



# Tizen IVI Architecture New features

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OP CS YUXTURE INTEL LINUX WIRELESS CONNMANXEN GUPNP KVM POKY OFONO LINUX KERNEL  
SYNCEVOLUTION SIMPLE FIRMWARE INTERFACE (SFI) ENTERPRISE SECURITY INFRASTRUCTURE



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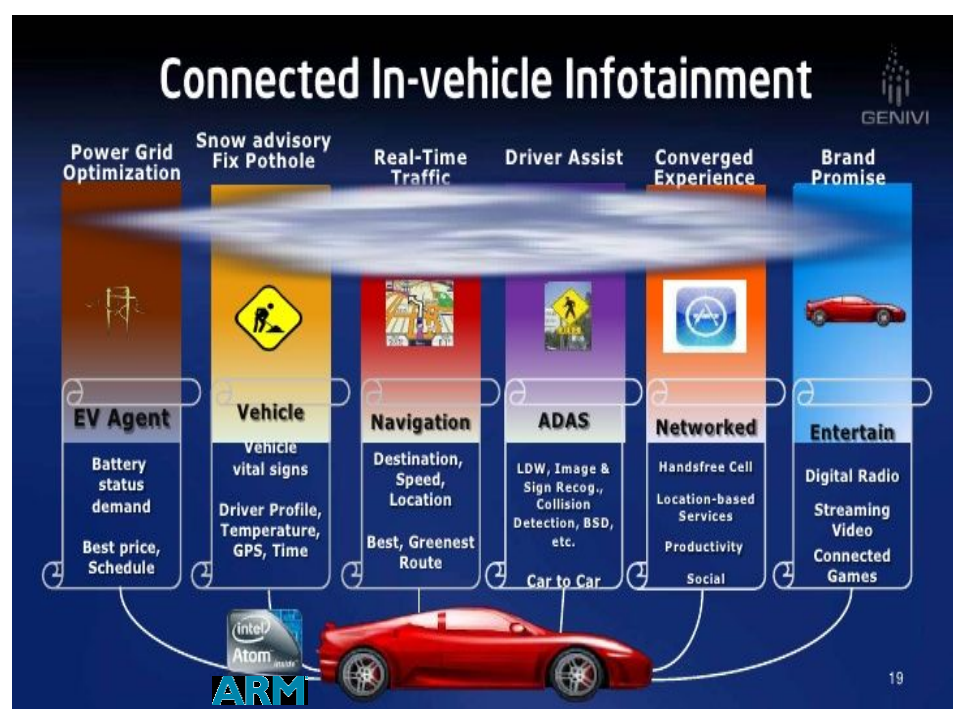
# Agenda

- What is Tizen IVI
- How to join the project
- Our road map
- Architecture
- New Features

