

Tizen* IVI Hands-on Lab

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Agenda

- Lab Objective
- Platform Development Workflow
- Tizen* Platform Tools Introduction
- Hands On Overview
- Q & A



Objective

- Get familiar with Tizen* IVI Core OS development
 - Tizen Core OS collaboration workflow
 - Tizen platform development tools
- Know which tools to use and how to set them up
 - How to build Tizen images
 - How to customize Tizen packages
 - Testing custom Tizen IVI images
- **DIY** fun time!





Platform Development Workflow

aka Core OS Development

Roles & Responsibilities (1/2)

- **Developers**

- Write and submit code to the development branch of a GIT project (i.e., the Master branch)
- Developers can also verify and review (vote '+1' or '-1') code change request for any project on any branch

- **Maintainers**

- Create additional branches, such as upstream, development branch for profile projects
- Rebase master branch to upstream branch
- Have the responsibility of code reviews, including approve('+2') or reject('-2') patches



Roles & Responsibilities (2/2)

- **Reviewers**

- Have the responsibility for code reviews, including approve (vote '+2') or reject (vote '-2') patches

- **Release Engineers**

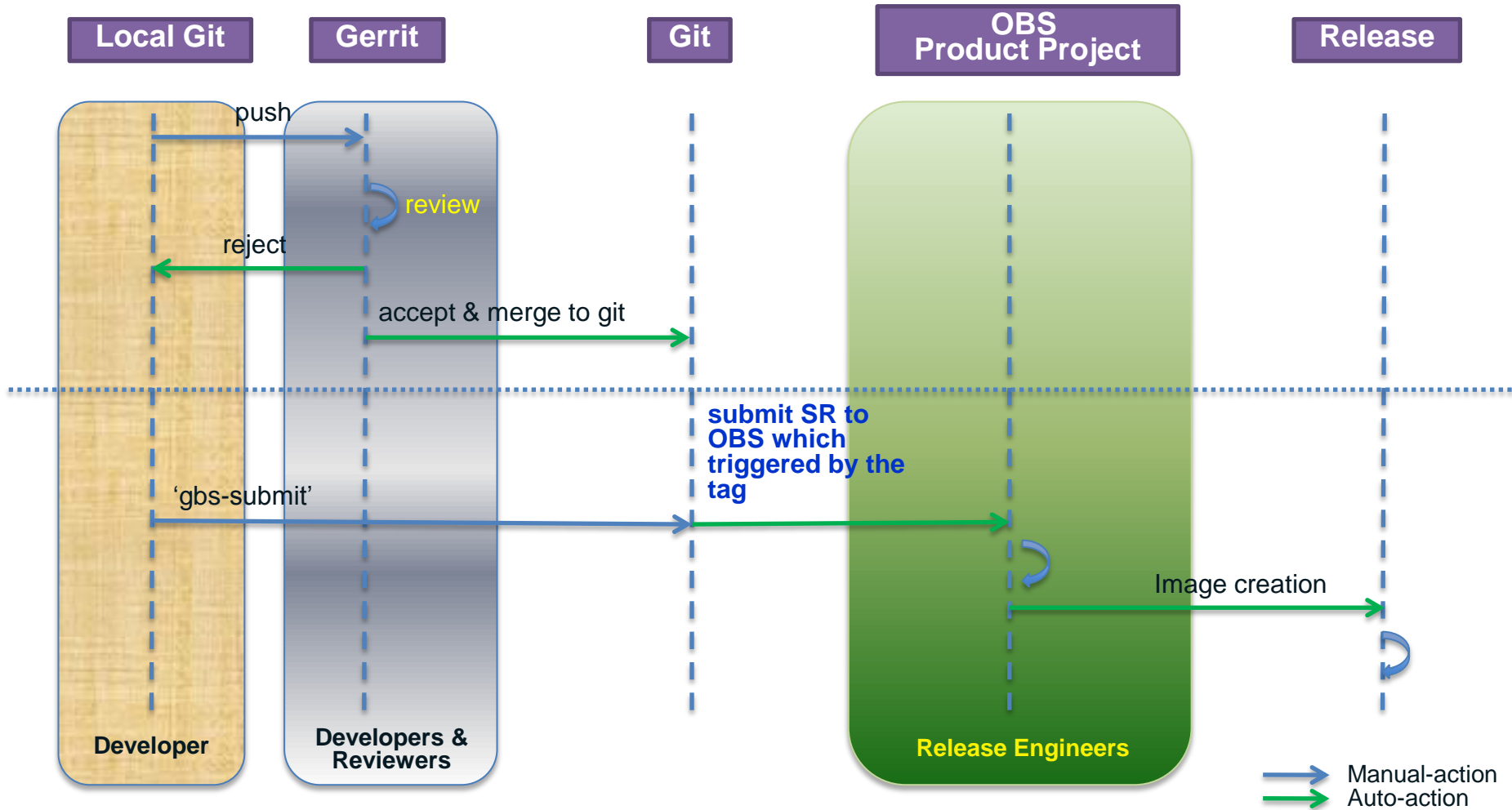
- Approve submission to OBS that will ultimately build an image for testing
- Responsible for smoke testing the resulting image and then copying them to the releases area for QA to test

