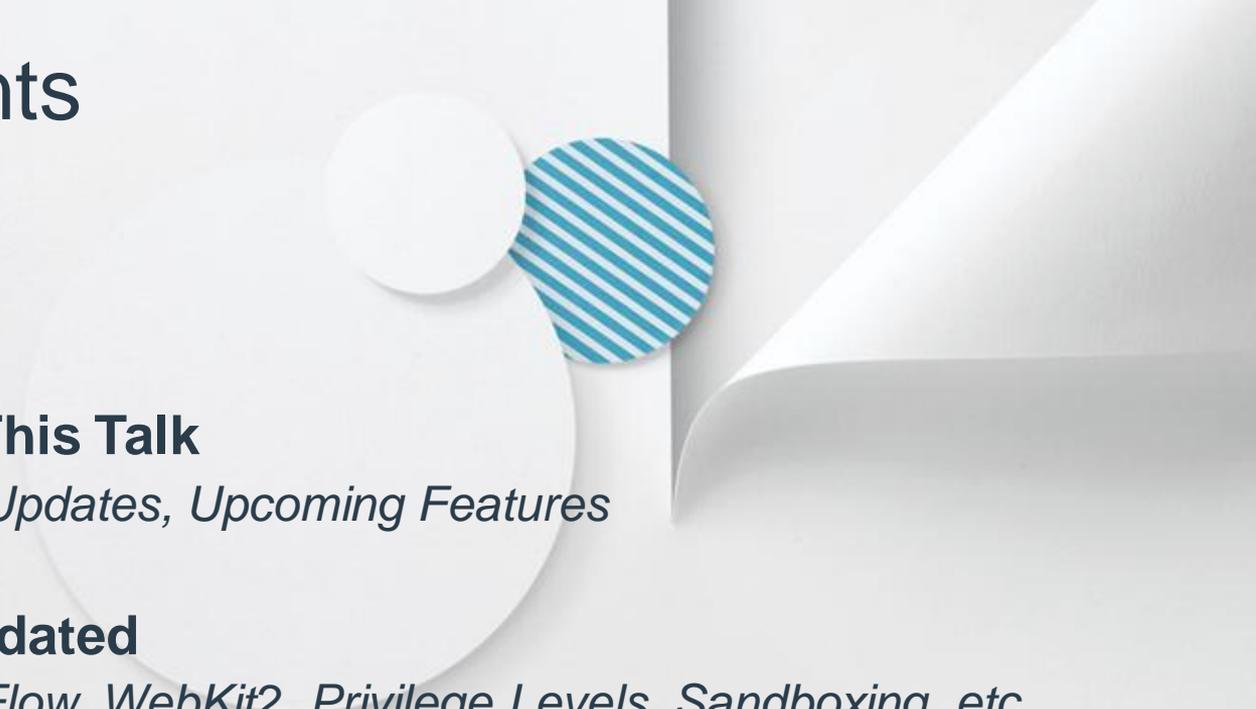


# Tizen Web Runtime Update

Ming Jin  
Samsung Electronics

**TIZEN**<sup>™</sup>  
**DEVELOPER  
CONFERENCE**  
2013  
**SAN FRANCISCO**

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- **Quick Overview of This Talk**

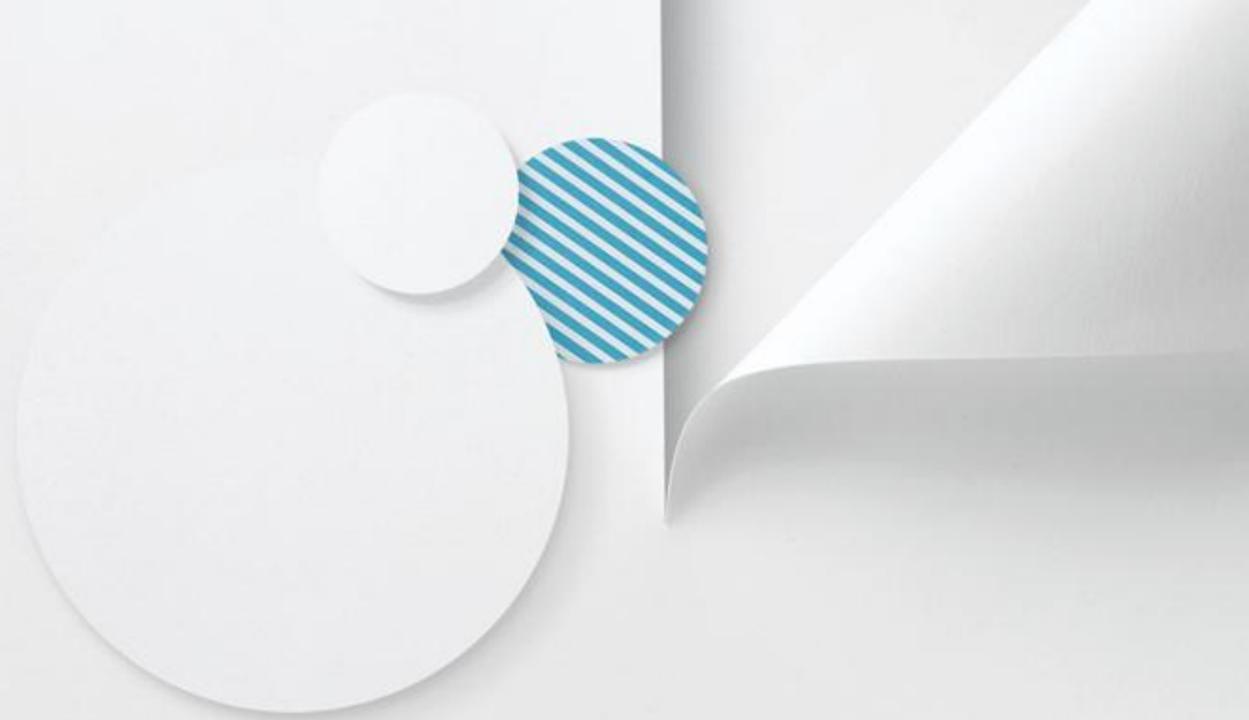
- ✓ *Background, Major Updates, Upcoming Features*