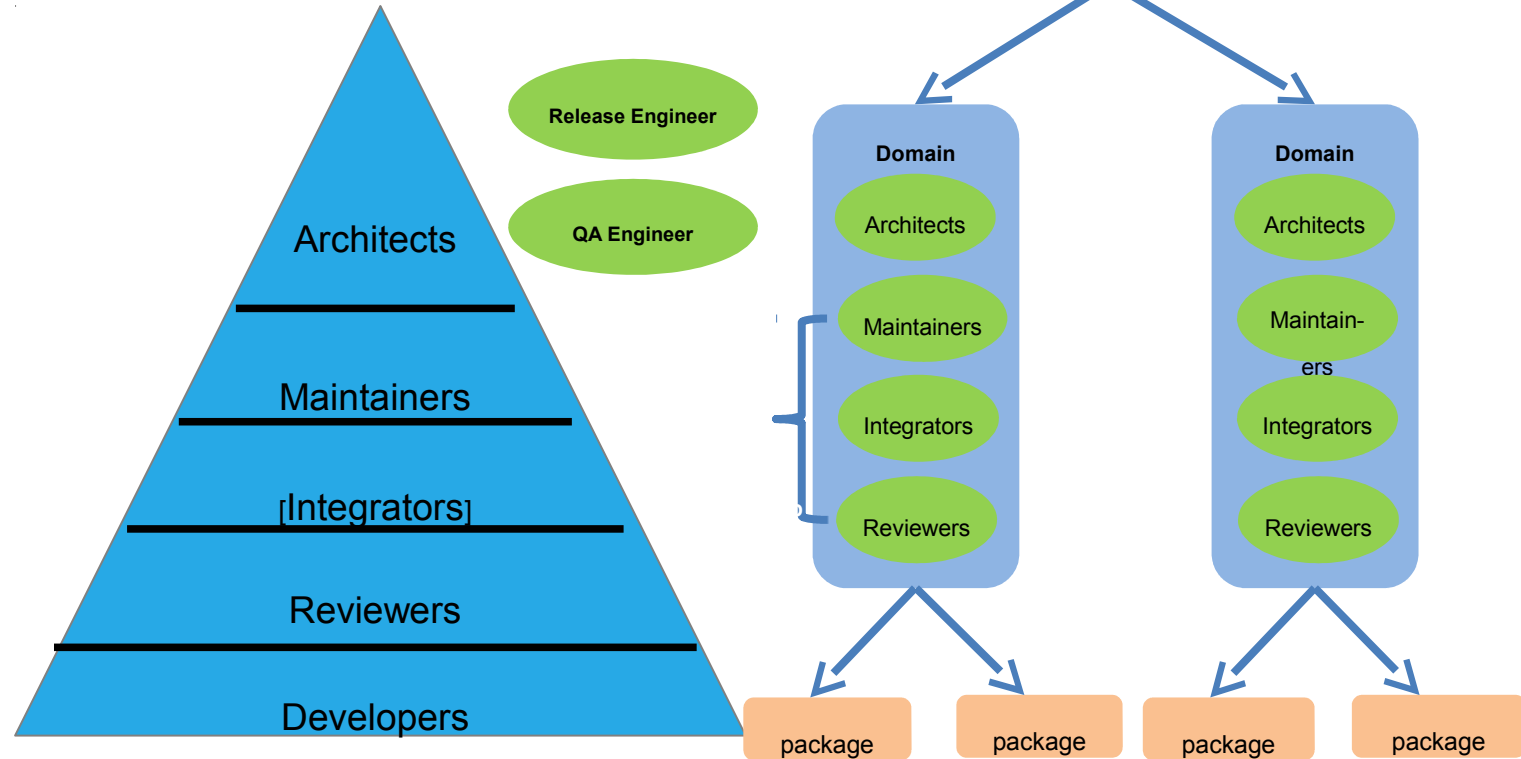


# Tizen IVI

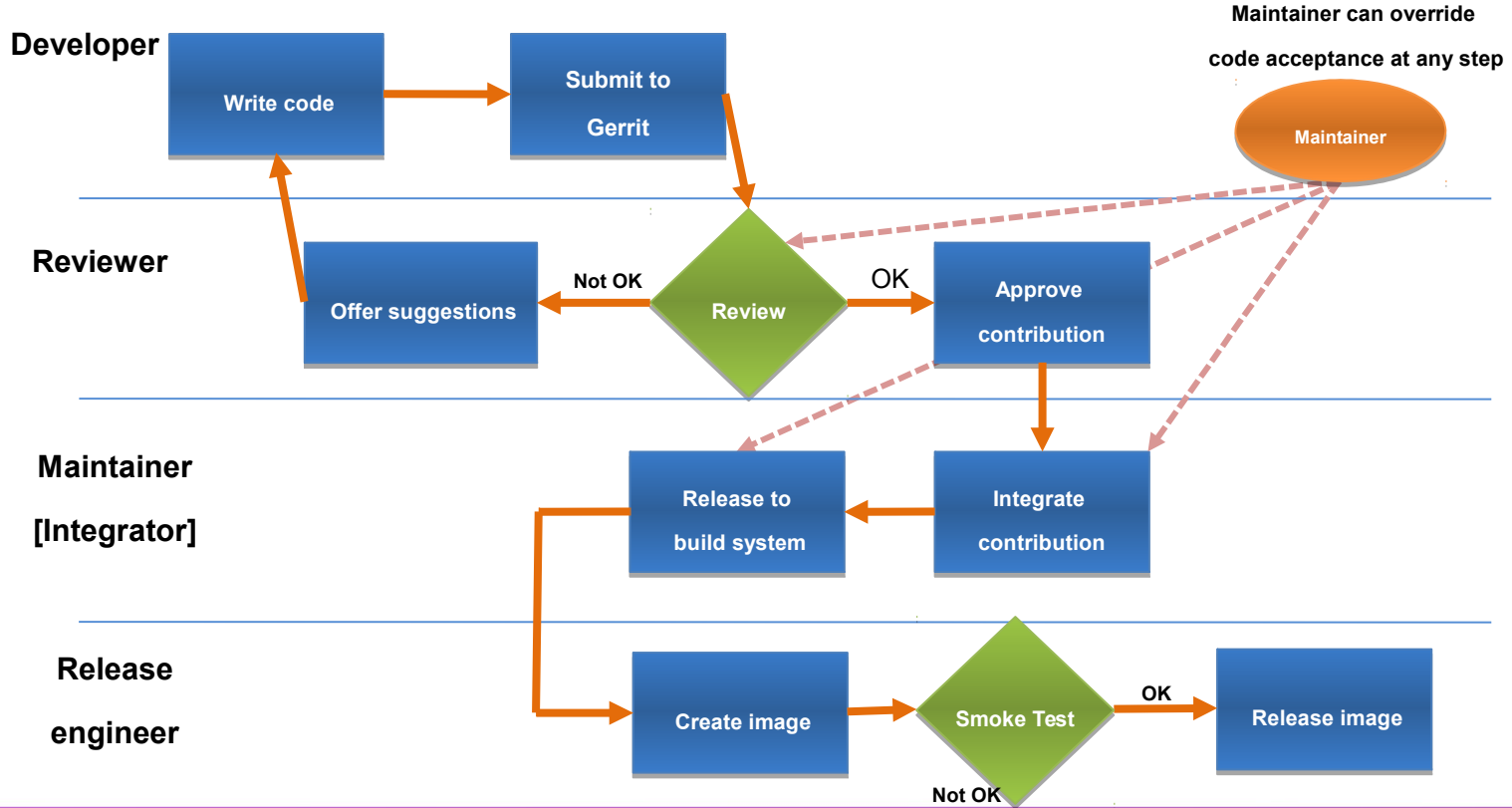
- Support Intel and ARM
- Secured Linux embedded distro
- Fast boot
- Advanced connectivity
- Wayland multi-tool kit
- HTML5 ready
- IVI middleware
  - Media
  - Car Can-Bus
  - Phone and messages
- Compliant with IVI standards
  - Genivi
  - AGL



# Tizen 3 an Open Project



# Code contribution Flow



# How to Create a New Tizen Profile

Profiles

Mobile

IVI

...

Common

QA & Tests

Devel

HAL / platform

Core

EFL

Qt

Ofono

...

