



# How to Build 3D Configurators in SAP Configuration and Visualization Cloud

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Session ID #83584

# About the Speaker



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## Key Outcomes/Objectives

1. Learn about new SAP cloud configuration and 3D visualization offerings.
2. Get tips for creation of a simple configurator.
3. Get encouraged to try this at your company.



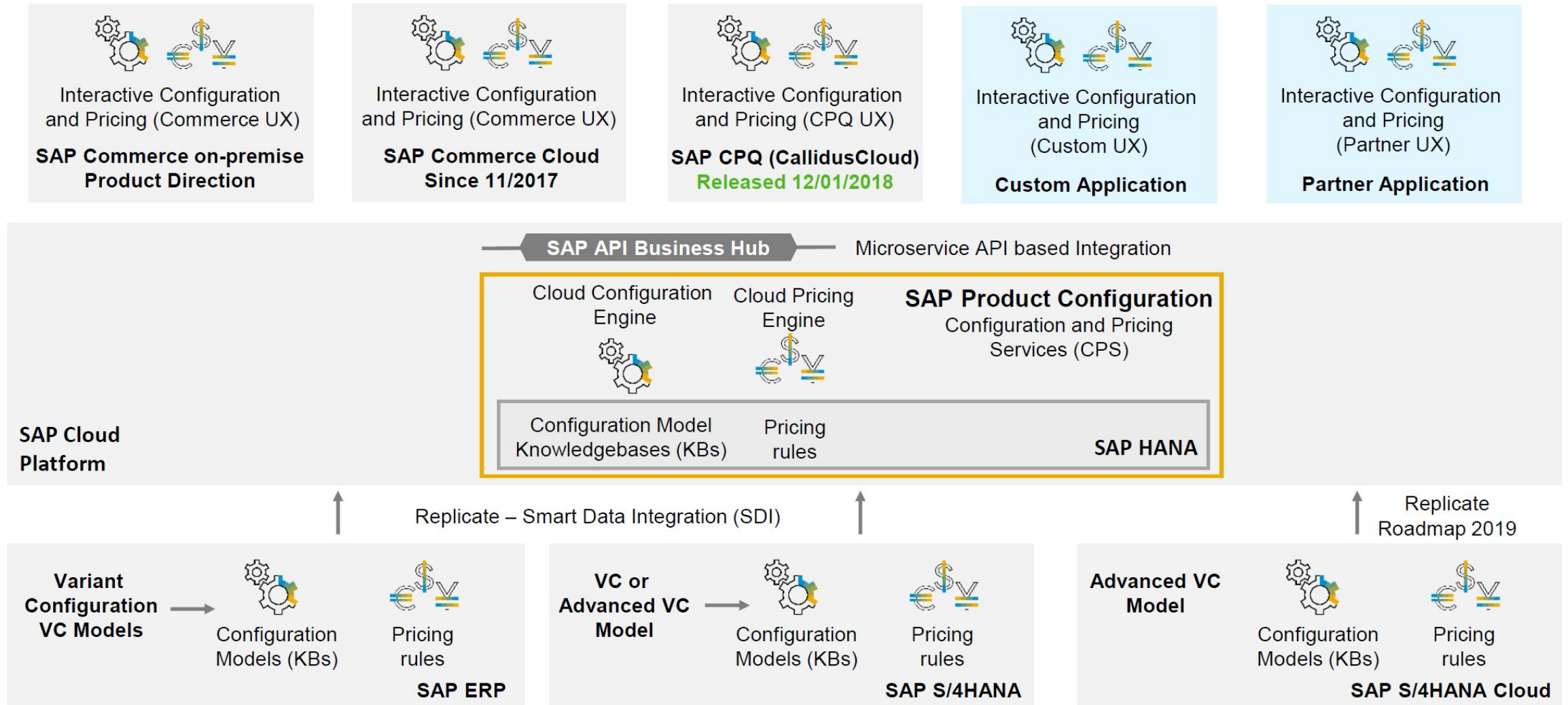
## Agenda

- SAP Configuration and Pricing Services (CPS)
- SAP Visual Enterprise Cloud (VE)
- Tips to create a simple configurator
- Q&A



# SAP Configuration and Pricing Services (CPS)

**SAP Product Configuration:** Cloud Configuration Engine and Cloud Pricing Engine, compatible with Variant Configuration & Pricing, Microservice API based Integration to any application



## CPS Web Service Overview

Main services:

- Product Configuration (configurations, ext config, kb)
- Pricing (pricing procedure, stateless pricing)

References:

- [SAP API Business Hub for Product Configuration](#)
- [SAP Help for Product Configuration](#)
- [SAPUI 5 Product Configuration Development Tutorial](#)
- [SAP CWG Presentation October 2018](#)