- **What Have Been Updated**

- ✓ *Installation/Update Flow, WebKit2, Privilege Levels, Sandboxing, etc.*

- **Upcoming Features**

- ✓ *Content Security Policy (CSP), Navigation Policy, etc.*



# Quick Overview

# Revisit: What Is Web App and Web Runtime

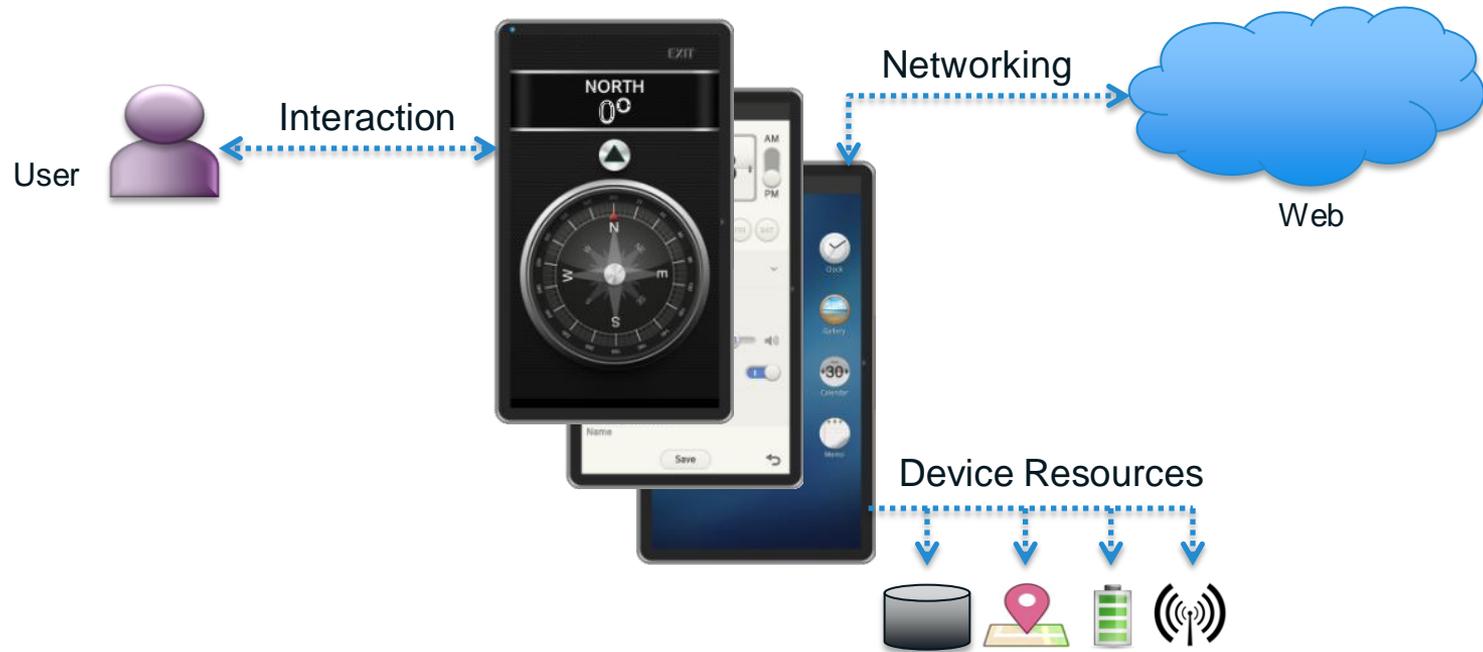
- **Web Application**

- Using Web based technologies (HTML/JS/CSS/etc.)
- Accessing local device / platform resources
- Can be installed on the device