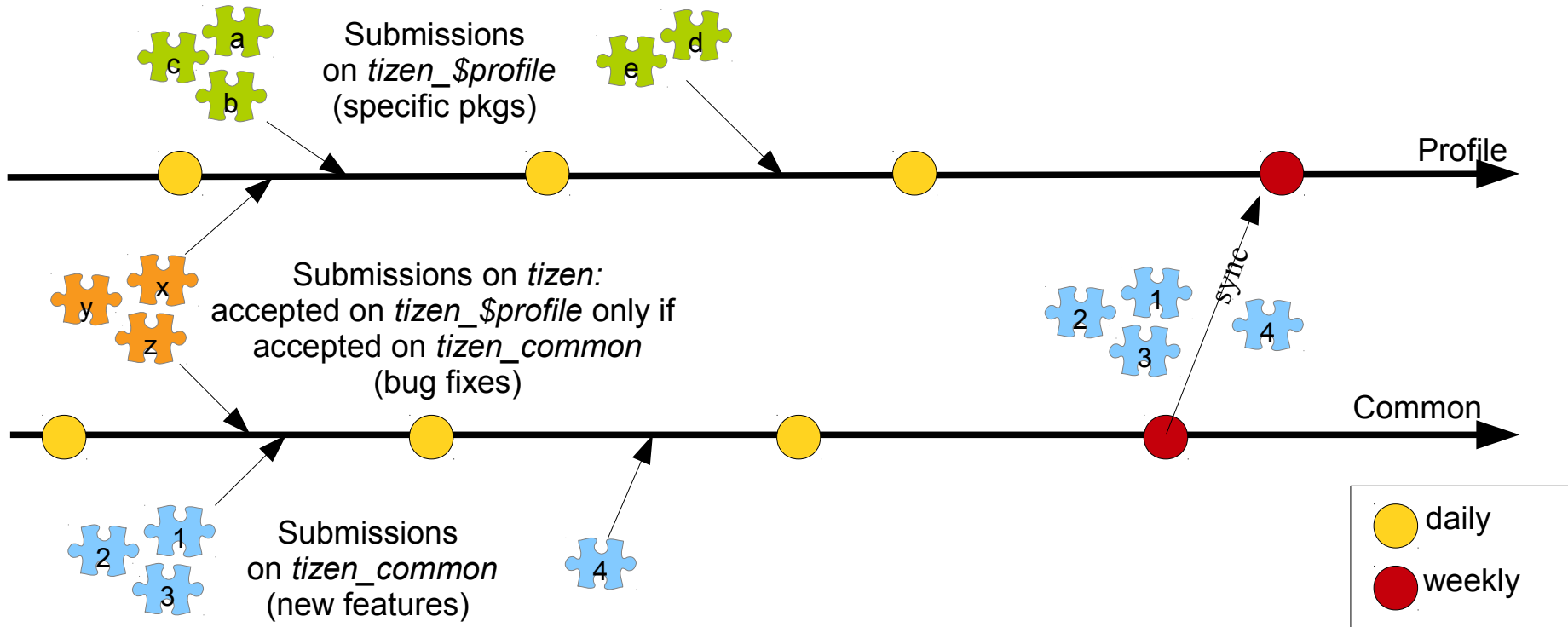
Tools

Base (mandatory)

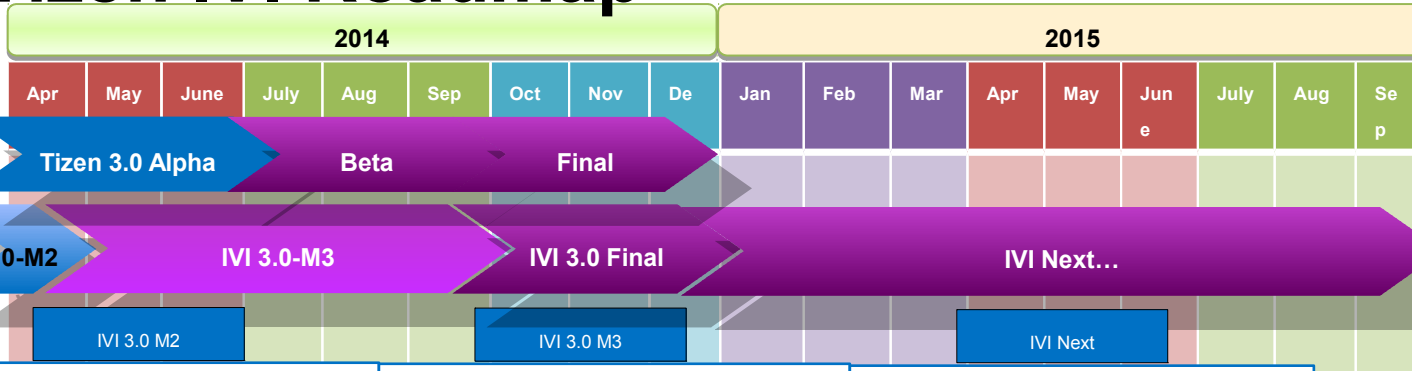
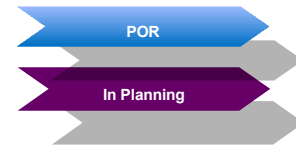
Shared (optional)



# Keeping Synced with Tizen:Common



# Tizen IVI Roadmap



## Functional Features

- BT - Serial Port Profile 1.1, AVRCP, A2DP, HFP 1.6, MAP
- Web APIs (Vehicle Info, DLNA DMS, Speech)
- Smack 3 domain model
- Apps2App Comms
- DLNA
- Media Player w/BT and DLNA
- Dialer App w/BT HFP
- WebGL, Video and CSS HW accel
- HW accel of Video streams
- Genivi Layer Manager
- Genivi Audio Manager
- Diagnostic Log and Trace
- Tizen IVI SDK

## Functional Features

- GENIVI Compliance w/ 6.0
- AGL incremental requirements as defined by AGL and OEM/Tier1 customers
- Crosswalk replaces webkit-efl
- Smack 3 domain model w/ Crosswalk
- Sequential Multi-User
- PIM w/ Cloud sync
- ICO sample UI w/ GENIVI Layer Manager
- Modello sample HMI
- Fast boot to camera
- WiFi Direct support