# HANA Smart Data Integration (SDI)

## Installation steps:

- Install the SDI Data Provisioning Agent (DP) - dependent on OS/DB
- Performs physical read of DB log files
- Does not work on cloud hosted MS SQL DB (AWS RDS, SQL Azure)

```
agentcli.bat --configAgent
10. Agent & Adapter Versions
q. Quit
b. Back
*****
Enter Option:6
*****
          SAP HANA Connection
*****
1. Connect to SAP HANA on Cloud (HTTP/HTTPS)
2. Connect to SAP HANA on Premise (TCP)
3. Connect to SAP HANA via JDBC
q. Quit
b. Back
*****
Enter Option:3
*****
          Connect to SAP HANA via JDBC
*****
Press "Enter" button to skip optional or default setting.
If one setting cannot be skipped, it is required.
*****
Enter Use encrypted JDBC connection[true]: Valid options: true|false
true
Enter Use WebSocket to connect (Enter false to use Direct SQL)[false]: Valid options: true|false
true
Enter WebSocket URL (e.g. /service/<service instance id>):
/service/271ef355-bdc4-4d83-8b4f-464f15151bed
Enter WebSocket Host:
wsproxy.hana.prod.us-east-1.whitney.dbaaS.ondemand.com
Enter WebSocket Port:
80
Enter Agent Admin HANA User:
SDI_USER_7ACD79B84D984FA58B1C75F6301E3B21
Enter Agent Admin HANA User Password:
Enter Agent Admin HANA User Password: (confirm)
Invalid entry, passwords do not match.
Enter Agent Admin HANA User Password:
Enter Agent Admin HANA User Password: (confirm)
Enter Use HTTP Proxy Server[false]: Valid options: true|false
false
Enter HANA User Name for Agent Messaging[SDI_DP_AGENT_7983A617D926A0873F2CCA9843471211]:
SDI_DP_AGENT_7983A617D926A0873F2CCA9843471211
Enter HANA User Password for Agent Messaging: (*****)
Enter HANA User Password for Agent Messaging: (*****) (confirm)
Connecting to SAP HANA server via JDBC...
Agent configuration tool is connected to SAP HANA server via JDBC.
Press Enter to continue...
```

# SAP CPS Administration

The screenshot shows the SAP CPS Administration interface. On the left is a dark navigation menu with the following items: Home, Onboarding, Connect to SAP Cloud, Settings, Replication (with a dropdown arrow), Configuration, Pricing, Advanced Actions, Monitoring (with a dropdown arrow), Tables, Queue, and Engine Trace. The main content area is titled "Administration of Configuration and Pricing Services" and contains several paragraphs of text. Below the main content are four light blue tiles, each with an icon and a title: "Onboarding" (person icon), "Connect to SAP Cloud" (cloud icon), "Replication" (document icon), and "Queue monitoring" (checklist icon).

## Administration of Configuration and Pricing Services

To provide product configuration and pricing information in the cloud, it is necessary to replicate data from the SAP back end to the SAP Cloud.

Please note that the different sections require specific roles. The required roles are specified in parentheses after the description.

To connect the SAP back end to the SAP Cloud, a Data Provisioning Agent (DP Agent) must be installed. The data required to install the agent is provided on the **Onboarding** page (CustomerAdmin role required). After the DP Agent has been installed, the connection to the SAP back end can be established via the **Connect to SAP Cloud** page (CustomerAdmin role required). Once the connection has been established successfully, the desired data can be replicated on the **Replication** subpages (BusinessExpert role required). The actions initiated on the replication pages can be monitored on the **QueueMonitoring** page (CustomerAdmin or BusinessExpert role required).

### Onboarding

The data required during the installation of the DP Agent can be found on the Onboarding page.

### Connect to SAP Cloud

After the DP Agent has been installed, the SAP back end can be connected to the SAP Cloud.

### Replication

The replication function includes product configuration and pricing data.

### Queue monitoring

Queue monitoring displays the current action performed by the replication system.

Connect agent to cloud  
Replicate KBs / pricing  
Monitor data transfer

The screenshot shows a progress bar with three steps, each marked with a green checkmark and the word "Done" below it. The steps are: "Establish connection (Done)", "Test (Done)", and "Finalizing (Done)". Above the progress bar are "Save" and "Cancel" buttons.



SAP Configuration for TL\_CWG\_2018\_1 12.10.2018

KB object: TL\_CWG\_2018\_1  
KB Runtime Version: 2.0

**Basic Data**

Status: 1  
Language: No selection means all languages a

**BOM Information**      **Classic Depend**

Plant: 0001       Load  
BOM Application: SD01       Including Act

**Administrative Data**

Created By: LEICHTWEISS  
Changed By:

Version 2.0 of TL\_CWG\_2018\_1 saved

File Edit View Help

New Import Runner My Workspace

GET create cfg 1898 with date on us1 GET {{protocol}}{{cfg\_service\_part}}. X + ...