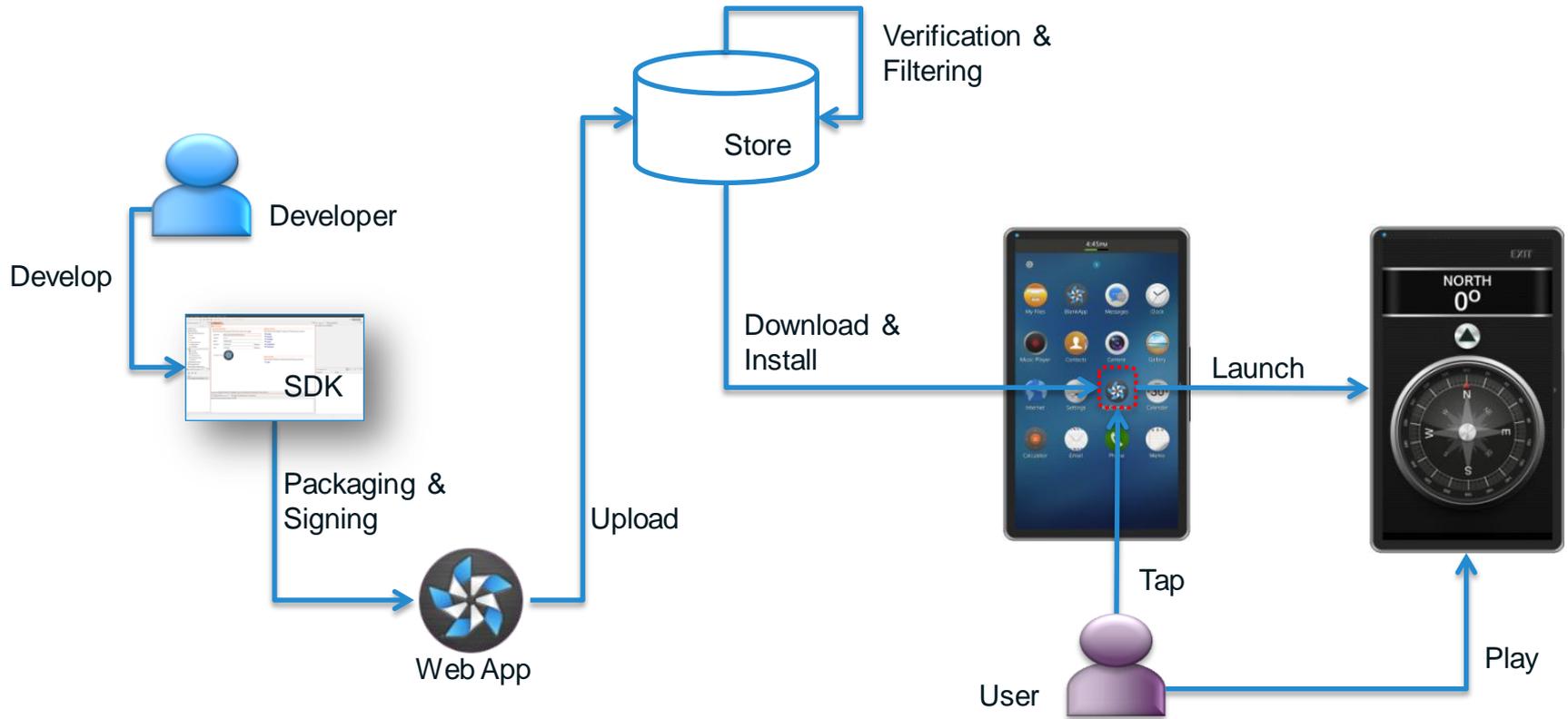
- **Web Runtime**

- Package management (installation, update, etc.)
- Execution and lifecycle (launching, pause, resume etc.)
- Runtime security (API/network access, sandboxing, etc.)
- Platform integration

# Revisit: Web Apps on Tizen Devices



# Revisit: Tizen Web App Ecosystem

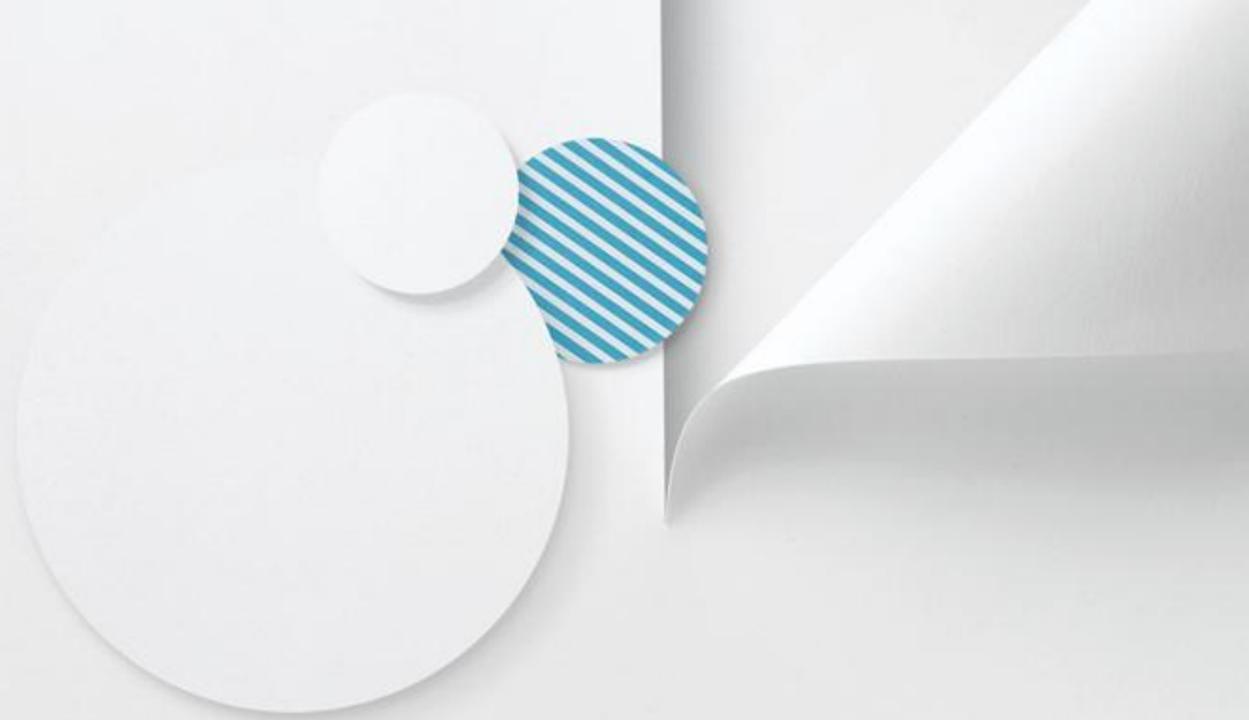


# What Have Been Updated

- “**Hosted**” Web App support
- Updated **installation** and **update** flow
- **WebKit2/EFL** based process model
- Faster **launching** flow
- Update on **suspend/resume**, and **localization**
- Resource **encryption/decryption**
- **Privilege-based** API security
- Process **sandboxing**
- Web **Dynamic Box** support