## Functional Features

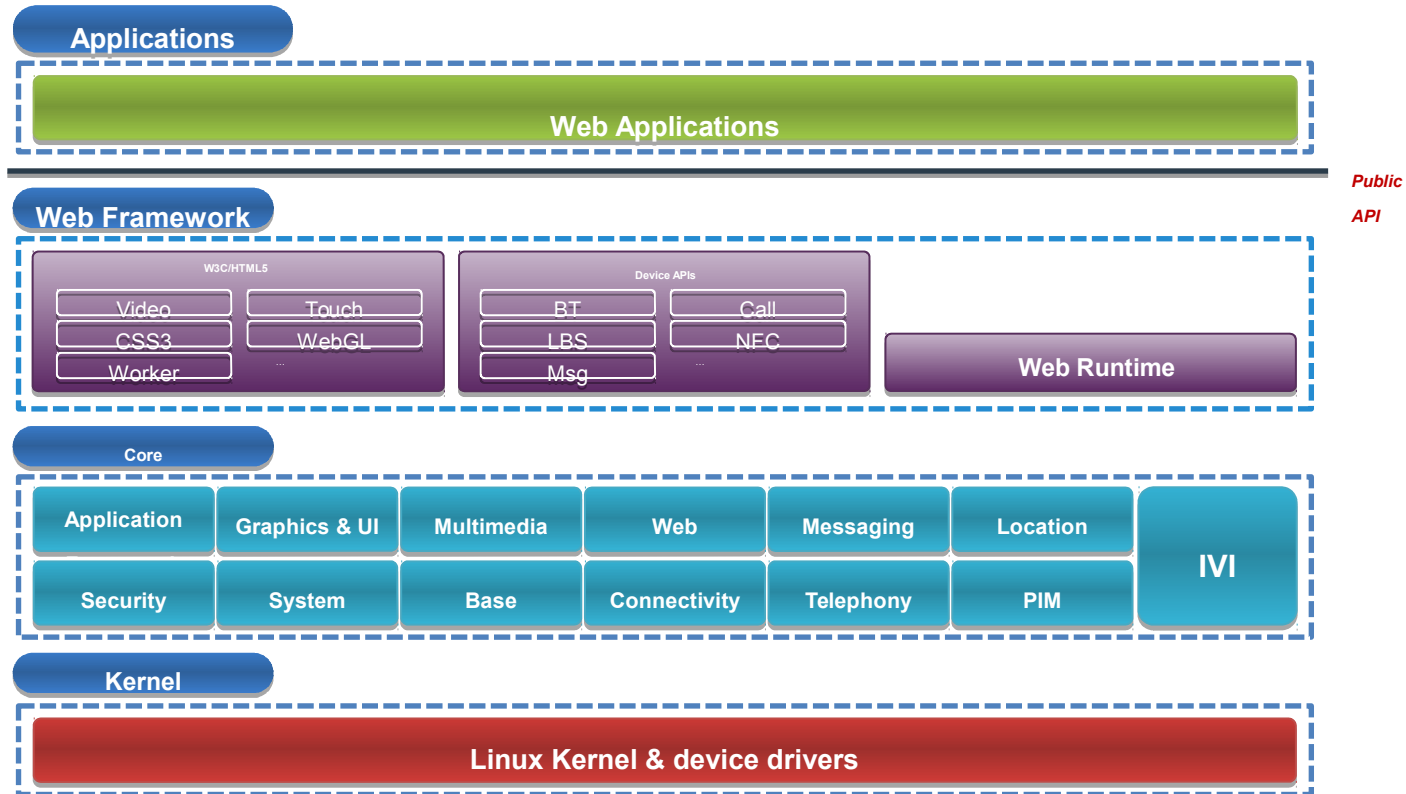
- Vendor defined Smack domains
- Yocto Build Support
- Simultaneous Multi-User
- Integrated Browser
- Additional AMB, Web APIs
- Additional AGL Component Integration
- Murphy w/ GENIVI Audio Manager
- *Miracast*
- *Qt5*
- *SDK Enhancements*
- *Additional Tools*

**\* IVI 3.0 Final will be focused on bug fixes and stabilization of all features in previous Tizen IVI 3.0 releases**





# Architecture



# Tizen IVI Multi-user system



# Tizen Multi-user requirements

- Guest log in by default
  - Start Generic Application  
(e.g. rear cam, radio, ...)
- User logging in shall not stop running applications
  - ID user is added on top of Guest.
  - Multiple user can share the same Display  
(e.g. passenger and drivers)
  - Users can exchange seats  
(and so Display)
- Security must protect the user data and the system data.



# Dissociate Seat and User

- General Linux
  - Before Login → No use
  - Seat = Display
- IVI
  - Before Login → Guest
  - Login → add user to a seat
  - User can change seat



