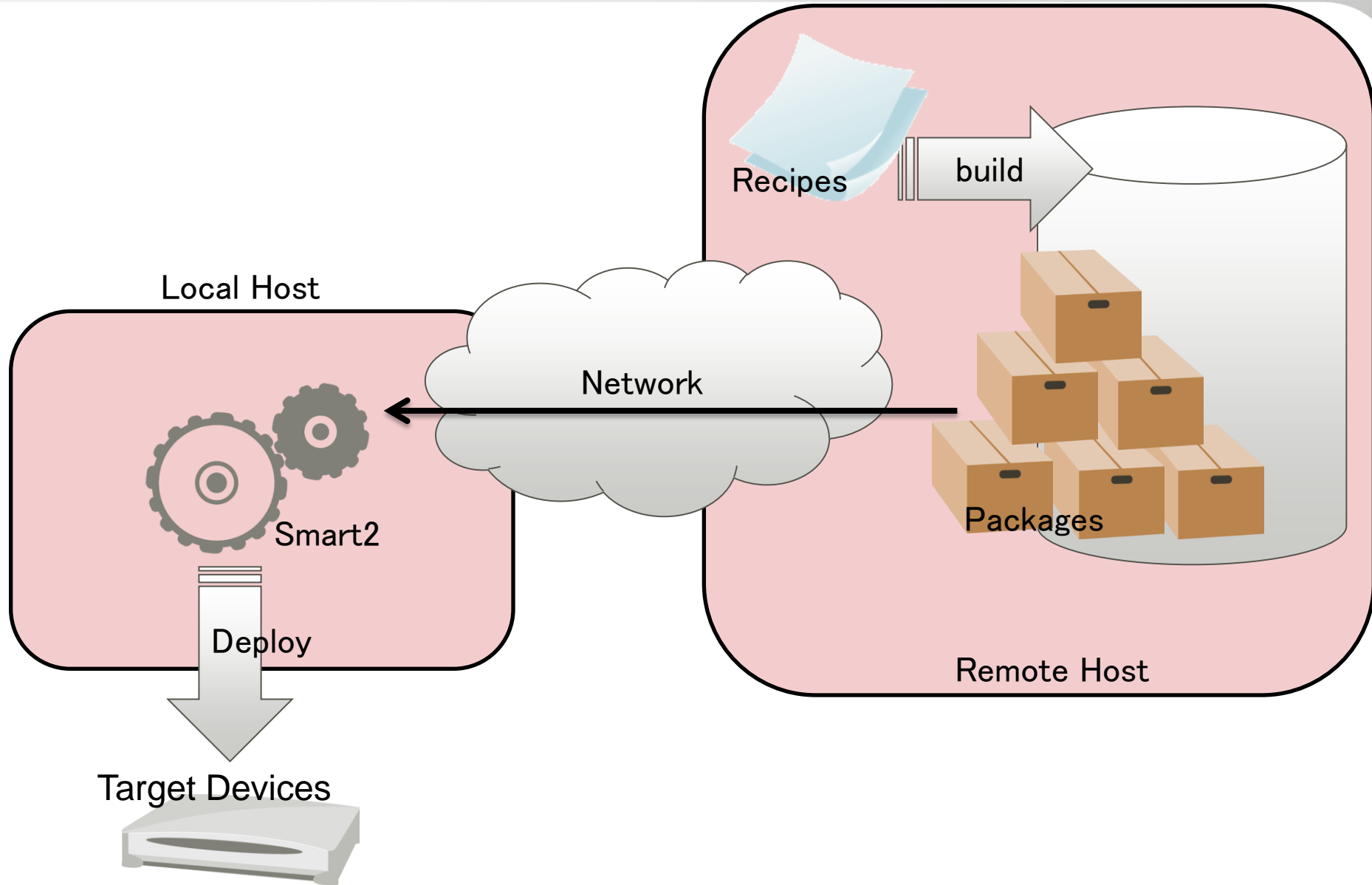
# License Management

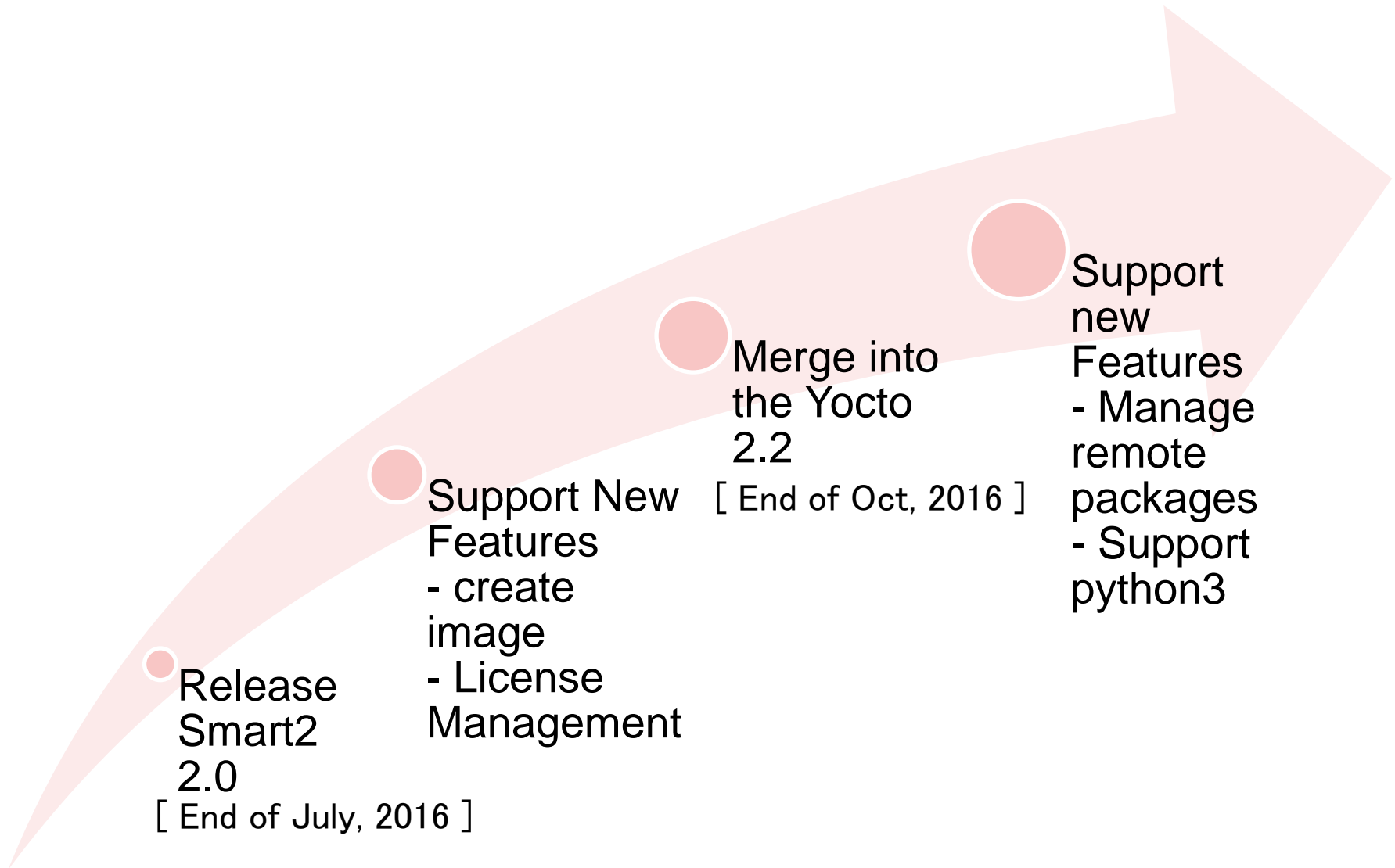


- Accompanied with the package files, SRPM packages and SPDX files are created to manage license information