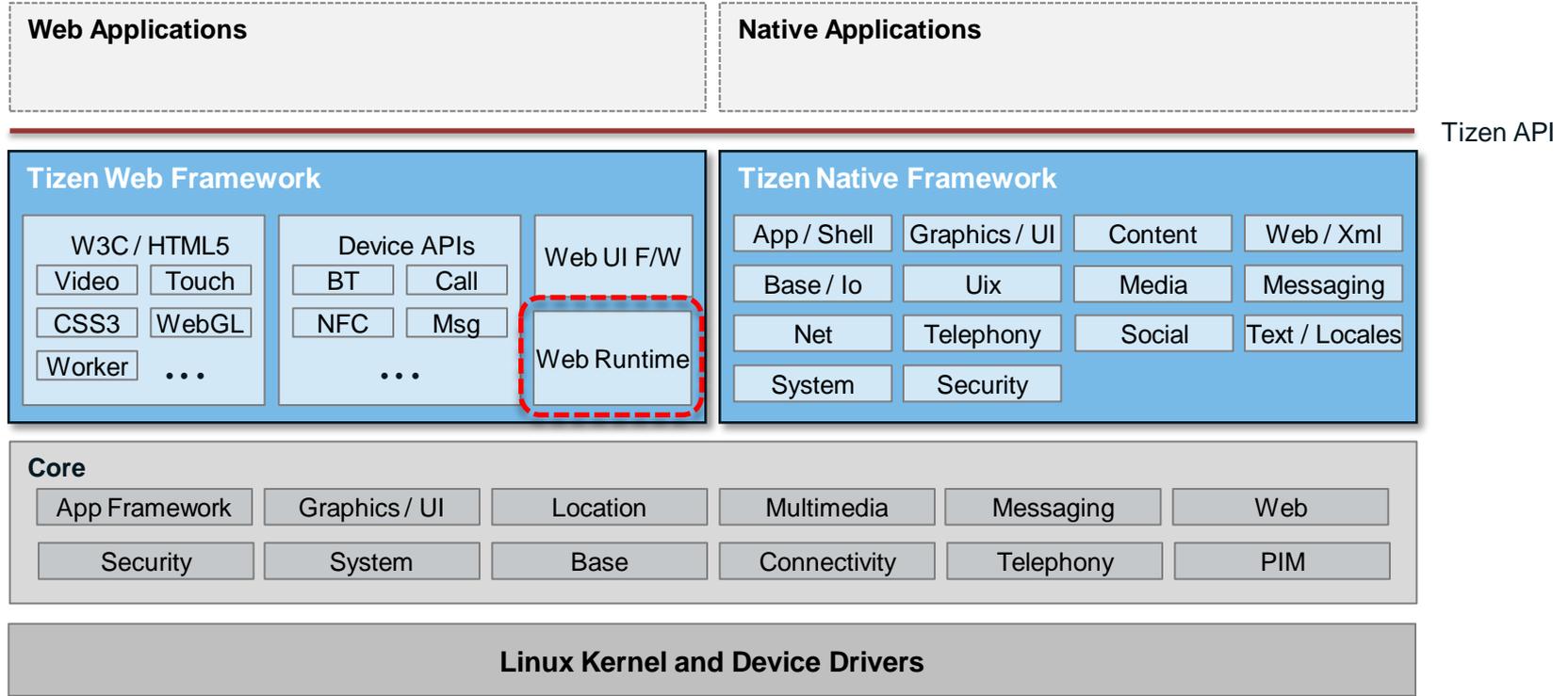
# Upcoming Features

- **CSP (Content Security Policy)**
- **Navigation policy restriction**
- **AppCache download**

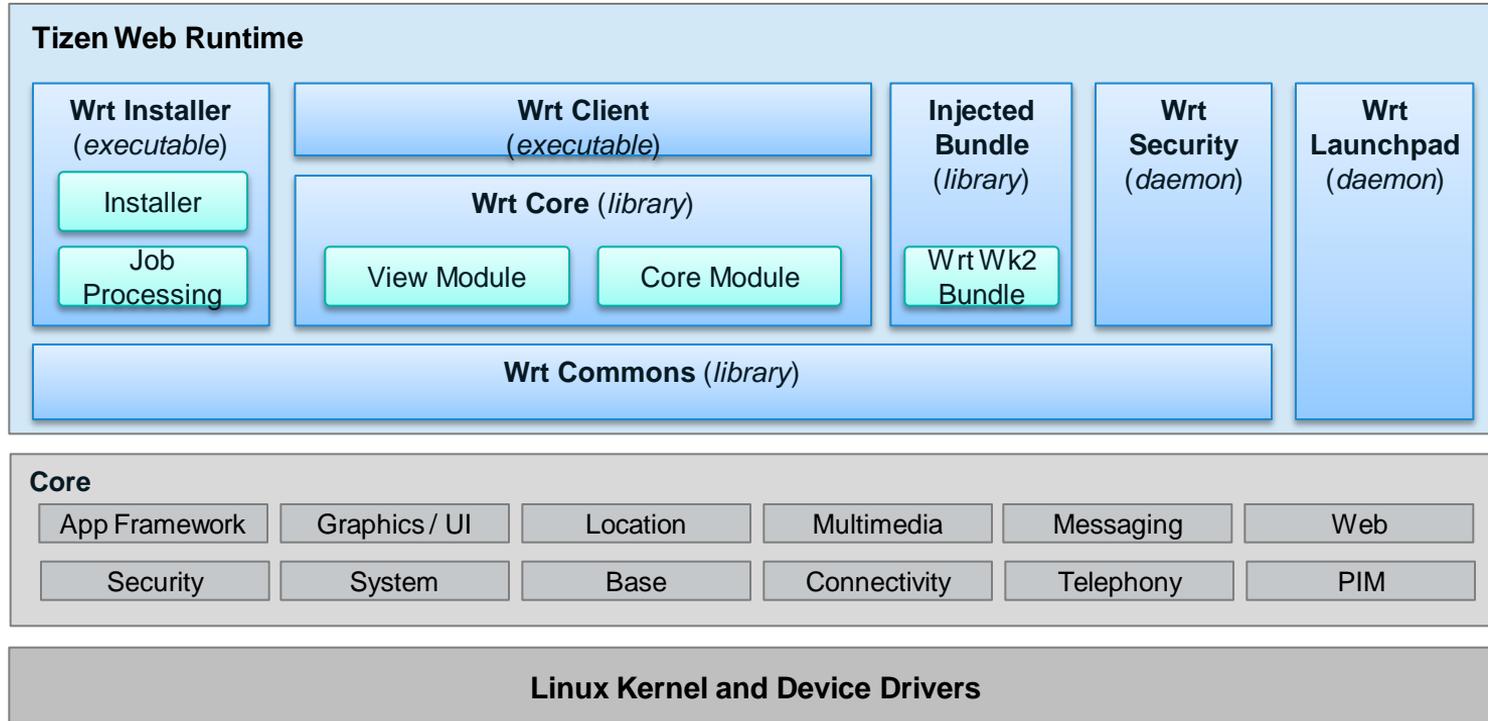


# Major Updates

# Revisit: Web Runtime on Tizen



# Tizen Web Runtime Internal Blocks



# Hosted Web App Support

- **What is “hosted” web app?**
  - A Web App with all of its resources located on a remote server
  - For now, it needs to be packaged with minimal resources: [config.xml](#), [signature\(s\)](#)
- **Restrictions:**
  - Start page should be specified in <tizen:content> extension
  - All of rendered pages are remote pages
  - Only W3C/HTML APIs are allowed in remote pages
  - Created browsing context has the same origin as remote server origin