# What needs to change

- Application Framework
- Login Manager
- Startup procedure
- Security model

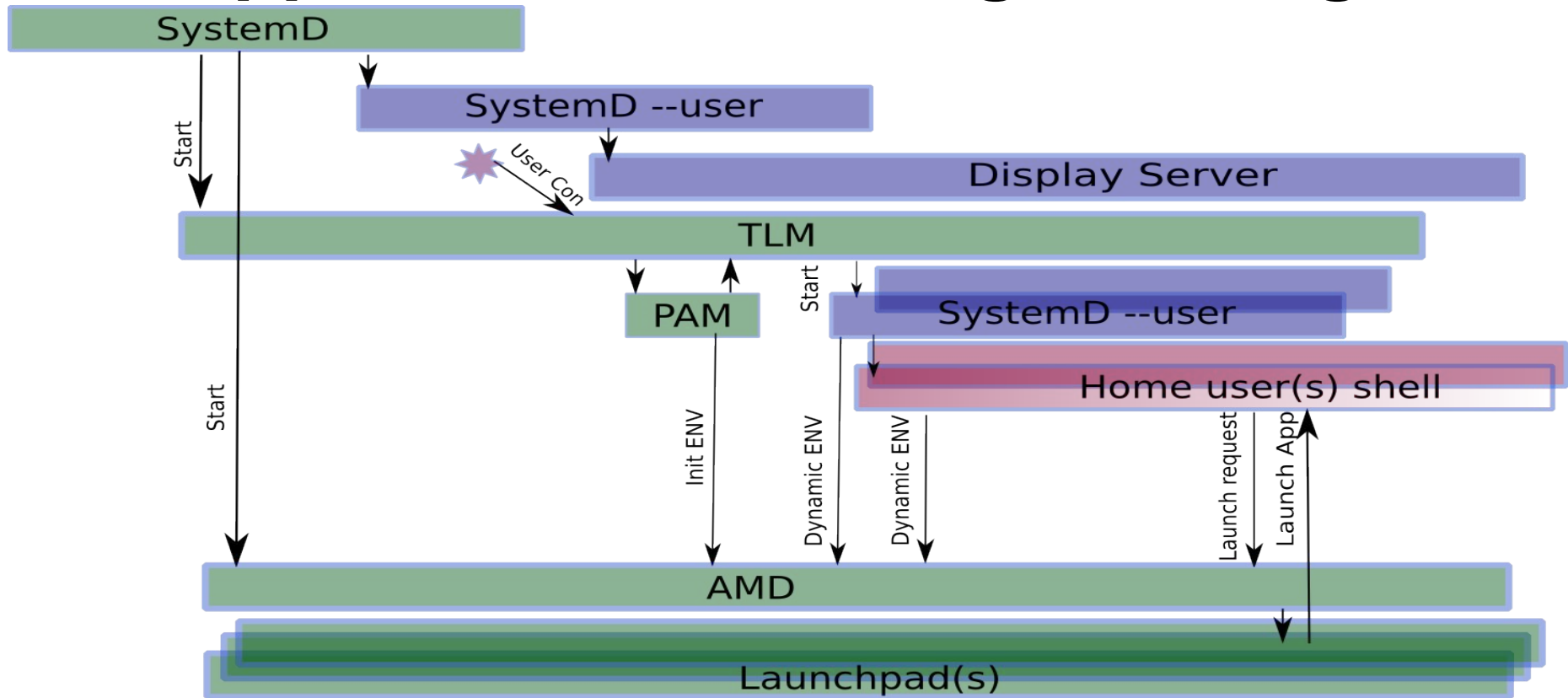


# Application Framework

- **Launching Application**
  - Explicit or implicit information (Combination of Action, URI, and MIME) can be used to determine an app to launch and the control backend.
  - Allowed to launch different type of app (i.e. Web to Native and Native to Web)
- **Application life cycle management**
  - Install – delete – update
  - List all, recently launch– Search – swap active
- **Event Handler**
  - Screen orientation size and number, dim, off
  - Critical resources RAM, disk, batterie, ...
- **Inter App communication**
  - Service Req
  - Message exchange
  - Copy/Paste
  - Drag/Drop

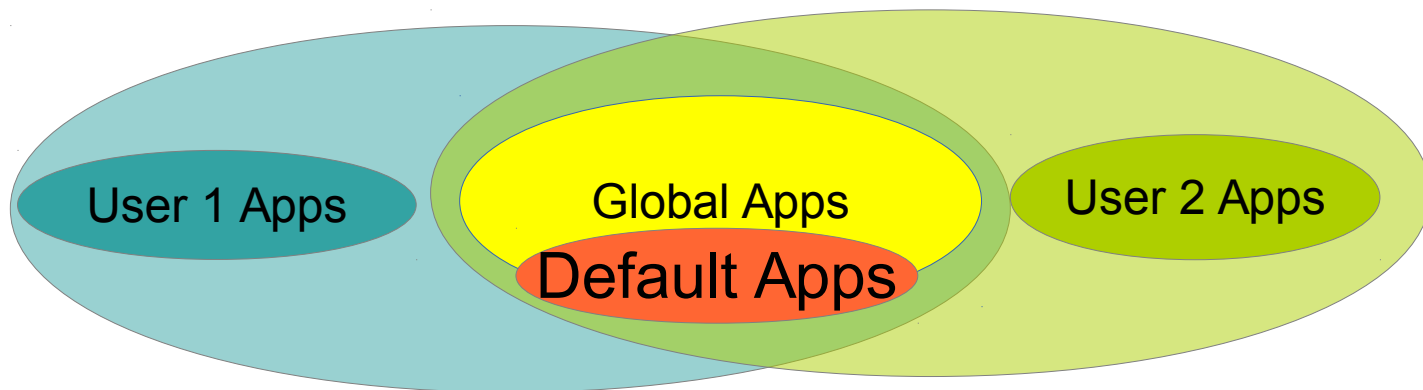


# AppFW with Tizen Login Manager



# User & App Management

- Base on standard Linux user account
- Each user owns its Environment / data / applications
- Priviledge users(s) concept
- Each App has its own Smack label and priviledge manifest