- **QA Engineers**

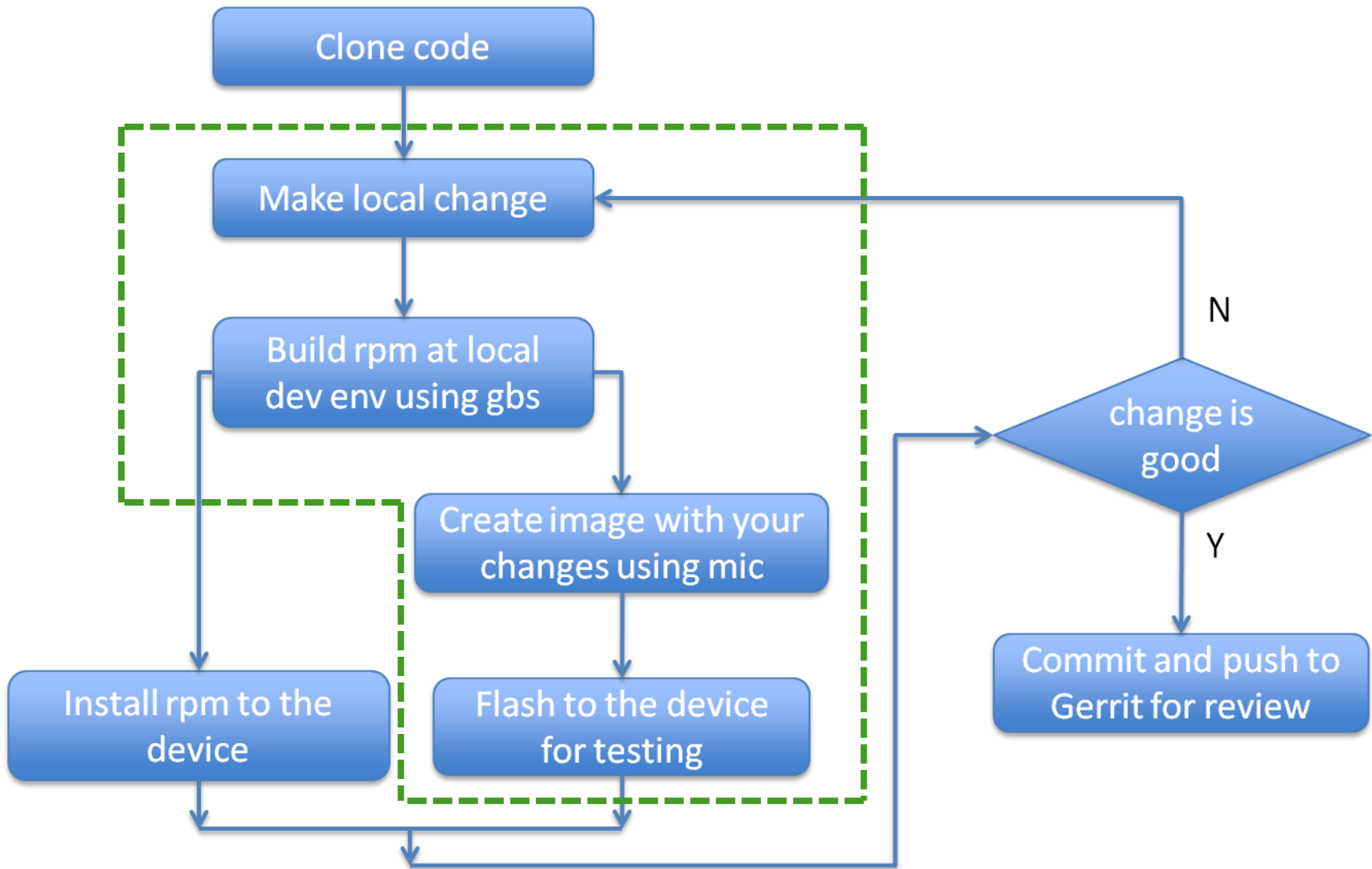
- Thorough testing of the image and verification of no regressions and bugs