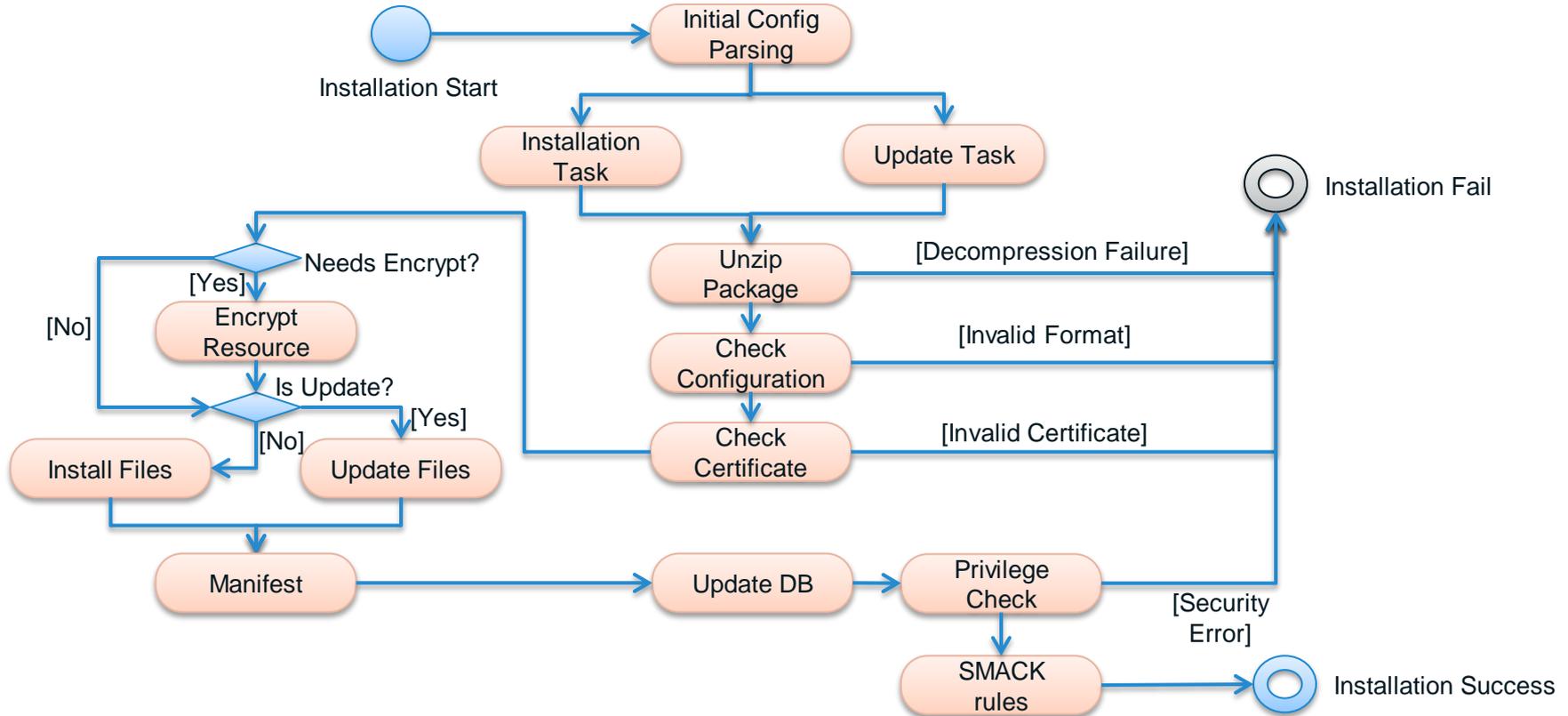
# Installation Flow Update

- **New verification steps introduced:**
  - Higher-level privilege declaration is not allowed
  - Invalid signature is not allowed
- **New installation steps introduced:**
  - Resource encryption (if necessary)
  - Smack rules population
- **Deprecated steps:**
  - W3C Widget P&C <feature> tag checking is ignored (used as Store side filtering purpose for now)

# Web App Update Flow

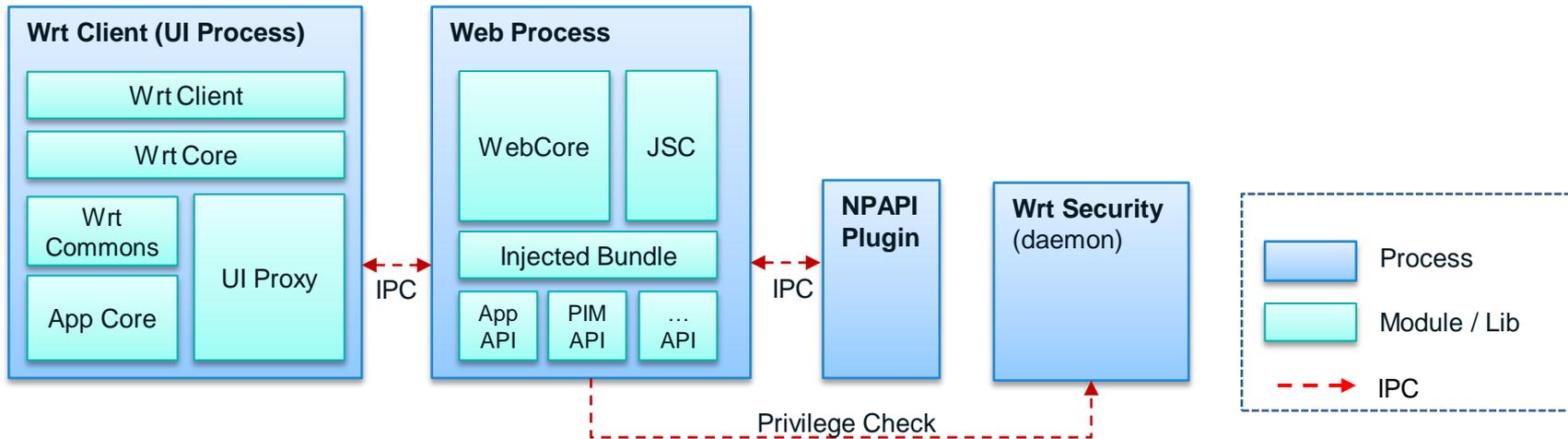
- **Update criteria:**
  - Must have the same Tizen App ID
  - Must have the same author signature
- **Update triggering point:**
  - At installation request time, if the request satisfies the “update criteria”
- **Update result:**
  - Web App data (settings, cookies, local storage etc.) must be preserved

