

Tizen Mini-Summit @ Linux Conference 2012

Introduction to Tizen IVI

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SSG / Intel

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Table of Contents

- Intel® Vision For Automotive
- Tizen™ Ecosystem
- Tizen™ IVI Architecture
- Tizen™ IVI 2012 Roadmap
- Tizen™ IVI Project Setup

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Automotive Market Tech Challenges

Cost:

- Software integration is expensive
- Implementing technology requires long lead-time

Technology innovation:

- Differentiated user experience
- Provide value-added connected services

Source: Interviews with major automotive OEMs

Car makers see the need for technology innovation.

Intel® Vision for Automotive

We deliver an experience in the car
that our customers love because our technology
makes it easier, safer, convenient, and more
fun to bring home, work, and community
into the car.



What is Tizen™ IVI?

Tizen™ IVI is an enabling software platform to foster open innovation and adapt to emerging standards.

- Innovation
- Extensibility
- Customization
- HTML5

Tizen™ is supported by leading mobile operators, device manufacturers, and silicon suppliers.



Why Tizen™ for IVI?

Reduce software integration costs by utilizing standards based Tizen IVI platform

Easily differentiate by customizing the user experience for Tizen IVI

Monetize by selling services and apps integrated into Tizen IVI

Deliver application ecosystem based on HTML5 standards



Tizen™ IVI Features and Benefits

Features

Benefits

- Small and fast boot
- GENIVI® compliant
- Multi-screen display
- Audio zoning and mixing
- Vehicle service data access
- Web service access
- Data protection

Reduce software integration costs by utilizing standards based Tizen IVI platform

- Customizable UX
 - ✓ User Interface (UI)
 - ✓ Window Manager
 - ✓ Audio Manager
 - ✓ Input Method
- Optional native API Lib.
- System settings

Easily differentiate by customizing the user experience for Tizen IVI

- Ease of application development
- Option to enable multiple development toolkits

Monetize by selling services and apps integrated into Tizen IVI

(in planning)

- Tizen™ IVI developer program
- Unified Tizen™ IVI community-developed apps repository

Deliver application ecosystem based on HTML5 standards

Why Work With Intel®?



Hardware platform
technology leadership



\$100M investment
in IVI innovations



Software leadership
and open source

Software Leadership

Linux Kernel Contributions by Company

By Changesets

Intel	1,138	10.6%
Red Hat	960	9.0%
Texas Instruments	428	4.0%
IBM	381	3.6%
Novell	372	3.5%
(Consultant)	298	2.8%
Wolfson	286	2.7%
Samsung	234	2.2%
Google	222	2.1%
Oracle	188	1.8%
Freescale	175	1.6%
Qualcomm	161	1.5%
Linaro	143	1.3%
Broadcom	140	1.3%
NetApp	133	1.2%

By Lines Changed

Intel	67,464	9.7%
Red Hat	65,966	9.4%
IBM	36,800	5.3%
Oracle	26,617	3.8%
Texas Instruments	25,687	3.7%
Samsung	24,966	3.6%
NVidia	20,604	2.9%
Linux Foundation	16,917	2.4%
ST Ericsson	15,792	2.3%
Novell	15,185	2.2%
Wolfson	14,039	2.0%
(Consultant)	13,495	1.9%
AMD	10,151	1.5%
Freescale	10,102	1.4%
Linaro	9,360	1.3%

Software Leadership

Intel Open Source Technology Center

Mobile

- Clutter
- Connman
- gUPnP
- oFono
- Qt
- Rapid Interface Builder
- SyncEvolution
- Tizen
- Web Simulator

Enterprise Infrastructure

- Enterprise Security Infrastructure
- KVM
- Node Manager
- OpenStack
- Xen

Linux

- Intel Linux Graphics
- Intel Linux Wireless
- Lesswats
- Linux Kernel
- PowerTOP