Package Development Procedure



Developer Workflow





Tizen* Platform Tools Introduction

Environment Setup

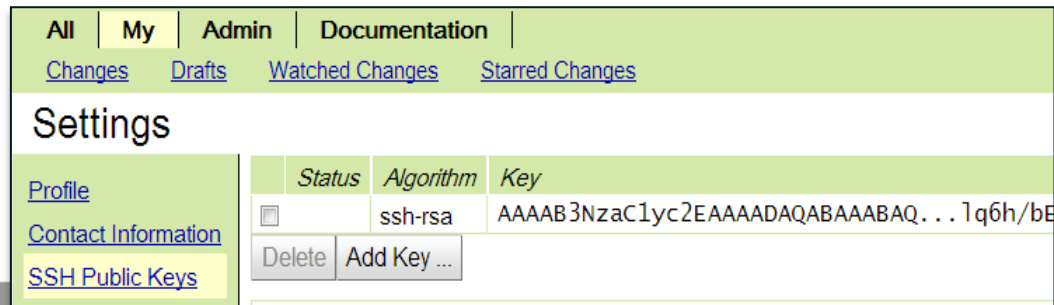
- Register to tizen.org, login and apply for developer access
- Install and configure Git

```
$ git config --global user.name "<First Name Last Name>"  
$ git config --global user.email "<Email Address>"
```

- Login to <https://review.tizen.org/gerrit> with Tizen* account
 - Register email address
 - Configure Secure Shell (SSH)
 - Generate RSA keys

```
$ ssh-keygen -t rsa -C "<Comments>"
```

- Create an SSH configuration file `~/.ssh/config`
- Upload the SSH public key `~/.ssh/id_rsa.pub` to Gerrit



The screenshot shows the Gerrit web interface. At the top, there are navigation tabs: All, My, Admin, and Documentation. Below these are links for Changes, Drafts, Watched Changes, and Starred Changes. The main heading is "Settings". On the left, there is a sidebar with links for Profile, Contact Information, and SSH Public Keys. The main content area shows a table with columns for Status, Algorithm, and Key. There is one entry with a checkbox, the algorithm "ssh-rsa", and a long key string. Below the table are "Delete" and "Add Key ..." buttons.

Status	Algorithm	Key
<input type="checkbox"/>	ssh-rsa	AAAAB3NzaC1yc2EAAAADAQABAAQ...1q6h/bE

```
Host review.tizen.org  
  Hostname review.tizen.org  
  IdentityFile ~/.ssh/id_rsa  
  User <User name on Gerrit>  
  Port 29418
```



Installing Development Tools

Overview

- **gbs** (<https://source.tizen.org/documentation/git-build-system>)
Git Build System, the tool for Tizen* package development
- **mic** (<https://source.tizen.org/documentation/mic-image-creator>)
the image creator for creating Tizen images
- **bmap-tool** (<https://source.tizen.org/documentation/bmaptool>)
the tool for flashing Tizen IVI images to USB sticks
- **lthor**
the tool for flashing Tizen images to SDP (Mobile only)

```
// Add Tizen tools repo to the source list /etc/apt/sources.list  
$ sudo apt-get update  
$ sudo apt-get install gbs mic bmap-tool
```

Prebuilt tools available at <http://download.tizen.org/tools/> for mainstream Linux* distributions

- Ubuntu* 12.04, 12.10, 13.04
- openSUSE 12.1, 12.2, 12.3
- Fedora* 17, 18



Cloning Packages

- Git Build System (**gbs**)
 - Package development tool based on Git repositories
 - Support local build or remote build on **OBS** (Open Build Service)
- Setup package Git repositories
 - Get the package name
 - Lookup names from Admin tool in Gerrit UI
 - Query a full list