# Installation/Update Flow



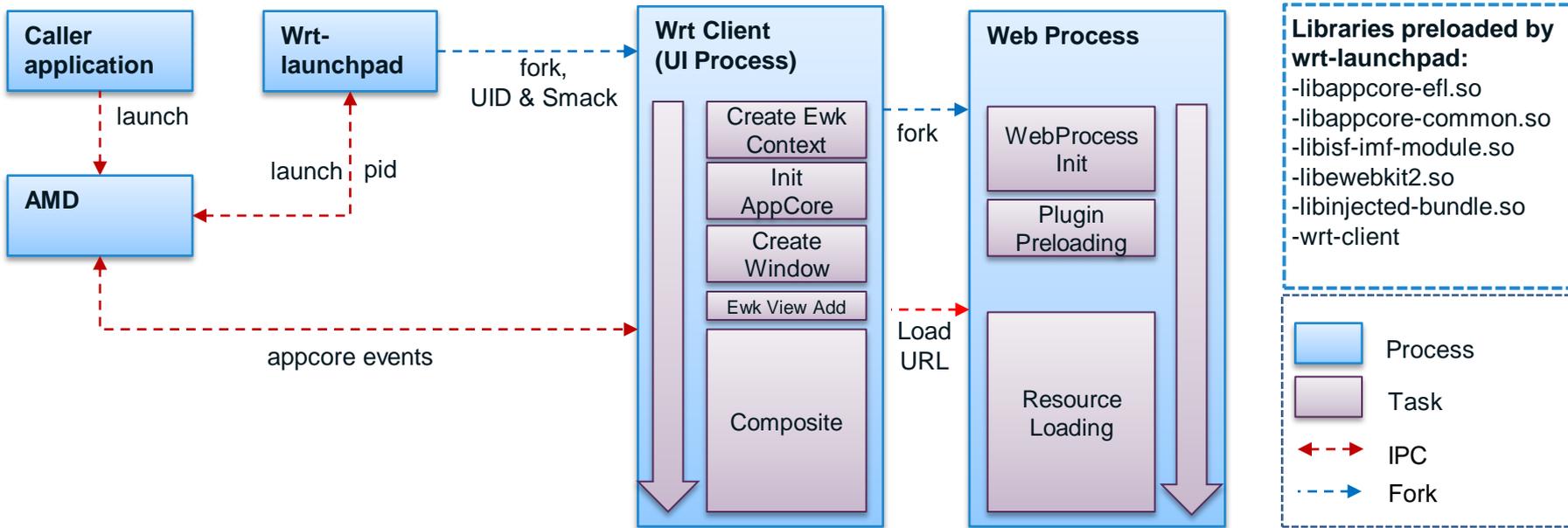
# WebKit2/EFL based Web App Process Model

- **Each Web App has 1 UI Process and 1 Web Process**
  - UI Process manages lifecycle, and Web Process is responsible for rendering
- **NPAPI plugins (if any) will run in separate processes**



# Launching Procedure

- **Wrt-launchpad** is introduced to preload WebKit and WRT libraries



# Suspend / Resume

- **By default, webviews will be suspended by WRT when the Web App goes to background, unless the developer explicitly enables it via <tizen:setting>**
  - Suspended activities include: JavaScript executions, timers, animations
  - Even if a webview is not suspended in background, the painting operations will not happen in background and the backing store will be purged
- **When switched to foreground, the suspended webviews will be resumed**

# Localization

- **Folder-based localization**

- Web App contents can be localized in file unit according to W3C Widget P&C specification
- The localization requires page reloading, and the localized contents will only be reflected at next launching time