Embedded

- Poky
- Simple Firmware Interface
- Yocto Project

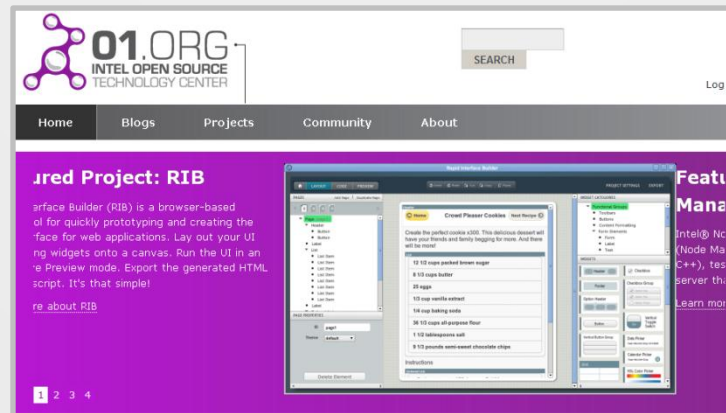
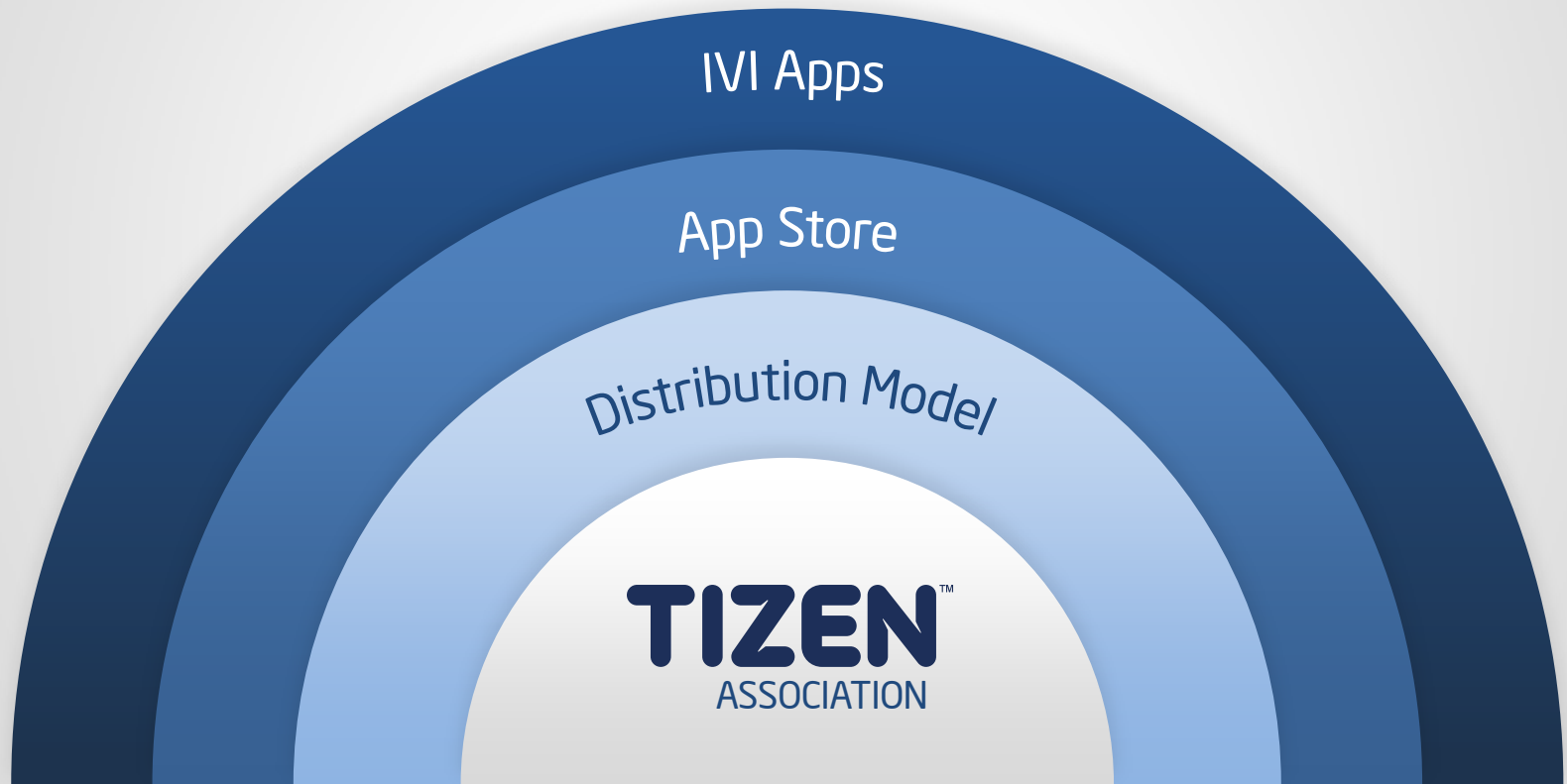