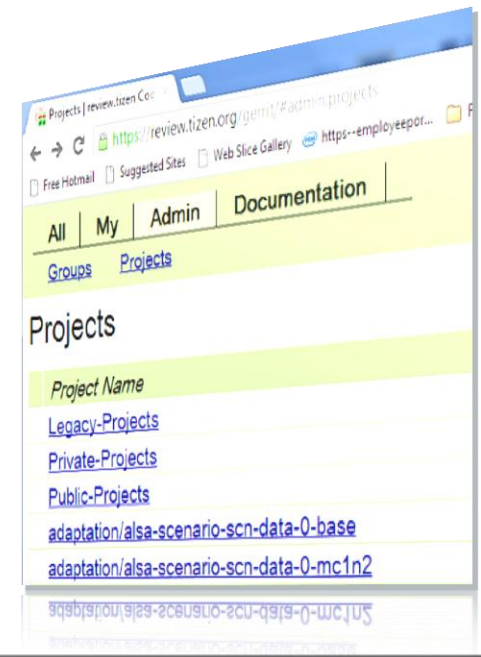
```
$ ssh review.tizen.org gerrit ls-projects
```

- Cloning from Gerrit

```
$ git clone review.tizen.org:<proj1> <proj2> ...
```

- Importing SRPM packages

```
$ gbs import <spec file | SRPM | tarball>
```



Building Packages

- Building packages locally
 - Available arch : x86_64, **i586**, armv6l, armv7hl, armv7l

```
$ cd project_name
$ gbs build [-R <repository>] [-A <arch>] [--include-all] \
                                                    [--keep-packs] \
                                                    [--incremental] \
                                                    [--noinit]
```

- Building packages at remote OBS (**approval required**)

```
$ gbs remotebuild [-B <base_obsproj>]
$ gbs remotebuild [-B <base_obsproj>] --status
$ gbs remotebuild [-B <base_obsproj>] --buildlog <repo> <arch>
```

- Submitting patches to Gerrit

```
$ git commit -m
$ git push ssh://review.tizen.org/<proj> HEAD:refs/for/master
$ gbs submit -m [<message_for_tag>]
```



Creating Images (1/2)

MIC

- MIC is the tool to create images for Tizen*. It also provides chroot and image conversion capabilities.
- Image creation requires a **kickstart**^[1] file that describes how to create an image
 - What repos to pull packages from
 - What packages to be included
 - What post-scripts to run

```
Usage: mic create <image_type> <ksfile> [options]
image types: auto, fs, livecd, liveusb, loop, raw
options:
--cachedir=<cache directory>
--pkgmgr=<package manager backend>
--local-pkgs-path=<local package path>
--pack-to=<archive for packing all images>
--runtime=<bootstrap | native>
...
```

[1] http://download.tizen.org/releases/2.0/tizen-2.0_20130219.4/builddata/image-configs/



Creating Images (2/2)

- Create images
 - Tizen* IVI (In-Vehicle Infotainment)

```
$ sudo mic cr raw --compress-disk-image=bz2 --generate-bmap -  
release-latest ivi-2.0.ks
```

- Tizen 2.0

```
$ sudo mic cr loop --pack-to=img.tar.gz --runtime=native RD-210.ks
```

```
Info: Retrieving repo metadata:  
Info: Retrieving 37b3e49fd6c2d8b06c917e51a7419532b11ecf77f3f06783a61432969c770  
  
Info: Use detected arch armv7l.  
Info: Refreshing repository: Tizen-main ...  
Info: Refreshing repository: Tizen-base ...  
Info: zypp architecture is <armv7l>  
Info: Checking packages cached ...  
Info: Packages: 679 Total, 0 Cached, 679 Missed  
Info: Downloading packages ...  
Info: Retrieving efl-theme-tizen-hd-1.0.112r05-1.1.armv7l.rpm [7/679] ... █
```



Customize Image (kickstart file)

```
part /boot --size 64 --ondisk sdb --fstype=ext4 --label boot --active --align 1024
part /opt --size 676 --ondisk sdb --fstype=ext4 --label opt --align 1024
part / --size 3072 --ondisk sdb --fstype=ext4 --label platform --align 1024
...
repo --name=Tizen-base --
baseurl=https://download.tizen.org/snapshots/2.0/ivi/@BUILD_ID@/repos/base/ia32/packages/
repo --name=Tizen-ivi --
baseurl=https://download.tizen.org/snapshots/2.0/ivi/@BUILD_ID@/repos/ivi/ia32/packages/

%packages
@common
...
@adaptation-automotive-intel

kernel-x86-ivi

release-repos
-opengl-es
%end

%prepackages
eglibc
...
%end

%post
# keygen.post
ssh-keygen -t rsa1 -f /etc/ssh/ssh_host_key -N ""
...
rpmdb --rebuilddb

%end
```