- **Element-based localization**

- Configuration document can be localized with xml:lang attribute

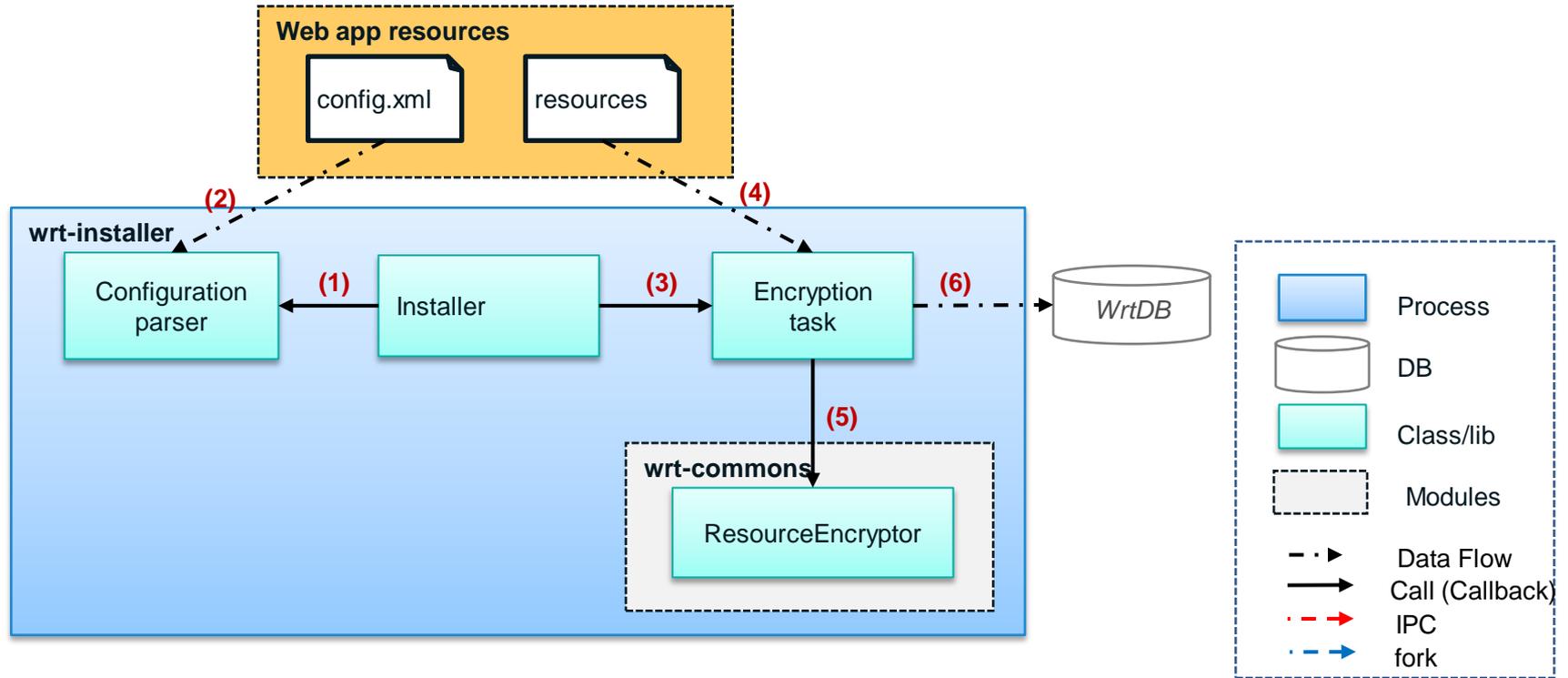
- **Content-based localization**

- System locale change event can be listened with Tizen System Info API
- L10n routine needs to be implemented in locale change event handler

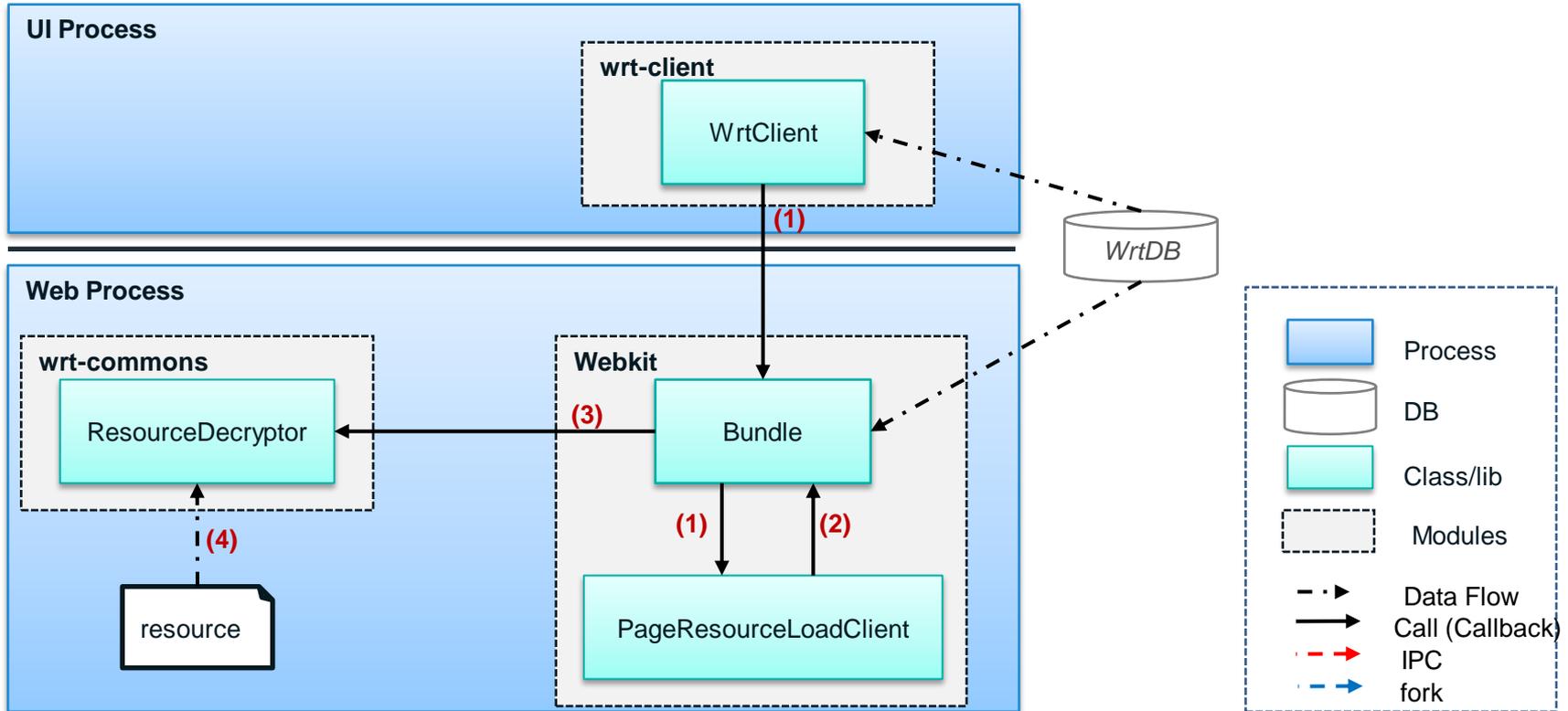
# Resource Encryption / Decryption

- **Resources are encrypted during installation / update**
  - Enabled with `<tizen:setting encryption="enable"/>` in *config.xml*
  - Web App directory is scanned recursively
  - Only resources with predefined extensions (html / js / css) are encrypted
  - Information about encrypted resources are stored in WRT DB
- **Resources are decrypted at runtime**
  - UI Process informs Bundle (WebProcess) about the decryption necessity
  - Bundle performs resource decryption in `willSendRequestForFrameCallback`
  - Resources are decrypted to base64 string and read by WebKit

# Resource Encryption at Install/Update Time



# Resource Decryption at Loading Time



# Privilege Levels and API Permissions

- **Untrusted**
  - Location, web notification, media capture, full screen, unlimited storage
- **Public**
  - Alarm, application, bluetooth, calendar, call history, contact, file system, message port, messaging, power, push, setting, system, etc.
- **Partner**
  - App manager, secure element, system manager, etc.
- **Platform**
  - Bluetooth manager, lock manager, package manager, setting manager, etc.