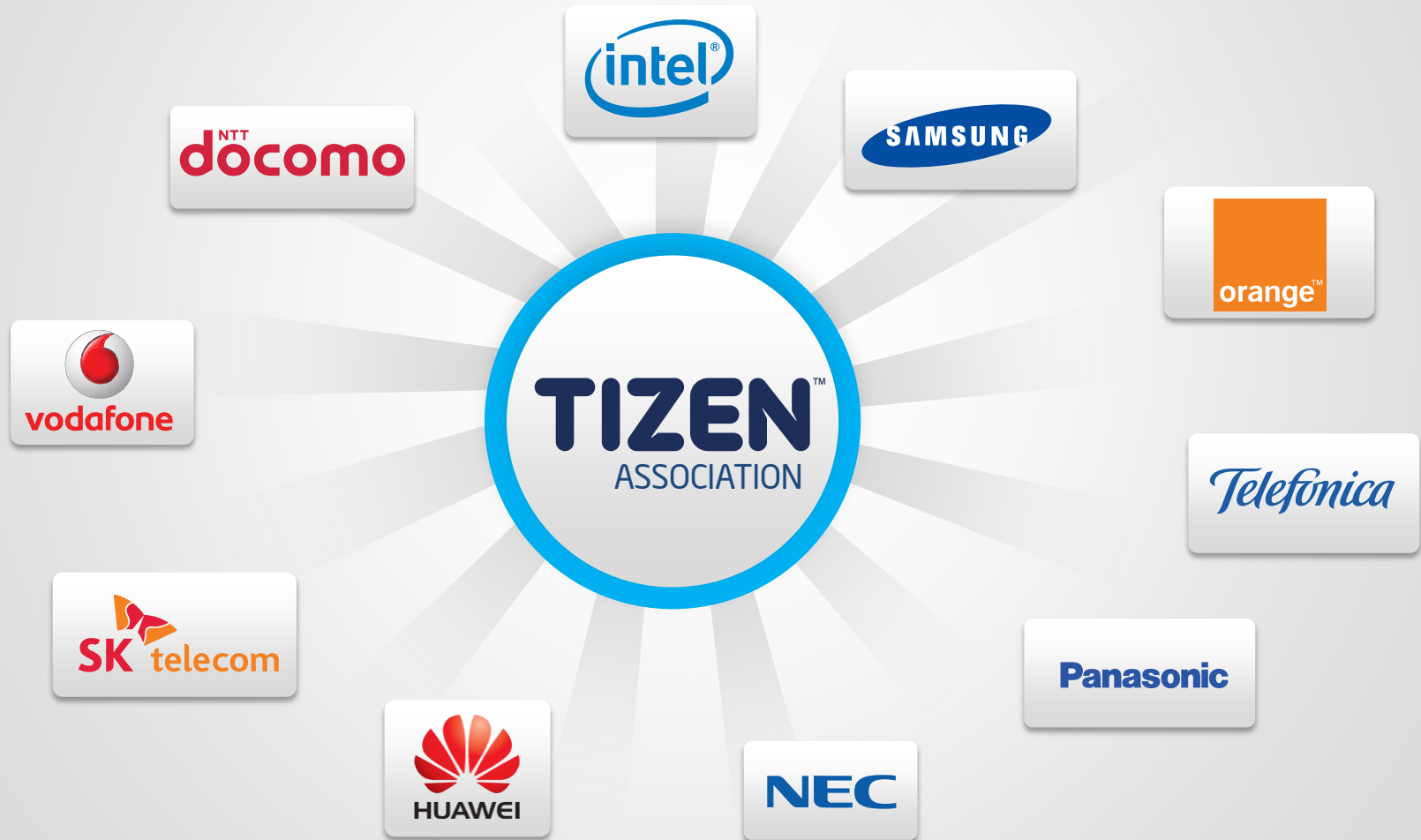
Table of Contents

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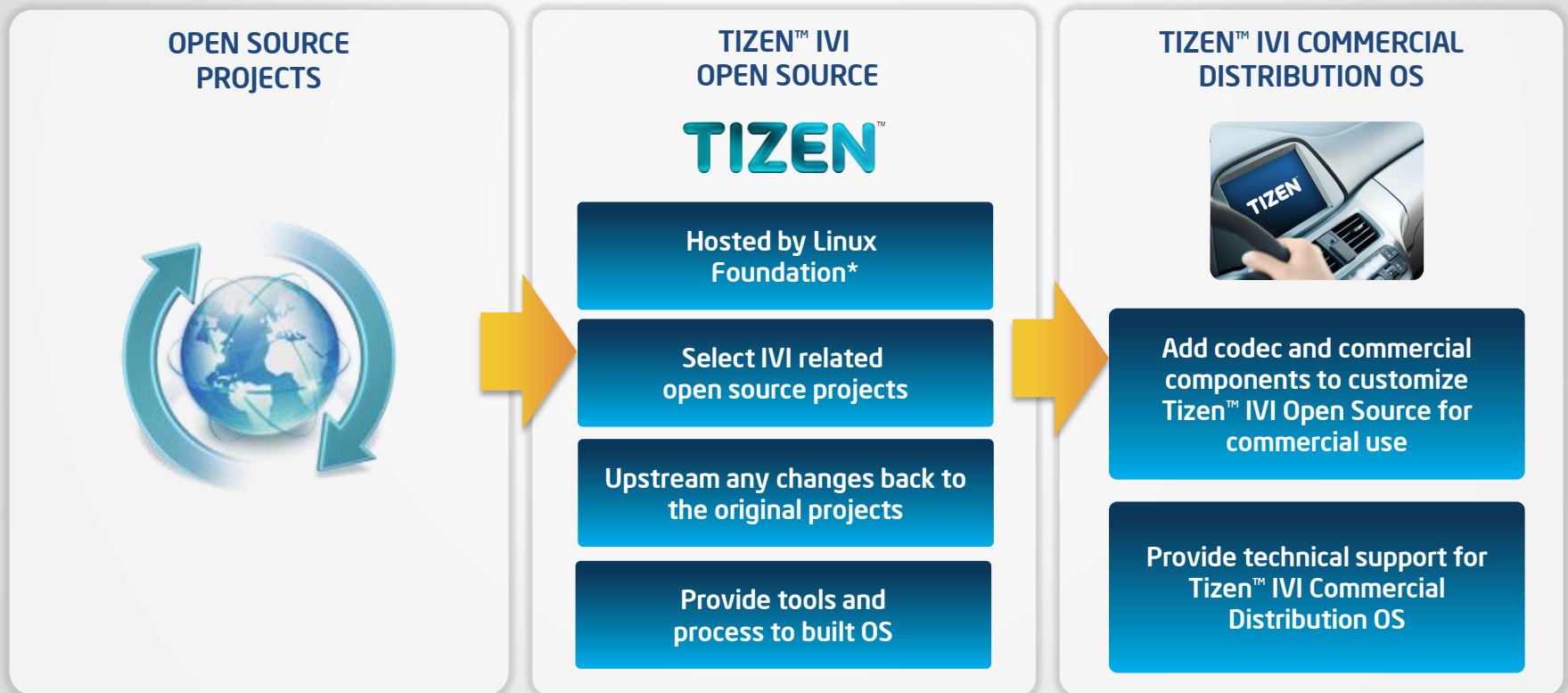
Tizen™ Ecosystem