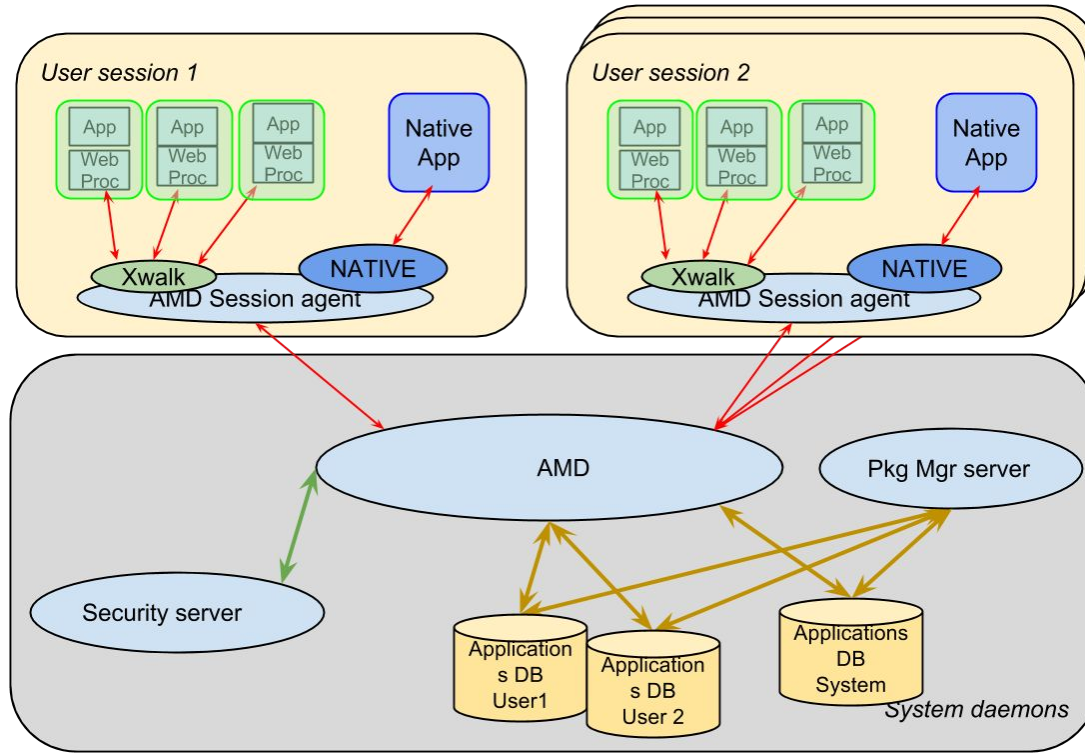


# Application Framework

- Application are launched in the User Environment provided by systemd session
- Each User can access to :
  - A set of databases corresponding to System/common Application
  - Another corresponding to it own databases.
  - Application Databases look like the Tizen 2.0 ones
  - Core API are extended



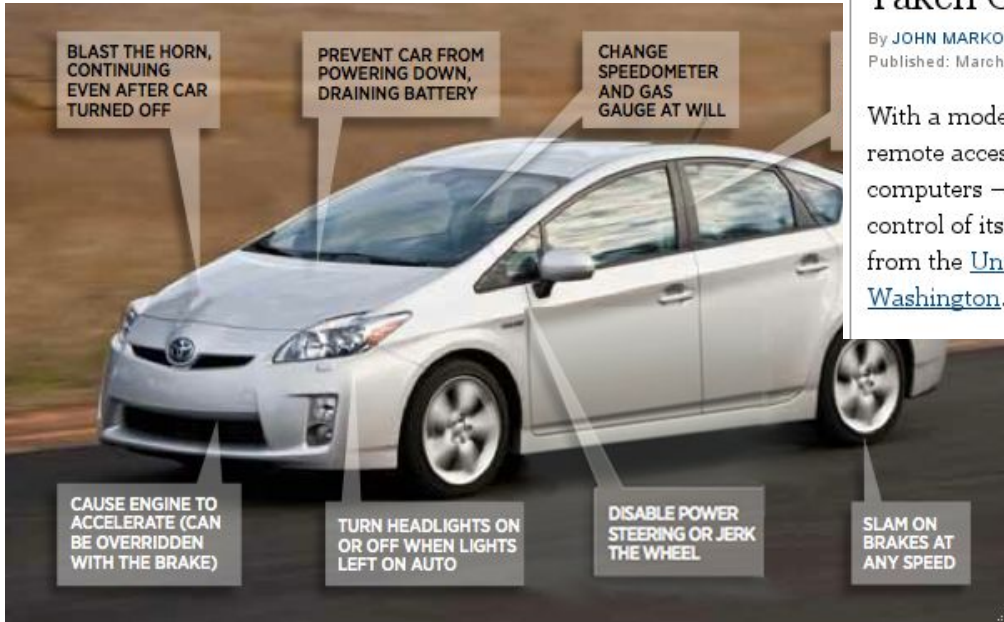
# Tizen 3 : Application Framework



# Security



# ¿ IT Security in a Car ?



The New York Times Business Day

WORLD U.S. N.Y. / REGION BUSINESS TECHNOLOGY SCIENCE HEALTH SPORTS OPINION

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## Researchers Show How a Car's Electronics Can Be Taken Over Remotely

By JOHN MARKOFF  
Published: March 9, 2011

With a modest amount of expertise, computer hackers could gain remote access to someone's car — just as they do to people's personal computers — and take over the vehicle's basic functions, including control of its engine, according to a report by computer scientists from the [University of California, San Diego](#) and the [University of Washington](#).

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# Tizen an integrated security

- Application isolation with controlled sharing
  - No access to system privileges
  - No undeclared data sharing
  - No direct launch in session
- Per Application control over privileged resources
  - Extensive control of system resources
  - Fine grain control of the resource
  - HTML5 and Native Applications
- Multiple users on a device
  - Application available for all or individual user
  - No data contamination of uncontrolled sharing.



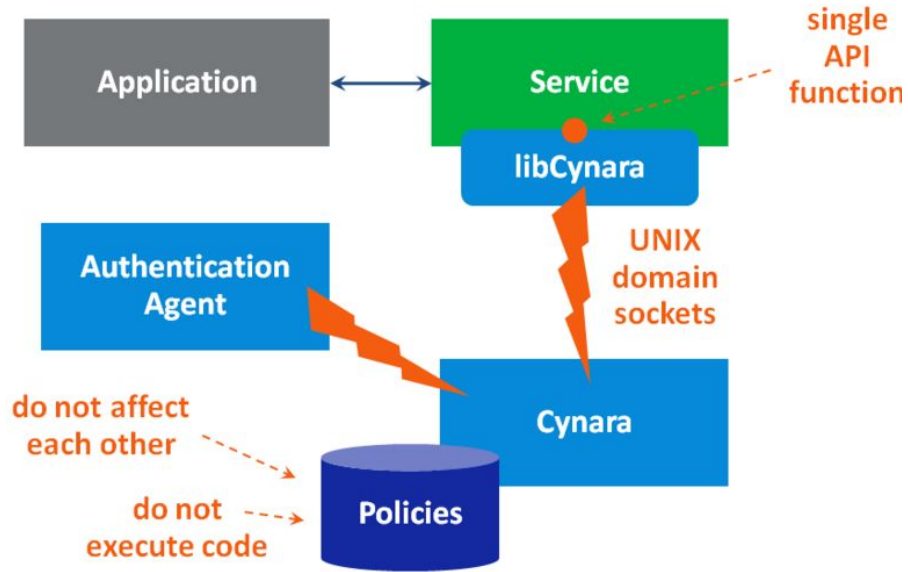
# Three Domains Model - A new simplified model

- "User" : user domain for user processes and data,
  - "System" : system domain for system processes and their private data
  - "\_" : floor domain for static public data.
  - Peers domains are used for
- 
- System process change ID whenever possible
  - Each User has a unique UID
  - Each Application has a unique Smack label.

