Best Practice for Tizen Platform from Code to Device

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Agenda

- Tizen Development Tools
- Workflow Overview
- Downloading Tizen source code
- Building Package with GBS
- Creating image with MIC
- Flash to device with lthor
- Experimental data

Tizen Development Tools

GBS – Git Build System

- **What is GBS**
  - Command line tool that supports developing Tizen package maintained with git.
- **Features**
  - build/remotebuild
  - submit
  - import/export
  - clone/pull
  - chroot
  - changelog

MIC – Mic Image Creator

- **What is MIC**
  - An image creator to create images for Tizen.
- **Features**
  - supported image types: loop, raw, fs, livecd, liveusb
  - create (cr): create an image
  - convert: convert image format from one type to another
  - chroot: chroot to an image

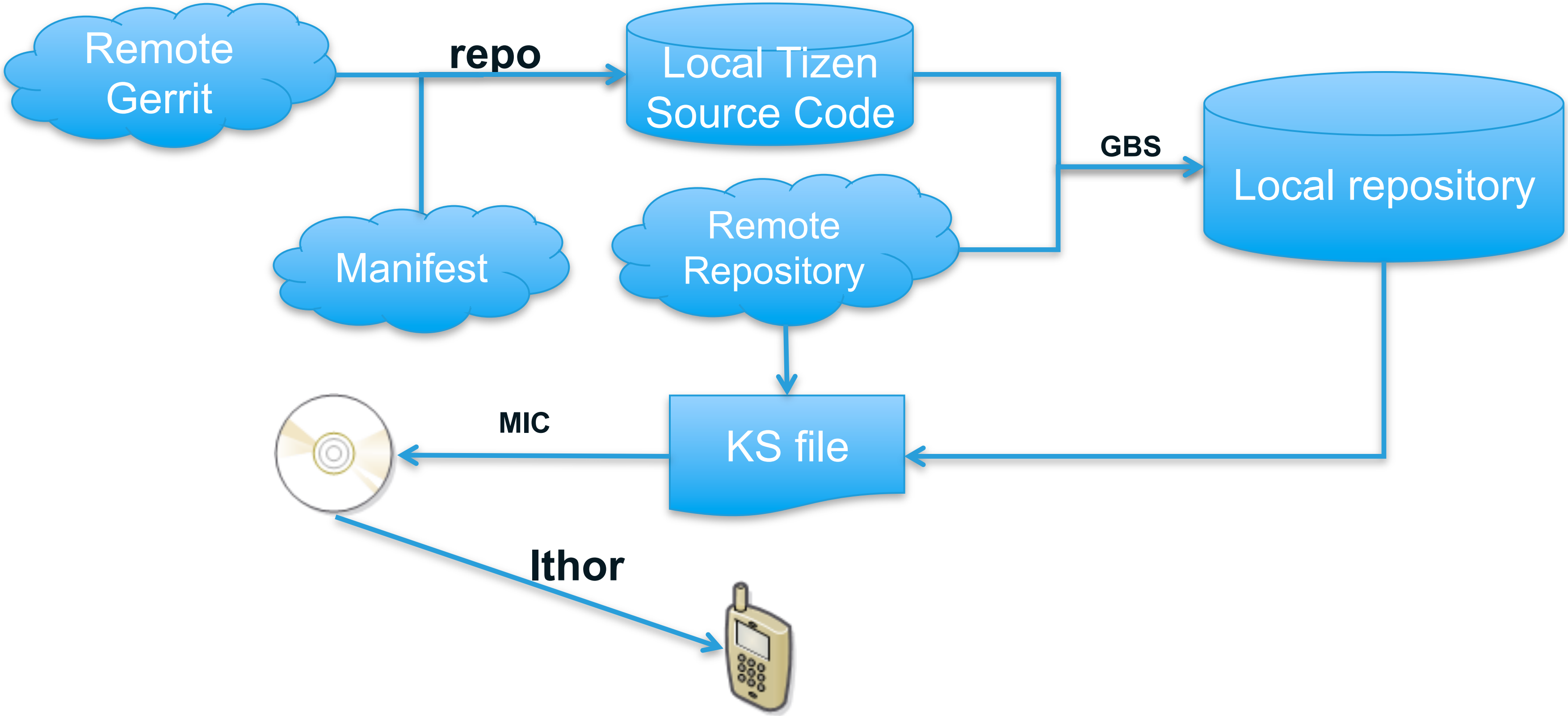
Others Tools

- **git**
  - An open-source version-control system
  - Handle large projects that are distributed over multiple repositories
- **repo**
  - First introduced in Android from Google
  - A repository management tool that we built on top of Git
  - Make it easier to work with multiple Git projects, sync / uploads codes.
- **lthor**
  - Flash tool for Tizen Phone
  - Support Linux and Windows

How to Install

- **Tizen Development Tools repo**
  - http://download.tizen.org/tools/latest-release/
- **Supported Distributions**
  - Ubuntu 12.04,12.10,13.04
  - Fedora 17, 18
  - openSUSE 12.1, 12.2, 12.3
  - CentOS 6

Workflow Overview



Download Tizen Source Code

Git Hosting

- **Gerrit:**
  - A web-based code review system for projects that use git
  - Tizen Gerrit URL: https://review.tizen.org/gerrit
  - Register: https://www.tizen.org
  - Follow guide to upload ssh public key
- **Code clone**
  - git clone
  - repo & manifest (recommended)
- **Examples:**
  - `$ ssh review.tizen.org -p 29418 gerrit ls-projects`