Tizen™ Association



Tizen™ IVI Distribution Model

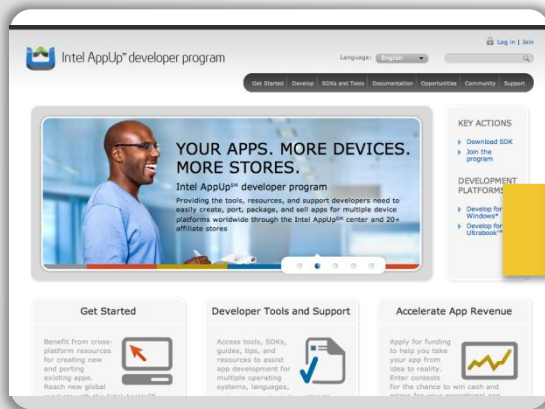


Tizen™ IVI Apps

Develop

Monetize

Consume



Developer program



App store infrastructure



Storefront client

Tizen™ IVI

Application Categories



Internet Radio

Multimedia Player

Streaming Video

Content Download



Traffic

Weather

Gas Price

Parking

Map

POI Search

Flight Info

Tickets



Compass

Rear View

ECO Drive

Surround View

Vehicle Metering

Diagnostics

Vehicle Manual

Navigation

Heating & Cooling

Dealer Finder

Radio Control

Maintenance

Tizen™ IVI Lets You



Reduce software integration cost by utilizing standards



Differentiate by customizing user experience



Monetize by selling services and apps

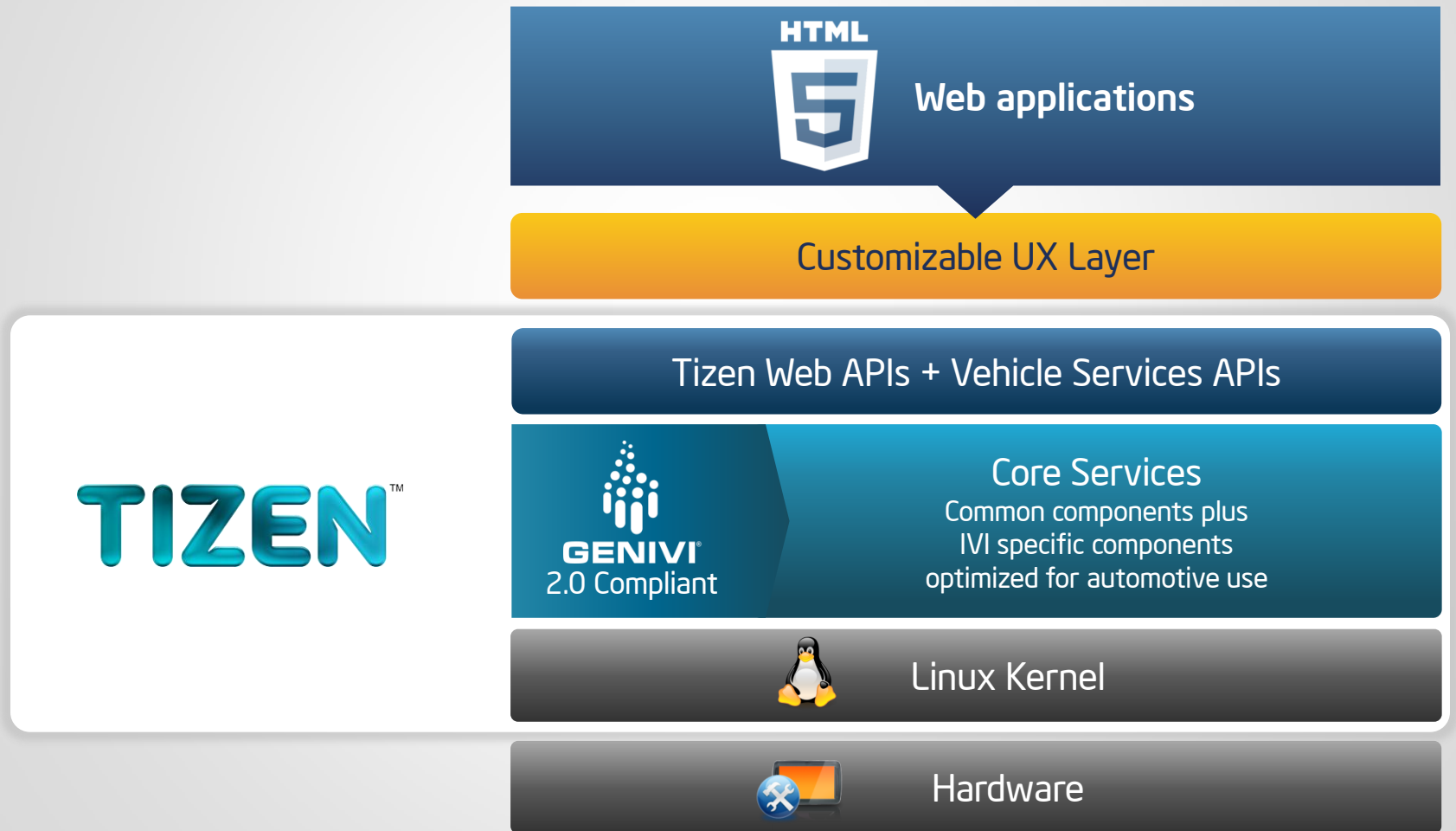


Deliver application ecosystem

Tizen™ IVI Architecture

- Overview
- Core Services
- Building the Stack Bottom Up
- Customization & Next Steps