GET {{protocol}}{{cfg\_service\_part}}.{{host\_port\_part}}.{{api\_version}}kbdetermin

Pretty Raw Preview JSON

```

1 {
2   {
3     "id": 114,
4     "key": {
5       "logsys": "RR4CLNT910",
6       "name": "TL_CWG_2018_1",
7       "version": "2.0"
8     },
9     "validFromDate": "2018-10-12",
10    "changeDate": "2018-10-12",
11    "build": 1,
12    "structureHash": "2EA83C5717636B62B7A37F2CEF018CF8"
13  },
14  [
15    {
16      "id": 111,
17      "key": {
18        "logsys": "RR4CLNT910",
19        "name": "TL_CWG_2018_1",
20        "version": "1.0"
21      },
22      "validFromDate": "2018-10-10",
23      "changeDate": "2018-10-10",
24      "build": 1,
25      "structureHash": "57971988A2C7E7605BDC4B485735172F"
26    }
27  ]
28 }

```

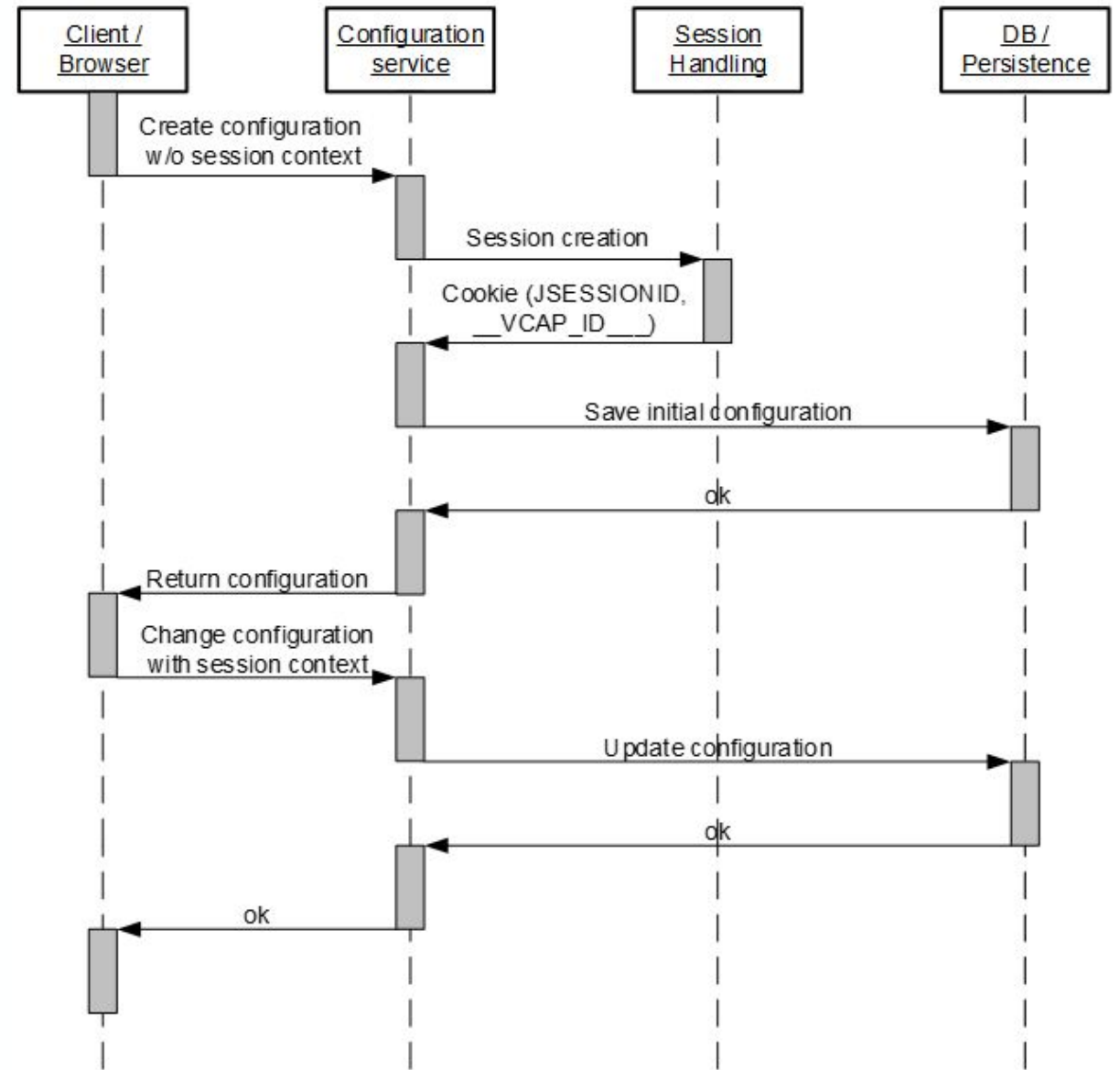
SDI jobs starts every 2 min and replicates all changes



# Configuration State Handling

CPS Services are RESTful but also maintain state for performance reasons.