Transferring the Tizen image to your device

Transferring the Tizen IVI image to your device

- `bmap-tool`: a tool for efficiently copying a Tizen IVI image onto a target device.
- The target can be: USB stick, HDD, SSD, eMMC

Usage: `bmaptool copy <tizen-ivi-image.raw> <device>`

- `tizen-ivi-image.raw` is the Tizen IVI image file created by MIC. It can also be a compressed image (e.g: bz2)
- `device` is the hardware device you want to transfer your Tizen IVI image to
- `bmaptool` will automatically search for the corresponding `*.bmap` file and use it if found

- Flashing the Tizen* Mobile image
 - **lthor** - the tool for downloading binaries to a Tizen SDP over a USB cable
 - Power on the device while pressing `<volume down>` + `<power>` to boot into Download mode
 - Flashing the image

Usage: `lthor [-p pitfile] tarfile1 tarfile2 ...`

- `PIT`(Partition Information) file if the partition info should be modified
- `tarfiles` contain binaries whose names are predefined in the partition information on the device



Contribute Code to Tizen* (1/2)

- Change-Id
 - Gerrit uses [Change-Id](#) to identify your submission and track these through the complete review process
 - Importing [commit-msg](#) will make sure a proper Change-Id is automatically generated when committing your changes

```
$ cd project_name
$ scp review.tizen.org:hooks/commit-msg .git/hooks/
$ git checkout branch_name # Optional
```

- Make changes, test and submit for review
 - Modify your code and test the modifications before committing the changes

```
// Generate RPM packages that includes all the local changes
$ gbs build --include-all
```

- Test your changes: install the new RPM on your system

```
// Transfer the binary RPM to your target / test system
$ zypper in -f your_package_rpm
```

- Commit the changes in Git and push to Gerrit for review

```
$ git commit -a -s
$ git push origin HEAD:refs/for/branch_name
// A four-digit Gerrit review ID will be issued
```



Contribute Code to Tizen* (2/2)

- Review feedbacks from developers / maintainers
 - Make more changes taken the feedback into account, and test
 - Amend previous commit and re-use the last Git commit ID

```
$ git commit -a --amend  
$ git push origin HEAD:refs/for/branch_name
```

- Your code will be merged in the package codebase after +2'ed

```
$ git log  
commit 94ed8913cecf8486cd0c48f6ca2ed387de3acef  
Author: XYZ <xyz@domain>  
Date: Sun Mar 24 14:47:54 2013 +0800
```

Write up a useful commit message, including the bug ID it fixes (e.g. TIVI-XXX) if relevant.

Signed-off-by: XYZ <xyz@domain>

Change-Id: I60d6966afc9c5b432cd38f53cfa12135c357fd93





Hands-on Overview

Exercises overview

There are 3 exercises defined

- **Exercise 1: Get the basics right**
 - Rebuild a Tizen IVI 2.0 image
 - Transfer the image to a USB stick and run it
- **Exercise 2: Build your own image**
 - Modify the kickstart file according to your needs
 - Build a new image and test it
- **Exercise 3: Patch and contribute**
 - Patch a package, rebuild it
 - Build a new test image to verify your changes



Lab machine set-up

- All the tools have been pre-installed on the lab machines:
 - mic
 - git/gbs
 - bmaptool
- Each exercise can be found under `~/tizen-lab/exercise-X/`
 - We are using some slightly tweaked configuration files
- There is a 4th and optional exercise... **not for the faint-hearted**
... in other words: it's unlikely to work at the first try... if at all! 😊





Questions & Answers

Summary

- Tizen* is an open source, standard-based software platform for multiple device categories such as smartphones, in-vehicle information (IVI) devices, etc.
- Tizen provides a set of tools and defines working process for platform developers to collaborate on Core OS development
- Tizen SDK and API allow application developers to use HTML5 and related web technologies to write applications that run across multiple device segments
- Tizen is customizable and open for OSV/ISV/OEM to do innovation



Tizen IVI Development

IVI on tizen.org

Downloads

<http://download.tizen.org/releases/milestone/2.0/ivi/>

Wiki Page

<http://wiki.tizen.org/wiki/IVI>

Email list

IVI@lists.tizen.org

<http://lists.tizen.org/listinfo/ivi>

Issue Tracking

<http://bugs.tizen.org> (Tizen IVI Project)

Register username to edit wiki or issues

<https://www.tizen.org/user/register>



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