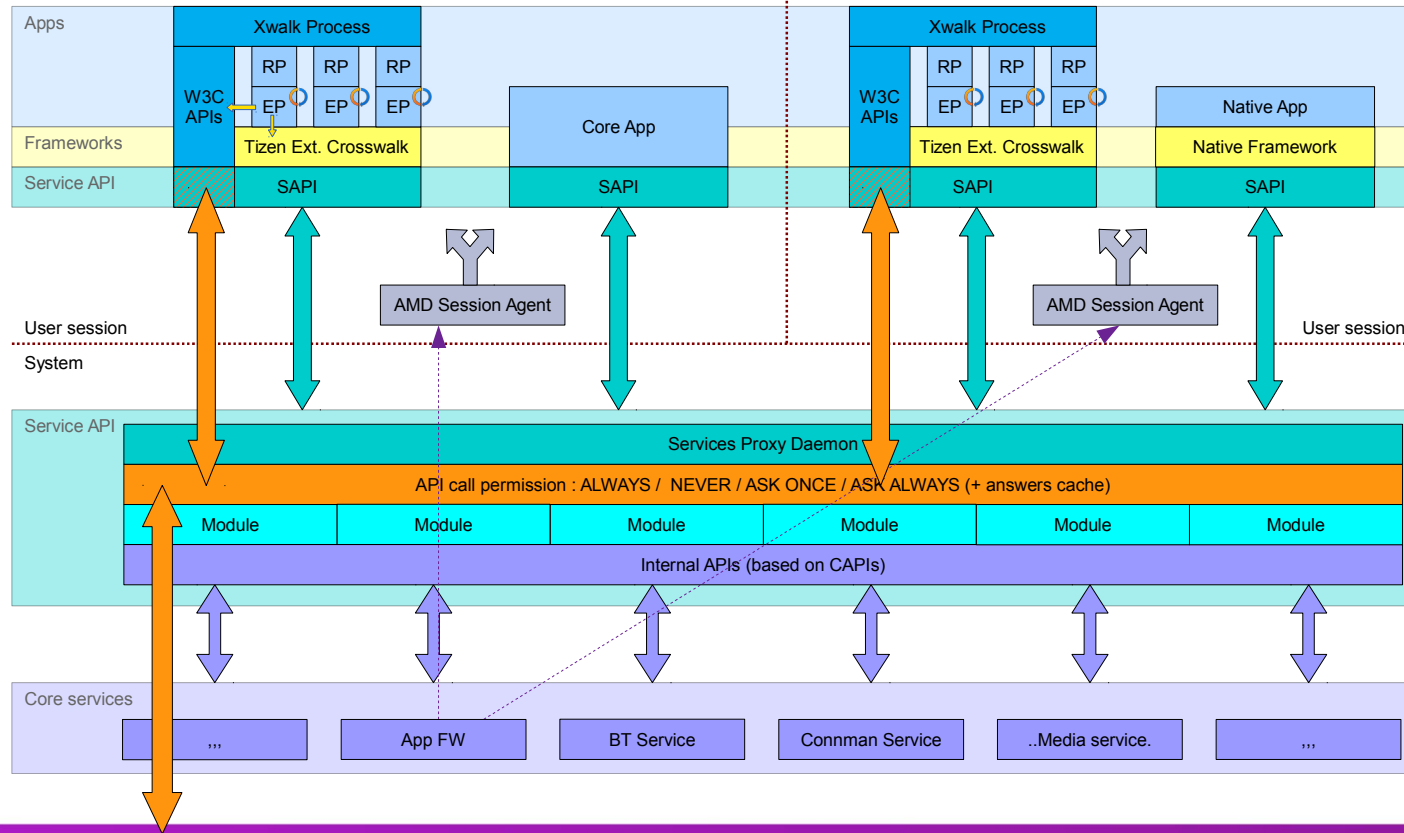


# Per Application Manifest

- Manifest are fined grained e.g. Bluetooth
  - bluetoothmanager
  - bluetooth.spp (*Serial Port Profile*)
  - bluetooth.opp (*Object Push Profile*)
  - bluetooth.health (*Health Device Profile*)
  - bluetooth.gap (*Generic Access Profile*)
  - bluetooth.admin