Convenience for developer  
- session id is persistent



## Watch out for Variant (p)functions!

VC models using variant (p)functions need to be refactored for use with CPS. Options:

- Use SAP delivered variant functions OSS [#2695561](#)
- Implement customer functions as serverless functions - e.g. [AWS Lambda](#) or [SAP Cloud Serverless Functions](#) (available in 1907 CPS)
- **pfuctions will never be supported with CPS!**

Conversions:

- SAP\_VF\_NUM\_TO\_CHAR
- SAP\_VF\_CHAR\_TO\_NUM

String Operations:

- SAP\_VF\_CONCATENATE
- SAP\_VF\_SUBSTRING
- SAP\_VF\_LENGTH
- SAP\_VF\_LEFT / SAP\_VF\_RIGHT
- SAP\_VF\_COMPARE\_STRINGS

Auxiliary functions:

- SAP\_VF\_COUNT\_VALUES
- SAP\_VF\_DAYS\_BETWEEN\_DATES

## Pricing in CPS

As with custom variant (p)functions, pricing requirements and formulas cannot use custom code. Options:

- [60 standard routines](#) implemented

Supported Pricing Requirements

Routine Number	Description	Required Attributes
1	Different Payer	KOMK-KUNNR KOMK-KNRZE
2	Item with Pricing	KOMP-PRSF
3	Foreign Currency Document	
4	Cost	INDICATOR_IC
7	Domestic Business	KOMK-STCEG AT005-XEGLD ET005-XEGLD KOMK-ALAND KOMK-LAND1
8	Export Business	KOMK-STCEG AT005-XEGLD ET005-XEGLD KOMK-ALAND KOMK-LAND1

etc..

# SAP Product Configuration User Experience Contest

## Who can participate in the Contest

- Customers or partners or SAP consultants

## How can I access the SAP Product Configuration Public Microservice API

- SAP API Business Hub – tenant with burger configuration model
- [Partner license](#) via SAP Partner Edge – get your own test tenant, against your own configuration model in ERP or S/4HANA

## Is there a guide how to build a Configuration UX?

- Link to [documentation](#), including “Development Guide”
- Link on [API Business Hub](#)

## Which UX Technology/Tool should I use?

- Free choice for any participant, e.g.
- [SAP UI5/Fiori on SAP Cloud Platform](#)
- [SAP Cloud Platform SDK for iOS](#) (Apple)
- [SAP Cloud Platform SDK for Android](#) (Google)
- [SAP Mobile Platform SDK](#)
- [AngularJS](#)
- Any other UX technology which can consume the APIs



## What is the duration of the Contest?

- Audience vote for the best Configuration UX at European Configuration Workgroup Conference (CWG), May 19-22, 2019 in Budapest, Hungary
- Another audience vote at North American CWG Conference October 2019

## How is the Contest organized and supported by SAP

- Sign up on the paper list during the session, or email [Harald.Reitz@sap.com](mailto:Harald.Reitz@sap.com)
- Kick-off call by SAP planned for January 2019
- Monthly calls for Q&A and to review progress
- Jam Group for discussion and knowledge sharing between participants

CWG conference in Budapest, May 19 – 22 and in St Louis, October 6 - 9 2019

[www.configuration-workgroup.com](http://www.configuration-workgroup.com)

[SAP JAM](#)

## What is SAP Visual Enterprise?

- Traditionally, an on-premise suite of 3D tools to automate and streamline conversion and enrichment of CAD 3D data, with a number of export formats, including 3D PDF.

