Templates vs. Video Streaming

Overview

What are Templates?

Templates are the pre-defined layouts filled by your data, and are the primary layout component of SDL. They encompass a UI system of base view layouts, a menu system, and modal views for alerts, receiving microphone input, list-views and more. This UI system was designed for meeting the needs of users in the vehicle in a safe way for a variety of possible app types and is quite full-featured. The app developer is able to present their data within these vehicle specific views and respond to actions (such as button presses) as they occur by manipulating the data and views.

This system provides benefits to both the IVI system designer and to the app designer. The system designer has mobile applications that fit within its own overall HMI design, while the the app designer has a one-size-fits-all integration that will be driver distraction safe and approved and also has some flexibility in layout and branding.

What is SDL Video Streaming?

Video Streaming, CarWindow, and Remote Display are all terms describing the SDL technologies designed to allow an application developer to create a video stream of their application interface and receive touch inputs in return in order to modify their interface.

Video streaming via SDL was originally designed to allow OpenGL-based navigation applications to present their application by streaming it over an encoded video byte stream (such as H.264). This was later expanded by CarWindow on iOS and Remote Display on Android to allow native iOS and Android views to stream their UI to the IVI system. However, this was designed and developed for navigation applications that were not strictly OpenGL and included a mix of OpenGL and native UI views, not for arbitrary applications. The capability for arbitrary “projection” applications was added, but this was added strictly for OEM applications. These kinds of applications’ needs either simply cannot be met by templates (navigation based apps), or have the backing of an OEM willing to take on driver distraction liabilities with a video streaming app (OEM projection applications).

Why Templates?

Why should an app pursue a template-based approach over video streaming?

Template Advantages over Video Streaming

Video streaming has several significant downsides that should steer the general app developer toward building a template-based app.

1. **Performance & Battery Life** – Balancing performance of the video stream and battery life is a constant struggle. Even in the best case for video streaming, an active video streaming-based app will use many orders of magnitude more CPU. Streaming performance and response times will always be worse than a template-based application.
2. **Driver Distraction & Approval** – Balancing driver distraction needs, especially as they vary in different countries, is a difficult task, and various OEMs may have various requirements. Video streaming apps will have to go through each app approval processes and split the application accordingly. Templates allow the OEM to build safety features that meet their individual needs around the world, and you as an app developer don't have to worry about the various implementation differences when seeking approval from the OEMs for release.
3. **Broader Compatibility** – IVI systems may or may not support video streaming capabilities, especially low-cost units. Additionally, streaming capabilities are disabled when the phone is connected over a low-bandwidth connection, such as Bluetooth.
4. **Resolution Issues** – Various IVI systems will have various resolutions. This may require you to build your layout for various possible sizes if you use video streaming.
5. **Easier Development and Support** – When video streaming, developing your own safe UI is your responsibility. Any bugs will generally be your responsibility to fix, not the OEM's, and you will have a greater burden of support.
6. **Fit** – Templates allow the OEM to design a UI for apps that fit with their overall UI of the IVI system. This can be a good and bad point, as the design may clash with your own sensibilities, but it does mean that the SDL UI components are designed to be safe when used in a car. The UI components available through templates are specifically designed for use in the car.

The primary advantage of video streaming over templates is the desire for your app's branding to shine through. There is the additional concern that building a templated SDL application requires more work than a video-streaming application, as you can reuse your already existing UI components when streaming (this point is unlikely to be true for the reasons stated above). The SDLC understands those concerns, and is shipping a variety of new features on Core and Mobile platforms to make template-based integrations both feature-rich and easier.

New Template Features in Core and Mobile

Mobile Manager Frameworks

The mobile manager frameworks have been in development for several years. These managers take a group of SDL template functionality and make it easier to develop against than using standard RPC function calls. For example, with the `ScreenManager` you can set an image you want to display, and the manager will handle uploading the file and displaying the image based on the connected IVI system's current capabilities and the app's state.

Several iOS managers exist in the library today, with more releasing in v6.0 in June 2018, and still more to come soon. Android versions of these managers are in development and will be available in the future.

Mobile UI Frameworks

UI frameworks are an in progress layer for developing iOS and Android applications in a manner mimicking native mobile UI development. This layer sits on top of the manager layer and will make SDL template development even simpler and easier in the future. The idea is currently accepted and details are being worked out in the SDL evolution process.

Template Enhancements

To be released in SDL Core v5, template enhancements will include the ability to apply various colors to the UI (though the details of application may vary by IVI system), and the ability to send "template images" (single color images that are colored by the system white or black to match backgrounds).