- SRPM Packages are classified by license type



# Remote Update

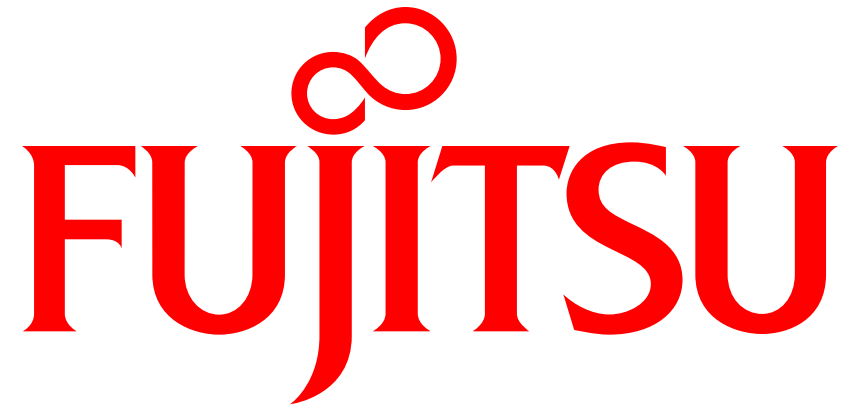




# Welcome patches and comments!

## [github.com/ubinux/smart2](https://github.com/ubinux/smart2)

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