### Suite of tools:

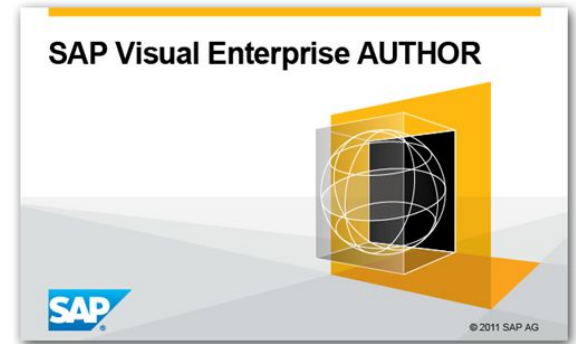
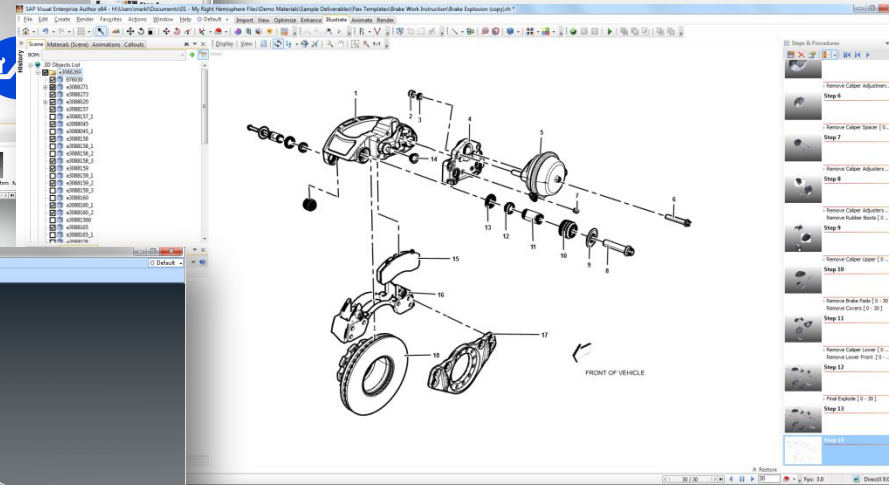
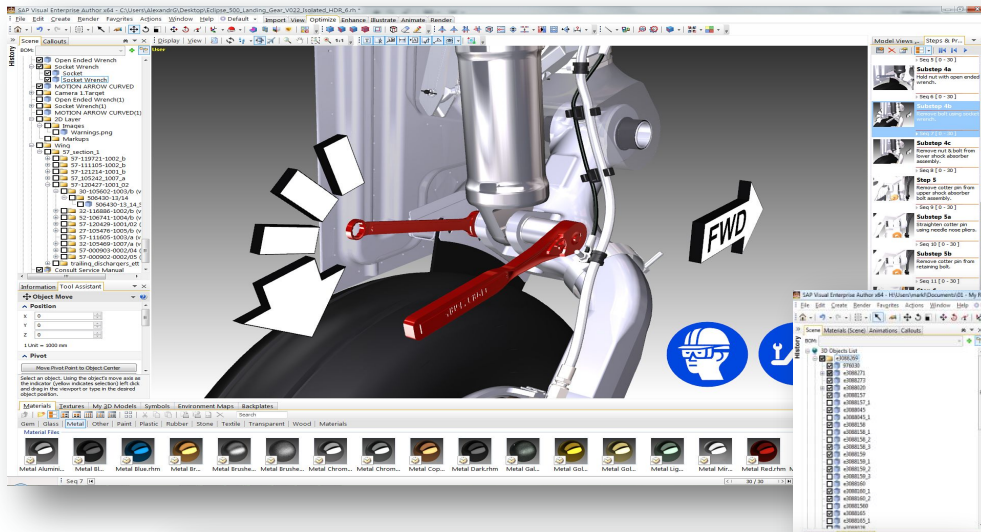
- SAP Visual Author
- SAP Visual Generator
- SAP Visual Viewer
- SAP Visual Instance Planner

One common format to “rule them all” – VDS (Visual Data Stream) ... in the cloud.





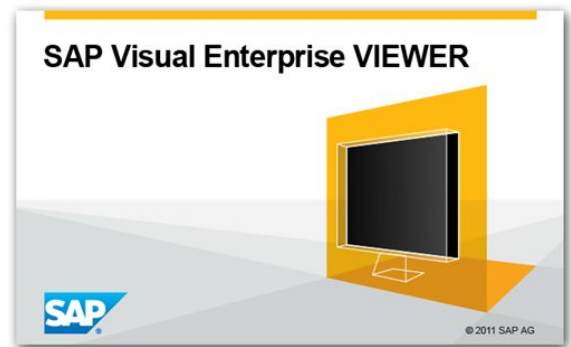
# Visual Enterprise Author: Deliverable Creation Solution



- Graphics Manipulation
- Content Authoring
- 3D Animations
- Technical Illustration Tools
- Photo-realistic Imagery
- Structure Planning