  - `$ git clone ssh://review.tizen.org:29418/apps/home/memo`

Prepare Manifest

- **Sample manifest file**

```
<?xml version="1.0" ?>
<manifest>
<remote name="tizen.org" fetch="ssh://tizen/" review="https://review.tizen.org/gerrit" />
 <default revision="tizen_2.1" remote="tizen.org" sync-j="4" />
 <project name="apps/home/app-selector" path="apps/home/app-selector" />
 <project name="apps/home/calculator" path="apps/home/calculator" />
...
 </manifest>
```

- **Get full released manifest.xml**
  - http://download.tizen.org/releases/2.1/tizen-2.1/builddata/manifest
- **Prepare local manifest git repo**

```
$ mkdir ~/tizen-manifest
$ git init
$ cp path/to/tizen2.1.xml .
$ git add tizen2.1.xml && git commit -a -m “initial version”
```

Downloading Tizen source

- Download `repo` script
  - https://dl-ssl.google.com/dl/googlesource/git-repo/repo
- Download Tizen source code with `repo`

```
$ repo init -u ~/manifest/ -m <manifest file>
$ repo sync
```

Build Tizen Source using GBS

Prepare gbs conf file

- **Create a new profile if needed**
- **Add Tizen repo to configuration file, Example:**

```
[general]
profile = profile.tizen2.1
...
[repo.tizen2.1]
url= http://download.tizen.org/releases/2.1/tizen-2.1
# Comments out the following two lines if auth needed
# user=
# passwd=

[profile.tizen2.1]
repos=repo.tizen2.1
```

- **use `--profile|-P` to use the profile above, like**
  - `$ gbs build -P tizen2.1 …`
  - -P option is not required if the profile is the default profile in [general] section

Build packages with GBS

- **Break dependencies circles**
  - 'gbs build' can report circles if exist, for example:

    cmake->curl->c-ares->cmake

    gettext->gcc->eglibc->gettext
  - use `--exclude` option to break circle: `--exclude=cmake,gettext`
- **Other useful options:**
  - --threads, --arch, --overwrite, -dist|-D, …
  - More: gbs build --help
- **Full gbs build command**

```
$ gbs build -A <i586|armv7l> --threads=4 --exclude=cmake,gettext
```