# Manifest enforcement SAPI *(evolution from Tizen 2.x CAPI)*

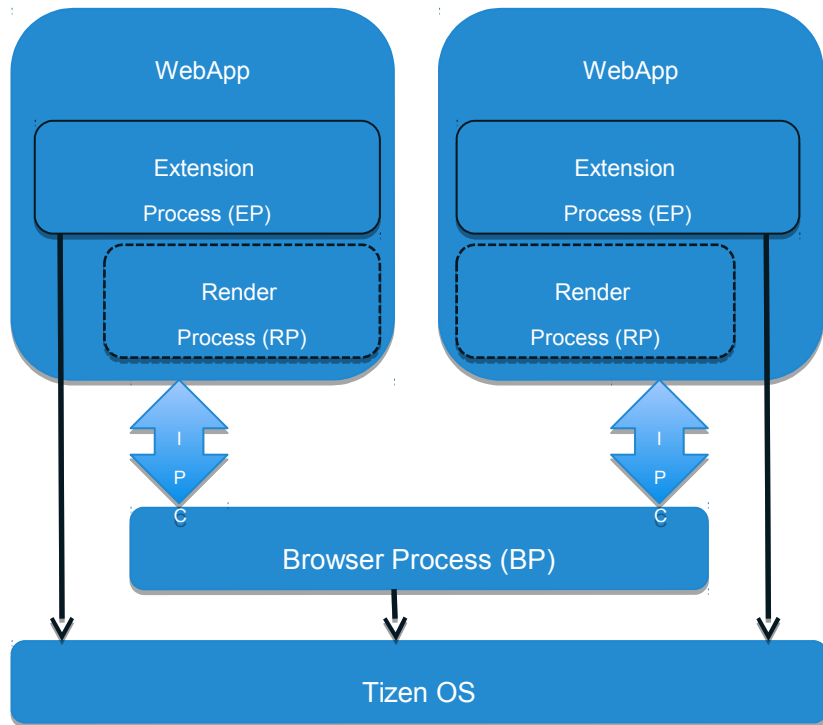




# Web Run Time



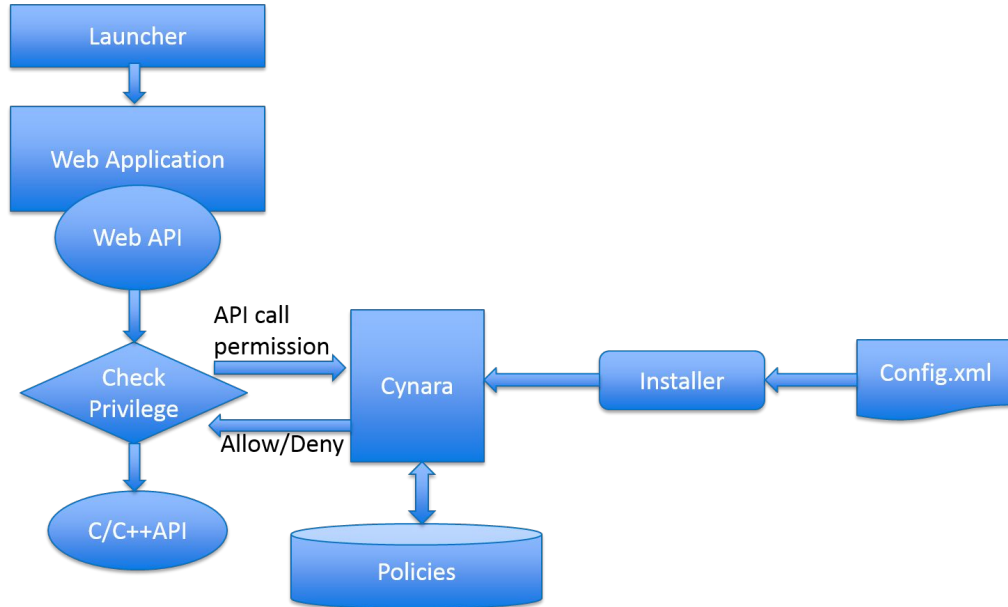
# CrossWalk Architecture



- Shared process model
- BP is shared with all WebApps
- WebApp contains EP and RP
- RP is sandboxed and can't do OS calls
- RP delegates OS calls to BP via IPC
- EP is not sandboxed and can do OS calls



# CrossWalk Security

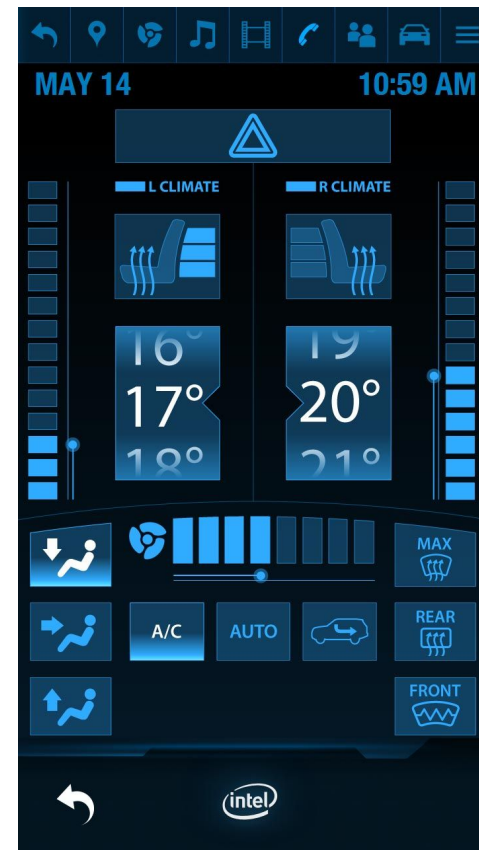
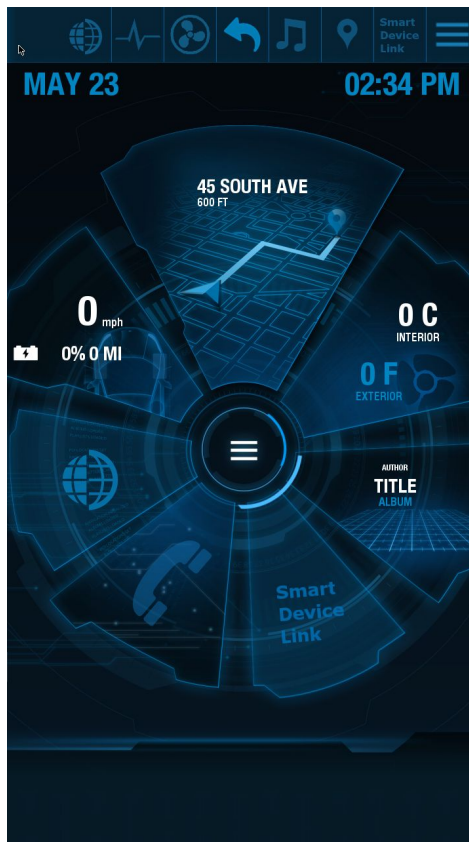


- Policy is created during WebApp installation
- API permission is checked against the policy during runtime
- Policy contains <application context>, <privilege> tuple
- Permission check has simple answer: **ALLOW, DENY or ASK USER**



# Modello HTML5 UI

- HTML5 UI
  - Proof of concept
  - Reference
  - Open Source Option
  - Fully functional



# Nice add-on



# Tizen Goodies

- Graphic
  - Weston 1.5 with XDG and Layers
  - EFL 1.9
  - QT 5.3
  - Ozone
  - Gstreamer 1.2
- Automotive Middleware
  - Automotive Message Broker
  - Murphy resource management
- DLNA, WiFi P2P, DNLA, NFC, ...
- Build Systems
  - OBS
  - Yocto
  - Eclipse SDK
- Architecture
  - IA 64 bits
  - IA 32 bits
  - ARM 32 bits