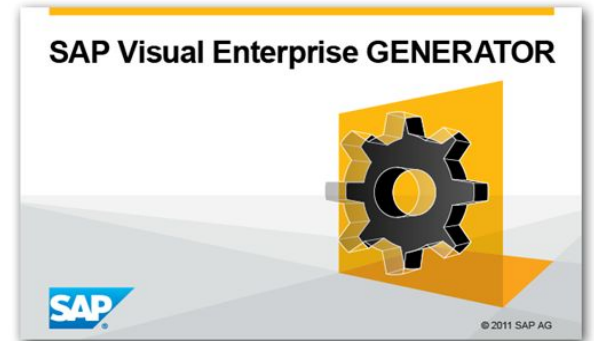
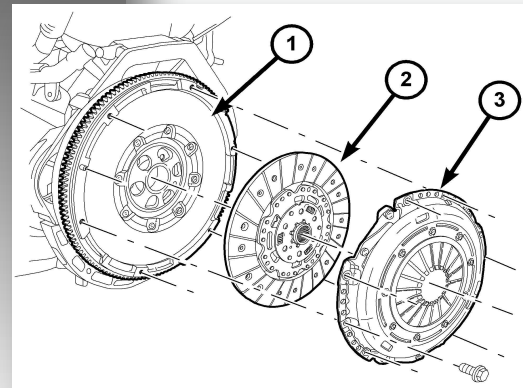
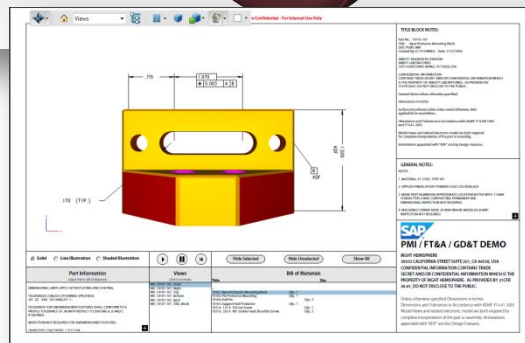
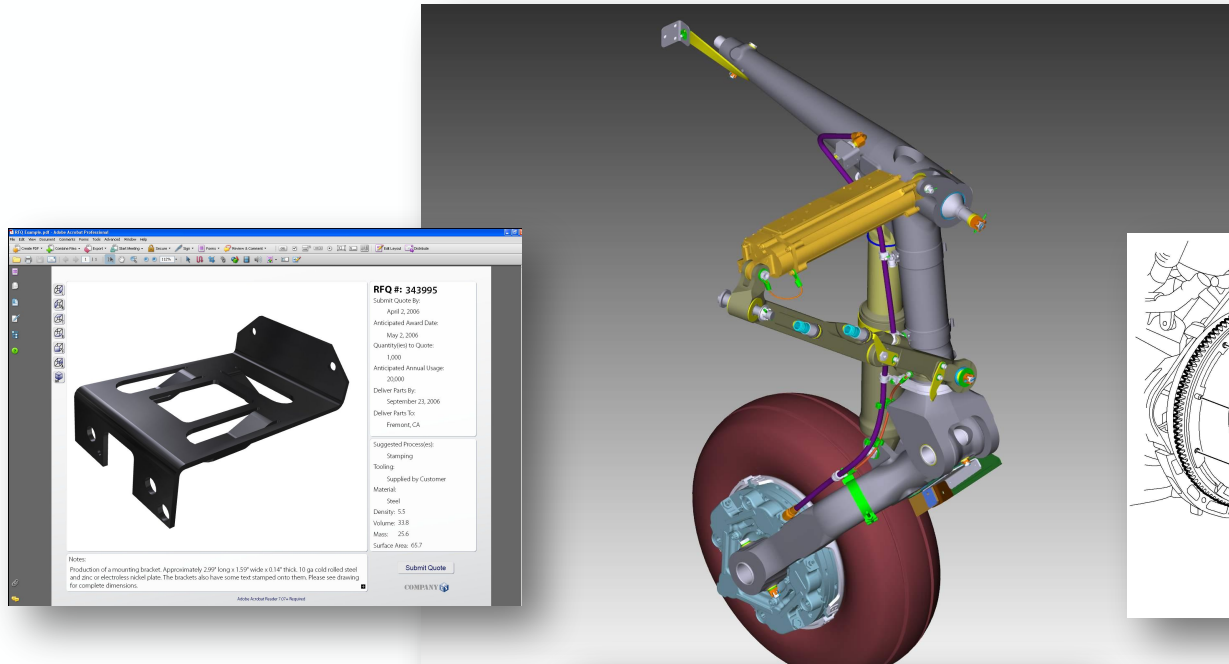


# Visual Enterprise Viewer: Delivery and Collaboration Mechanism



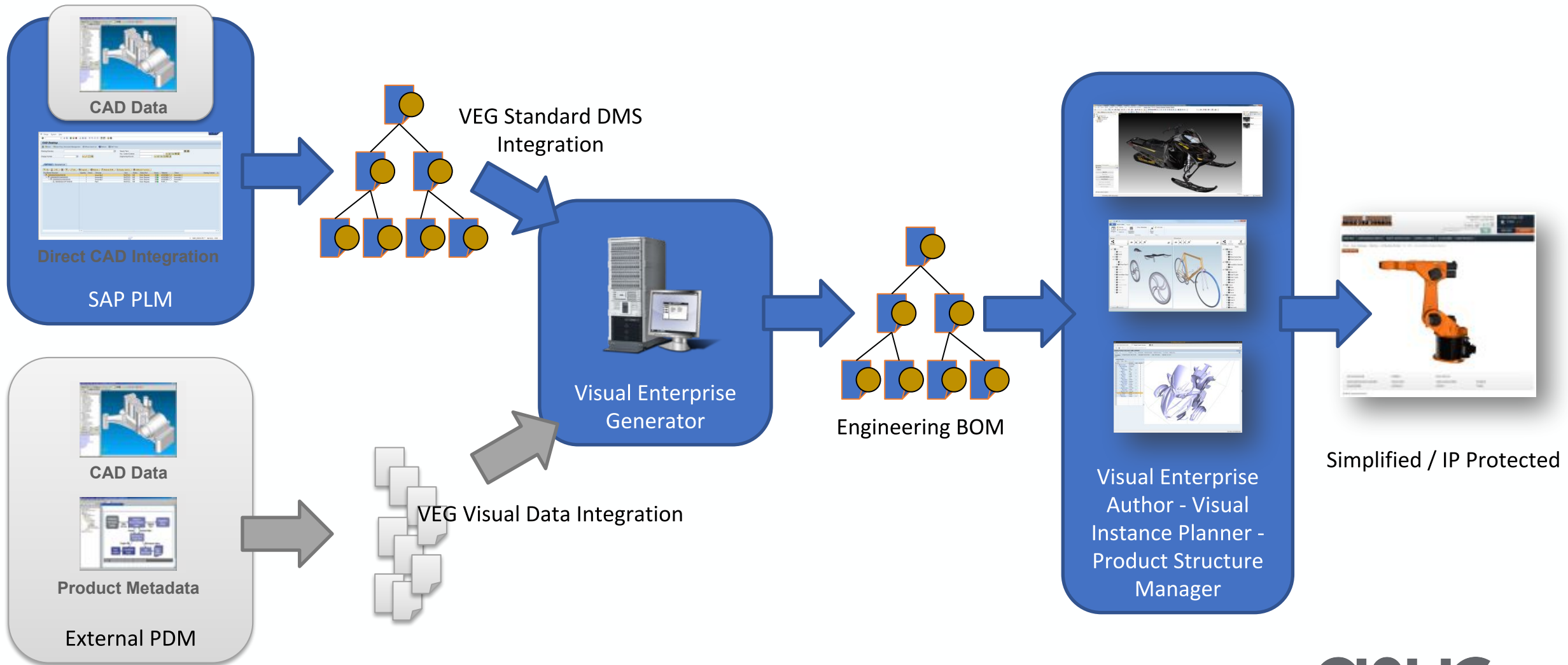
- Collaboration
- View and Mark-up
- View 3D Models and Animations
- Embed 3D in MS-Office, PDF, and HTML
- Mobile viewer