Output of gbs build

```
gbs output top dir                        # Default is ~/GBS-ROOT/
|-- local
|   |-- cache                             # repodata and RPMs from remote repositories
|   |-- repos                             # generated local repo top directory
|   |   |-- tizen2.0                      # repo for profile ivi
|   |   |   |-- armv7l                    # store armv7l RPM packages
|   |   |   |-- i586                      # store i586 RPM packages
|   |   `-- tizen2.1                      # build for profile: tizen2.1
|   |       `-- i586                      # the same as above
|   |-- BUILD-ROOTS                       # top dir to store all kinds of build roots
|   |   |-- scratch.i586.0                # first build root for x86 build
|   |   |-- scratch.i586.1                # second build root for x86 build
|   |   |-- scratch.i586.2                # third build root for x86 build
|   |   `-- scratch.armv7l.0              # first build root for armv7l build
|   |                                     # The above build root dir can be used by gbs chroot
|   `-- sources                           # sources generated for build, including tarball, spec, etc.
|       |-- tizen
|       `-- tizen2.1
`-- meta                                  # meta data used by gbs in the future
```

Create image using MIC

Customize KS file

- **Get original ks file**
  - Download from released remote repo:
    http://download.tizen.org/releases/2.1/tizen-2.1/builddata/image-configs/
- **Customize ks file**
  - Add local repo created by gbs
  - Add priority for repo if needed
  - Add extra packages/groups
  - Remove packages / groups
  - Update post scripts

Sample KS file

```
# -*-mic2-options-*- -f loop --pack-to=@NAME@.tar.gz -*-mic2-options-*-
lang en_US.UTF-8
keyboard us
timezone --utc America/Los_Angeles
# ROOT fs partition
part / --size=3000 --ondisk mmcblk0p --fstype=ext4 --label=platform
# DATA partition
...
# Add local repo generated by gbs
repo  --name=local --baseurl=file:///home/<user>/GBS-ROOT/local/repos/tizen2.1/i586 --priority=1
repo  --name=base \
      --baseurl=https://download.tizen.org/releases/2.1/tizen-2.1/repos/tizen-base/ia32/packages/ \
      --save --ssl_verify=no
repo  --name=main \
      --baseurl=https://download.tizen.org/releases/2.1/tizen-2.1/repos/tizen-main/ia32/packages/ \
      --save --ssl_verify=no
%packages
...
%end
%prepackages
...
%end
%post
...
%end
```

Create image using mic

- **Options for image creation**
  - `mic cr --help` or `mic cr <image type> --help`
  - Image types supported: `loop, raw, fs, livecd, liveusb`
  - special type: `auto`
- **Basic usage of mic**
  - `$ mic cr auto <tizen.ks>`
  - `$ mic cr loop --pack-to=@NAME@-rs.zip <tizen.ks>`

Flashing image with lthor

- **Boot into download mode**
  - Power off
  - Press <volume down> + <power> keys
- **Flash system (kernel, u-boot) image**
  - Get me here: http://download.tizen.org/releases/system/
  - `$ lthor <system.tar>`
- **Flash rootfs image**
  - rootfs: platform.img, data.img, ums.img
  - `$ lthor <tizen.tar.gz>`

Experimental work

Test Machine	CPU	i7, 3.40GHz, 8 cores
	Memory	8G
	Swap	8G

Test Data	Packages	770
	spec file	790
	Total Code Size	15.5G

			i586	armv7l
Build Time	gbs build	export package	10 m 30 s	10 m 30 s
		build package	5 h 10 m	8 h 15 m
	Create image		38 m 29 s	40 m 48 s

			i586	armv7l
Build Time (optimized)	gbs build	export package	10 m 30 s	10 m 30 s
		build package	2 h 30 m	5 h 25 m
	Create image		4 m 39 s	5 m 56 s

Optimization

GBS: mount gbs build root dir as tmpfs

```
$ mount -t tmpfs -o size=16G tmpfs ~/GBS-ROOT/local/BUILD-ROOTS
```

MIC: add `--tmpfs` option

```
$ mic cr --tmpfs ...
```

References

- [1] https://source.tizen.org/documentation/articles/creating-tizen-platform-image-scratch
- [2] https://source.tizen.org/documentation/reference/git-build-system
- [3] https://source.tizen.org/documentation/reference/mic-image-creator
- [4] https://source.tizen.org/documentation/reference/flash-device
- [5] http://download.tizen.org/releases/2.1/latest/
- [6] https://download.tizen.org/tools/latest-release/
- [7] https://git-repo.googlecode.com/git-history/v1.6.8.2/docs/manifest-format.txt

Q&A

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