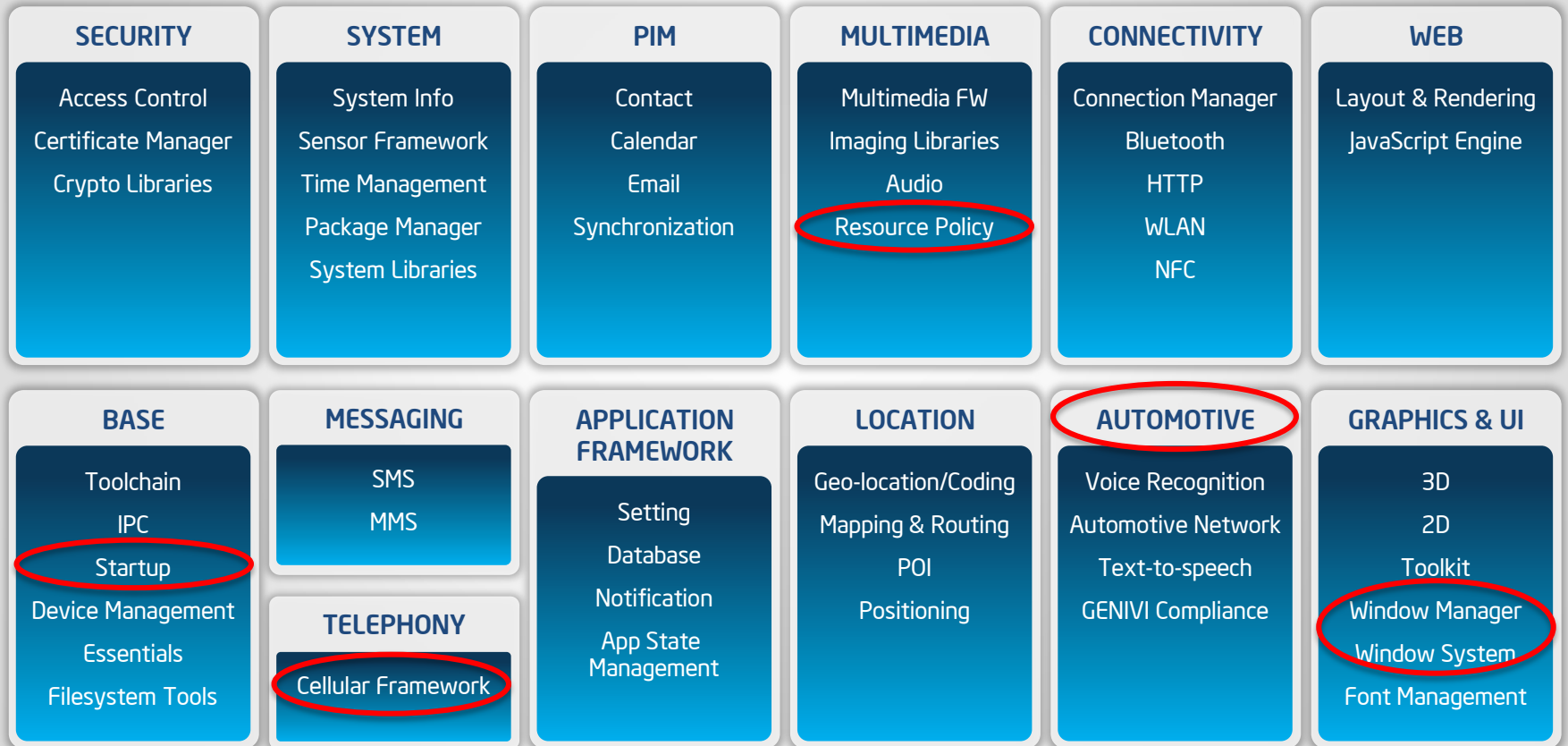
Tizen™ IVI Architecture Overview



Tizen™ IVI Architecture

Core Services

COMMON WEB API



Tizen™ Core Services

IVI Delta: Multimedia



Multimedia

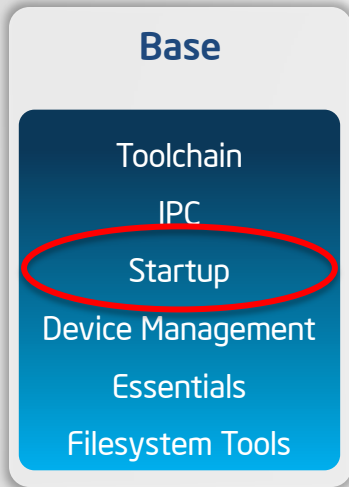
Multimedia is based on GStreamer. It provides support for media, including video, audio and imaging. It also provides media content management for managing media file metadata information.

Resource Policy

- Different from mobile stack because of complex use cases in IVI.
- Need to provide a solution that implements independent passenger zones for audio and display.

Tizen™ Core Services

IVI Delta: Base



Base

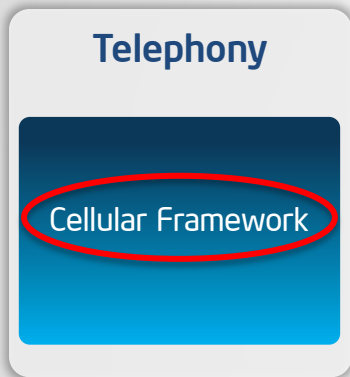
Base is the most minimal set of packages that are needed to bring the system to console or login. Base contains Linux base essential system libraries that provide key features, such as internationalization and XML parsing.

Startup

- Fastboot using systemd
