SAP UI5 – GETTING STARTED WITH SAPUI5

Applies to:
SAP UI5

Summary
The objective of this document is to give brief introduction about SAP UI5

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Introduction

The UI Development Toolkit for HTML5 (SAPUI5 or UI5) is an extensible JavaScript-based HTML5 control rendering library for Business Applications that run in browsers.

UI5 comes with:
- Runtime
- Interactive documentation
- Eclipse based Tooling

Versions of SAPUI5

SAPUI5 is available with the platform license on a number of SAP platforms:
- **NetWeaver ABAP**
  - 7.00, 7.01, 7.02, 7.31: Part of User Interface Add-On 1.0 for SAP NetWeaver
  - 7.40 Built in part of the platform
- **NetWeaver Java**
  - Part 7.30 SP09 and later: Included in Usage Type Basic or as software component SAPUI5 Client RT AS Java 7.31
  - Part 7.31 SP05 and later: included i in Usage Type Basic or as software component
- **SAP HANA Cloud**
  - SAPUI5 runtime
  - SAPUI5 Eclipse tools part of SAP HANA cloud tools
  - **SAP HANA Extended Application Services (XS Engine)**
    - SPS 05 and later

Installation Procedure

- If it is not already installed, install the latest [Java Development Kit 6](https://www.oracle.com/technetwork/java/javase/downloads/jdk8-downloads-132419.html).
- Download and install the [UI Development Toolkit for HTML5 Developer Center](https://ui5.sap.com/).
UI5 Main Offerings

Runtime (Browser Based)

Theming part controlled by CSS files.

- Control libraries: Implemented in JavaScript, CSS with related image files
- Core Framework: Implemented in JavaScript
- Test suite: Implemented in HTML and extended with JavaScript functionality

Design Time Tools (optional)

Can use notepad if you wish, but Eclipse has tools and libraries available to work and test UI5 applications. Built in Resource Handler depending upon what application server you are using. Additional component to install Theming Generator (Theme Designer)

- Eclipse
  - Application development tools
  - Control development tools
- Resource handler in Java and ABAP
- Theming generator
UI5 Architecture Overview: Core Libraries

- UI5 Core includes base, core and model modules
- Dependency / Class-Loader to load control libraries
- Render manager creates HTML strings for the instantiated controls

The UI5 Core is shipped with various 3rd party JavaScript libraries included:

- jQuery
- jQuery UI
- data.js
- D3
UI5 Architecture Overview: Control Libraries

**sap.ui.commons**
- Includes “bread and butter” controls like TextField, TextView, Button

**sap.ui.table**
- Includes DataTable control

**sap.ui.ux3**
- Includes UX3 patterns, mainly available in “Gold Reflection” design
  - e.g.: Shell, ExAct and Thing Inspector
UI5 Architecture Overview: UI5 and jQuery

jQuery acts as the foundation of UI5

jQuery is currently the most popular JavaScript library on the Web. It's an open source library designed to help Web developers perform common tasks in JavaScript such as:

- Browser detection and abstraction
- Reading and manipulating the DOM
- Creating UI elements that the HTML standard doesn't provide (e.g. a date picker)
- Theming and animating UIs
- Handling AJAX requests and parsing XML or JSON data

Basic Usage of SAPUI5

UI5 pages always have to start with the `bootstrap`, to load the UI5 runtime.

```html
<script id="sap-ui-bootstrap"
    src="https://sapui5.netweaver.ondemand.com/resources/sap-ui-core.js"
    data-sap-ui-theme="sap_goldreflection"
    data-sap-ui-libs="sap.ui.commons,sap.ui.ux3">
</script>
```

Attributes of the script tag are evaluated and used to configure the runtime

- **data-sap-ui-libs**: comma-separated list of required controls libraries
- **data-sap-ui-theme**: the name of the theme to use, defines the CSS styles applied to the controls
- **data-sap-ui-language**: the ISO name of the language to display
- There are more attributes: **data-sap-ui-debug**, **data-sap-ui-rtl**, …
- Instead of putting the attributes in the script tag, many can also be added as URL parameters
Model View Controller (MVC) Concept:

Model-View-Controller
The Model-View-Controller (MVC) design pattern was invented in 1978 by the Norwegian software designer Trygve Reenskaug (pronounced “TRIG-vuh RAINS-cow”) whilst working at Xerox PARC. The first implementation of this design paradigm was with the release of the Smalltalk-80 programming language.

MVC was a revolutionary design pattern because it was the first to describe software components in terms of:

- The functional responsibilities each should fulfil.
- The message protocols to which each component should respond.

UI5 provides an implementation of the MVC pattern.
Since MVC is just a design pattern and not a specification, no two implementations of MVC are exactly the same.

UI5 provides an implementation of the MVC design pattern
- **Model**: Data binding can be used on the views
- **Views** can be defined using
  - XML (with HTML, mixed or standalone) sap.ui.core.mvc/XMLView
  - JavaScript sap.ui.core.mvc.JSView
  - JSON sap.ui.core.mvc.JSONView
  - declarative HTML (experimental) sap.ui.core.mvc.HTMLView
- **Controller**
  - bound to a view or standalone
  - can also be used by multiple views
  - Controller always in a namespace “sap.hcm.Address”
  - Event onInit, counter increments each time button is hit.
  - Bind the view to the controller using controller="sap.hcm.Address"
  - View last line binds the view to the controller and location of the placeAt.
**UI5 Data Binding**

In UI5, the term “data binding” describes a process by which a property in a data source (such as a model) is bound to a property in a UI5 control.

There are two implementations of data-binding:

- **One-way data binding (default)**
  Any changes to the property value in the data source are automatically visible in the UI control

- **Two-way data binding**
  Any changes to the property value in the data source are automatically visible in the UI control, and any changes to the value in the UI control are updated in the data source.

**The Data Binding Type System**

When binding UI Control properties to model properties, you can specify the data type of the model properties.

Bound model properties with a defined type are automatically formatted when displayed in the UI. Conversely, when input values are received in UI controls bound to such model properties, the values are parsed and converted back to the defined type in the model.

For each model data type, you can define the following parameters in the constructor:

- **format options**: Format options define how a value is formatted and displayed in the UI.
- **constraints** (optional): Constraints define how an input value entered in the UI should look like. When parsing the value will be validated against these constraints

**UI5 Theming**

- Based on Cascading Style Sheets (CSS) and CSS Parameters
- UI5 supports the creation and usage of different visual designs - called Themes - that can be used alternatively and switched on the fly, thus allowing for the same application to have a very different look
- On top of pure CSS, UI5 offers a variety of optional features that add value regarding modularization, modification, compatibility and performance:
- The SAPUI5 framework supports the following themes:
  - Gold Reflection
  - Blue Crystal
  - High Contrast Black
- For the UI5 Mobile controls for touch devices the following theme is provided:
  - SAP Mobile Visual Identity (this one visually matches the "Gold Reflection" theme provided for desktop controls)
Useful Links

- Interactive documentation of UI5: https://sapui5.netweaver.ondemand.com/sdk/
- SAPUI5 runtime under https://sapui5.netweaver.ondemand.com/resources/sap-ui-core.js
- SAPUI5 Eclipse tools part of SAP HANA cloud tools under https://tools.hana.ondemand.com/