# Process Sandboxing

- **Web App (UI/Web Process) Sandboxing**
  - UID: “app”
  - GUID: “app”
  - Process Smack label: {PkgID}
  - Resource Smack label: {PkgID}
  - Smack rules: basic application rules + privilege specific rules
- **Web App private data (e.g., localStorage, indexed db, cookie, etc.) is protected from the rest of system after sandboxing**

# Web Dynamic Box

- **Features:**
  - Included in a Web App package
  - Installed, updated, and uninstalled as part of Web App package
  - Supported sizes: 1x1, 2x1, 2x2
  - Supports periodic update: minimum 30 min term
  - Embeddable in viewer-like applications (e.g., home screen)

# Tizen Configuration Extensions Update

```
<tizen:application id="PkgA.MyApp" package="PkgA" required_version="2.0" />
```

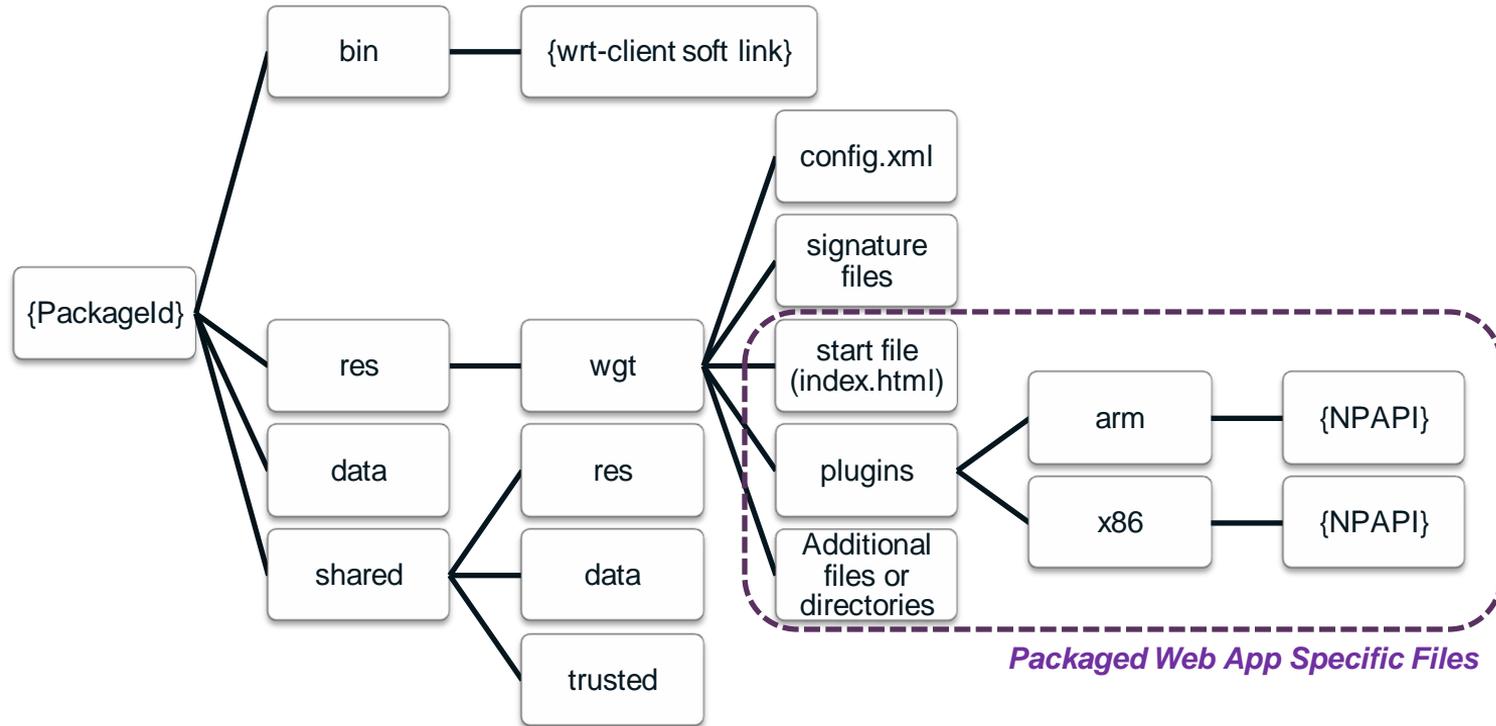
```
<tizen:privilege name="http://tizen.org/privilege/application.launch" />
```

```
<tizen:app-control>  
  <tizen:src name="edit.html"/>  
  <tizen:operation name="http://tizen.org/appcontrol/operation/edit"/>  
  <tizen:mime name="image/jpg" />  
  <tizen:uri name="" />  
</tizen:app-control>
```

```
<tizen:setting background-support="enable" />  
<tizen:setting context-menu="disable" />  
<tizen:setting encryption="enable" />  
<tizen:setting screen-orientation="landscape" />  
<tizen:setting install-location="internal-only" />
```

```
<tizen:content src="https://www.tizen.org/" />
```

# Typical Web App Directory Structure (on Device)





Coming Soon

# Content Security Policy (CSP)

- **New fields required in config.xml:**
  - E.g.: <tizen:content-security-policy>, <tizen:content-security-policy-report-only>
- **Possible default policy:**
  - "default-src '\*'; script-src 'self'; style-src 'self'; object-src 'none';"
- **A Web App can define a fine-grained CSP policy by using different directives:**
  - E.g., script-src, style-src, img-src, connect-src, frame-src, etc.

# Navigation Policy

- **New field required in config.xml:**
  - E.g., `<tizen:allow-navigation>`
- **Top-level window URL navigation is limited to the list of domains specified in `<tizen:allow-navigation>`.**
- **Navigation to any other domains (not listed in `<tizen:allow-navigation>`) may result in opening up the URL in Browser**

# AppCache Download

- **New field required in config.xml:**
  - E.g., <tizen:appcache-manifest-url>
- **Upon installation, download the appcache resources specified in appcache manifest URL**
- **Useful for hosted web apps to work offline or provide fallback routines for offline**



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