- Less than 7 seconds to home screen

Tizen™ Core Services

IVI Delta: Telephony



Telephony

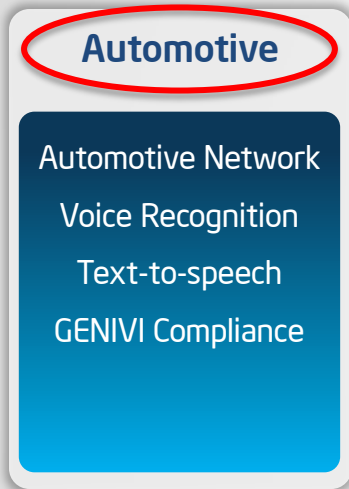
Telephony consists of cellular functionalities communicating with the modem, managing call-related and non-call-related information and services.

Cellular Framework

- Planning to use Ofono.
- Genivi has been looking into taking Ofono as an abstract component.

Tizen™ Core Services

IVI Delta: Automotive



Automotive

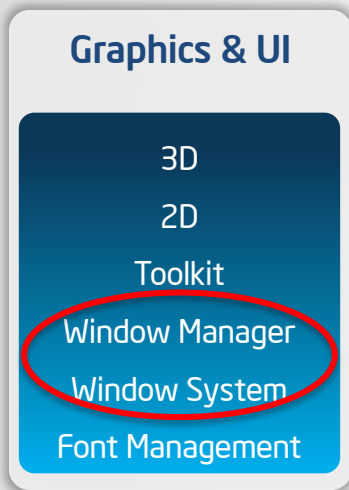
The key functionality of Automotive is Automotive Network Manager that provides APIs to access to vehicle service APIs, includes sensors and diagnostics data.

Voice recognition and Text-to-speech will be available for demonstration.

GENIVI Compliance subsystem will have GENIVI compliant components.

Tizen™ Core Services

IVI Delta: Graphics and User Interface (UI)



Graphics & UI

Graphics and UI consist of the system graphic and UI stacks, which includes components listed.