# SAP Visual Enterprise Generator: Robust Publishing Engine



- CAD Translation
- Ultra Lightweight File Generation
- Graphics Manipulation
- Content Publishing
- Workflow Automation
- Asset Management
- Master Data Creation

# Visual Enterprise and Visual Configuration Flow (on premise)



# SAP Cloud Platform 3D Visualisation

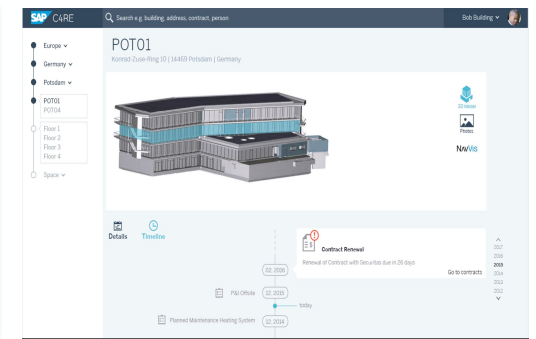
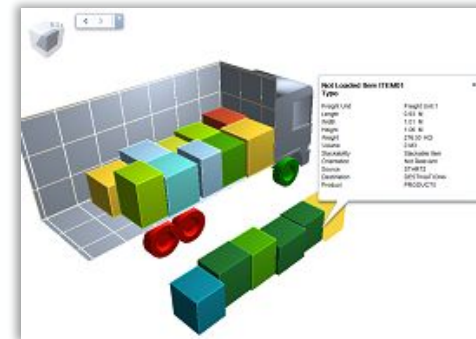
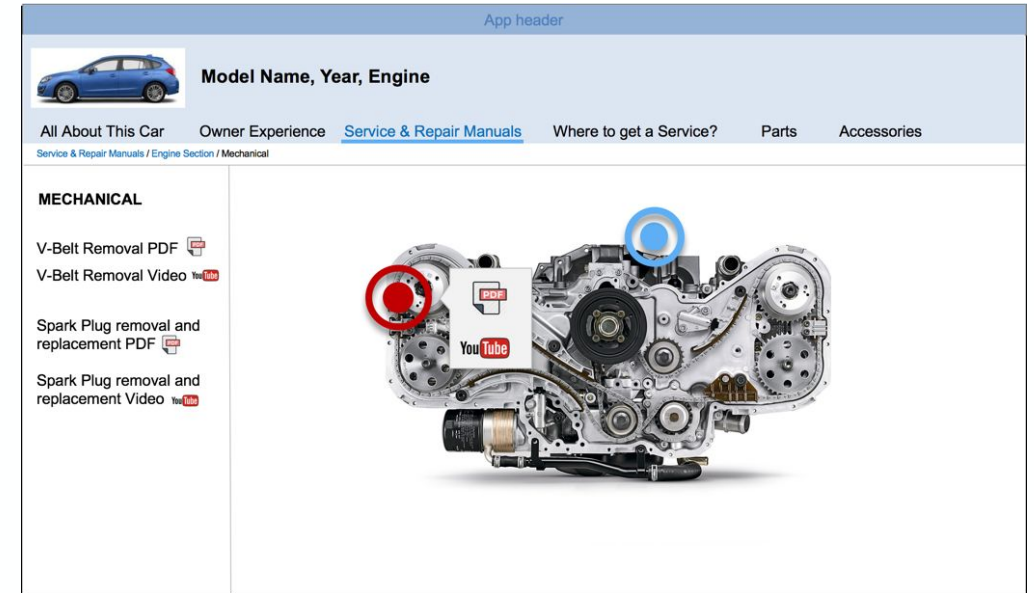
- SAP 3D Visualisation is a family of services, products and components enabling simple end-user and developer 3D, 2D and geo-enabled visualisation in cloud, mobile and on-premise applications and solutions.
- A real-time interactive visual user experience is more intuitive, yielding better, faster understanding and decision-making.
- The Cloud offering comprises two parts, Cloud Services and UI components