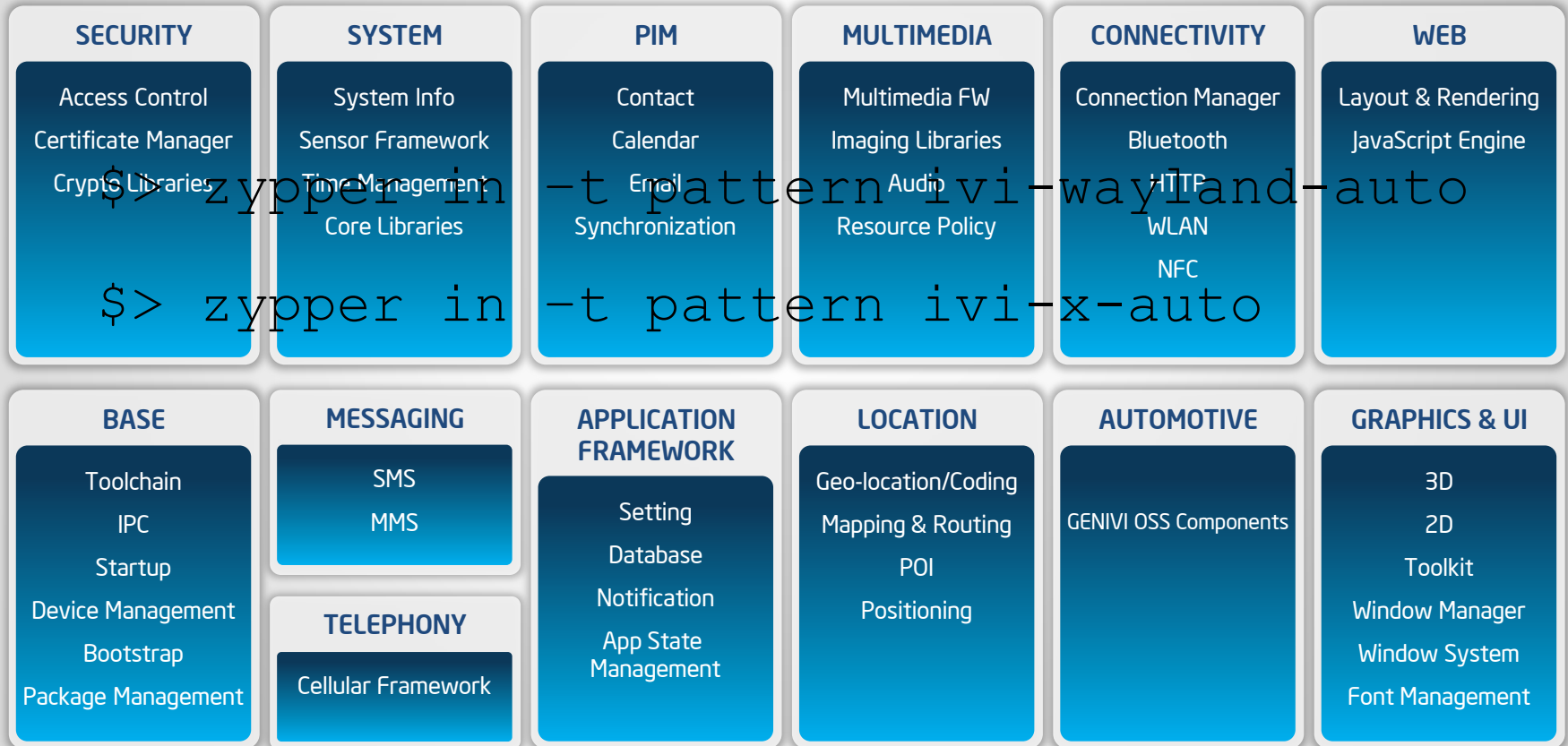
Window Manager / Window System

- Provide an installation option for display protocol between Wayland and X11
- In Wayland's case, Window manager uses Wayland server API to implement Wayland compositor. Weston is a sample compositor.
- X11 for backwards compatibility during a transition period

Tizen™ IVI Architecture

Building the Stack Bottom Up

COMMON WEB API



```
$> zypper in -t pattern ivi-wayland-auto
$> zypper in -t pattern ivi-x-auto
```

Tizen™ IVI Architecture Customization & Next Steps

- Define more installable patterns
 - ivi-wayland-auto / ivi-x-auto (available now)
 - genivi-compliance
- Map RPM package groups to the architecture diagram
 - Gives platform developers a way to see which set of packages implement each subsystem

Table of Contents

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Tizen™ IVI 2012 Roadmap

2012

2013

April May Jun Jul Aug Sept Oct Nov Dec Jan Feb Mar

Tizen IVI Open Source

Preview

Feature Complete
(Target)

1.0 Final
(Target)

1.x Update
(Target)

Intel Atom Processors

E660T
(Tunnel Creek)

Valley View

Find Tizen IVI

ISIF 2012 Tokyo

Linux Forum

Genivi AMM Shanghai

Tizen™ IVI Preview Objectives

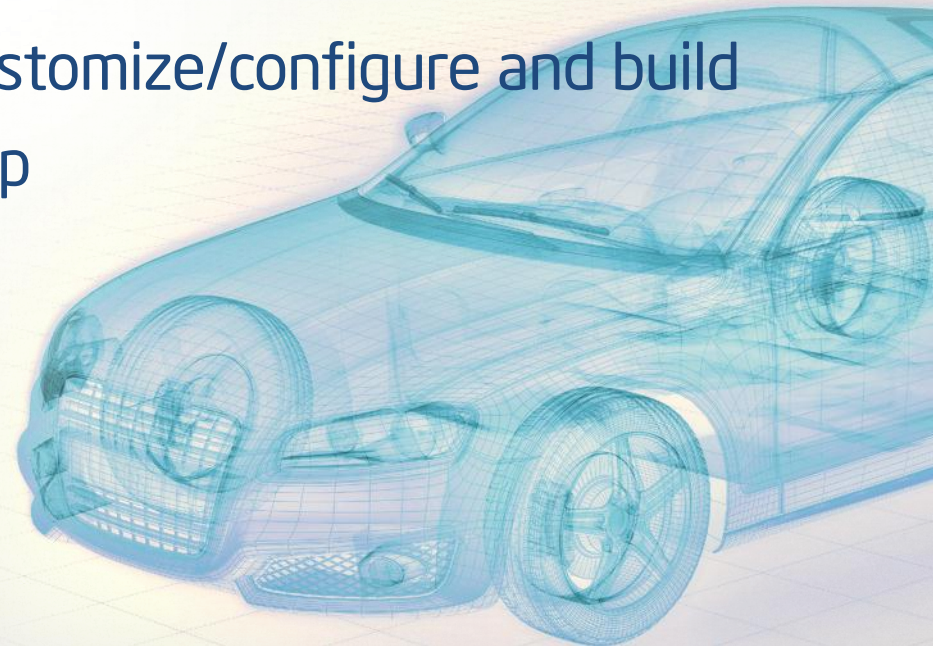
- Show Tizen IVI signs of life
- Establish Tizen IVI as preferred base for GENIVI research
- Provide working base for continued collaboration with IA IVI design win
- Prove the Tizen IVI vision has unique value grounded in working code



Tizen™ IVI Preview

Key Non-functional Drivers

- Fastboot: Less than 7 seconds to home screen
- Small footprint: Less than 500MB
- Provide an easy way to customize/configure and build a complete stack bottom up



Tizen™ IVI Preview

Key Technology Drivers

- Demonstrate Wayland display protocol and X11-less stack
 - Wayland project released a snapshot branch (“v0.85”) in February 2012
 - Includes v0.85 Wayland protocol and Weston reference compositor implementations
- Demonstrate UI toolkits using Wayland with sample apps
 - Qt 4.8, EFL, GTK+3 and Clutter in Tizen IVI today
- Provide window management system as an installation option
 - Wayland <-> X11
 - X11 for backwards compatibility during a transition period
- Demonstrate fastboot using systemd

GENIVI® Overview

- " GENIVI® is a non-profit industry alliance committed to driving the broad adoption of an In-Vehicle Infotainment (IVI) open-source development platform."
- "The GENIVI® compliance program provides a set of specifications for GENIVI® member companies to measure their products and services. Those that meet the specifications may be registered as GENIVI® compliant..."

GENIVI® Compliance 2.0

- Tizen IVI passed all requirements and was approved by GENIVI® as 2.0 Compliant on May 23, 2012.

- Examples of such components:

- SC: Systemd
- PC: Bluetooth stack -> Bluez
- AC: OpenGL-ES -> EMGD

Compliance Level

SC (Specific Component)	Actual Component
PC (Placeholder Component)	Requirements Defined
AC (Abstract Component)	API Defined

- And many more: linux kernel, Gstreamer,alsa, connman...

Tizen™ IVI 1.0

Architecture Focus Items

- Webruntime + automotive device API(s)
- Wayland + kernel updates
- Rootfs size optimization, Busybox
- Resource policy & audio routing for automotive needs
 - Independent passenger zones (audio and displays)
- Automotive network management (daemon)
 - A daemon talking to CAN, OBD... buses.
 - D-Bus API definition ongoing, based on MeeGo IVI initiative
- Active collaboration with GENIVI®
 - v3.0 compliance in October
 - Proof of concept demonstrations, e.g., persistency

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Tizen™ IVI Project Setup

Reference Hardware

[Auto Image]

1. Nexcom VTC1000, VTC1000-D2, VMC1000
 - A commercially supported, the official Tizen IVI reference HW
 - Go to nexcom.com to buy yours
2. Intel Crossville OKI, Crown Bay devkit



Crossville OKI

[PC Image]

3. Pinetrail / Sandy Bridge based platform



Pinetrail-based Netbook

Tizen™ IVI Project Setup

IVI on tizen.org

Downloads

<http://download.tizen.org/previews/ivi/latest>

Wiki Page

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

Email list

IVI@lists.tizen.org

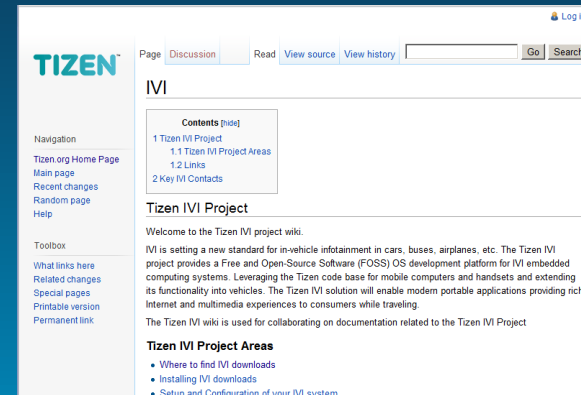
<http://lists.tizen.org/listinfo/ivi>

Issue Tracking

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

Register username to edit wiki or issues

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



Q&A