## 3D Visualisation Services:

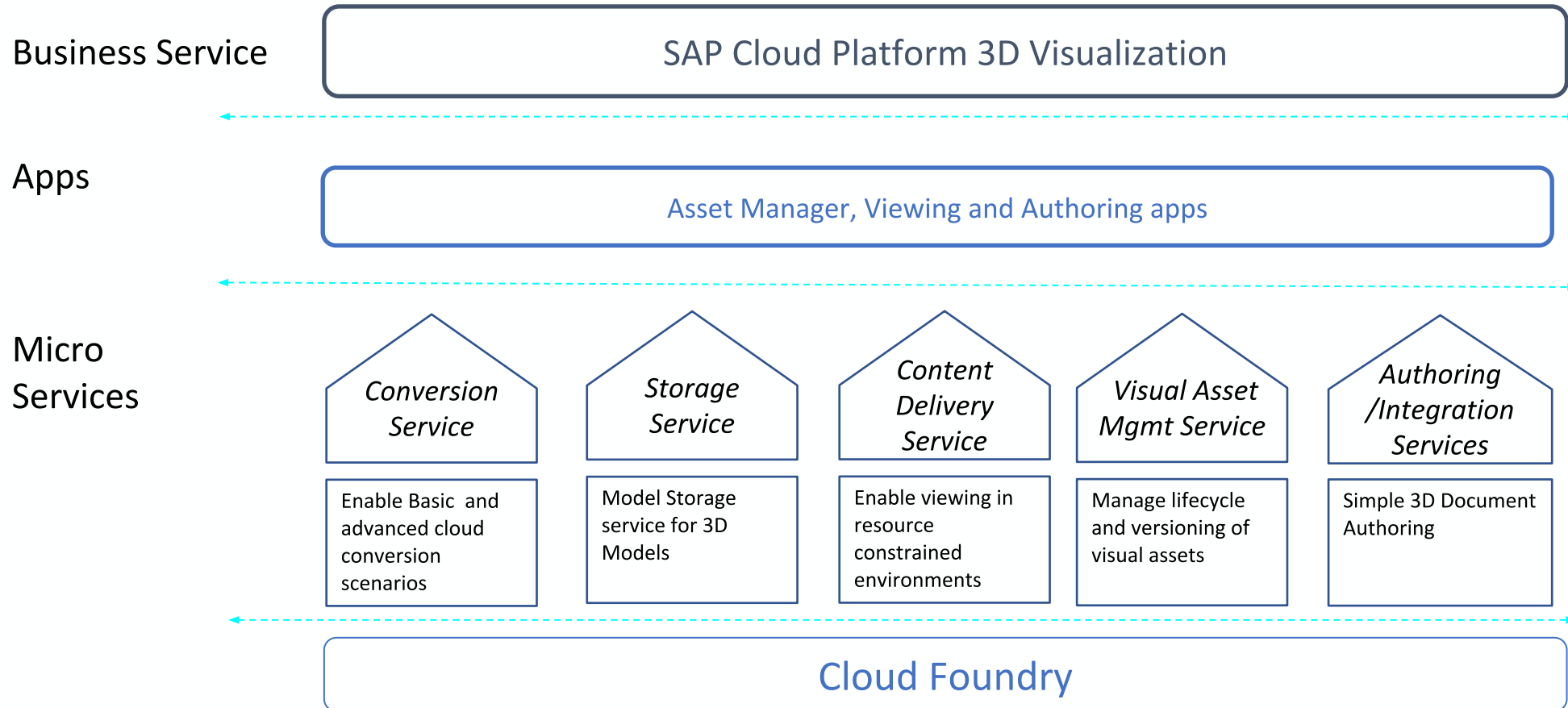
- A set of SAP Cloud Platform microservices supporting the conversion of native CAD data to visualization files, and streaming the stored content to a range of devices including mobile and AR/VR
- Technical applications for managing, authoring and enhancing visualisation assets, enabling the easy creation and publishing of interactive 3D content

## Visual Interaction toolkit for SAPUI5:

- A set of SAPUI5 components supporting interactive 3D, 2D and geo-enabled applications including visual business capabilities



# Cloud Services Delivery components



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# Uploading / Converting / Modifying / Viewing a 3D File

1. Visualization Asset Manager. Upload size currently limited to 100MB and supported formats:
  - Native CAD formats
    - High: CATIA V5, NX, SolidWorks (up to 2017)
    - Medium: SolidEdge, Inventor, CATIA V4, Pro/E
    - 2D Drawings: CATIA V5, NX, SolidWorks (medium)
  - Interchange formats
    - High: Parasolid, PLMXML, JT, IGES, STEP, STL, CGR
    - Medium: CATIA V6 3DXML, ACIS, IFC
2. Example of modifying the 3D object, adding Points of Interest (POIs)
3. Visual Interaction Toolkit (VIT) and new Viewer based on [three.js](https://three.js.org/)



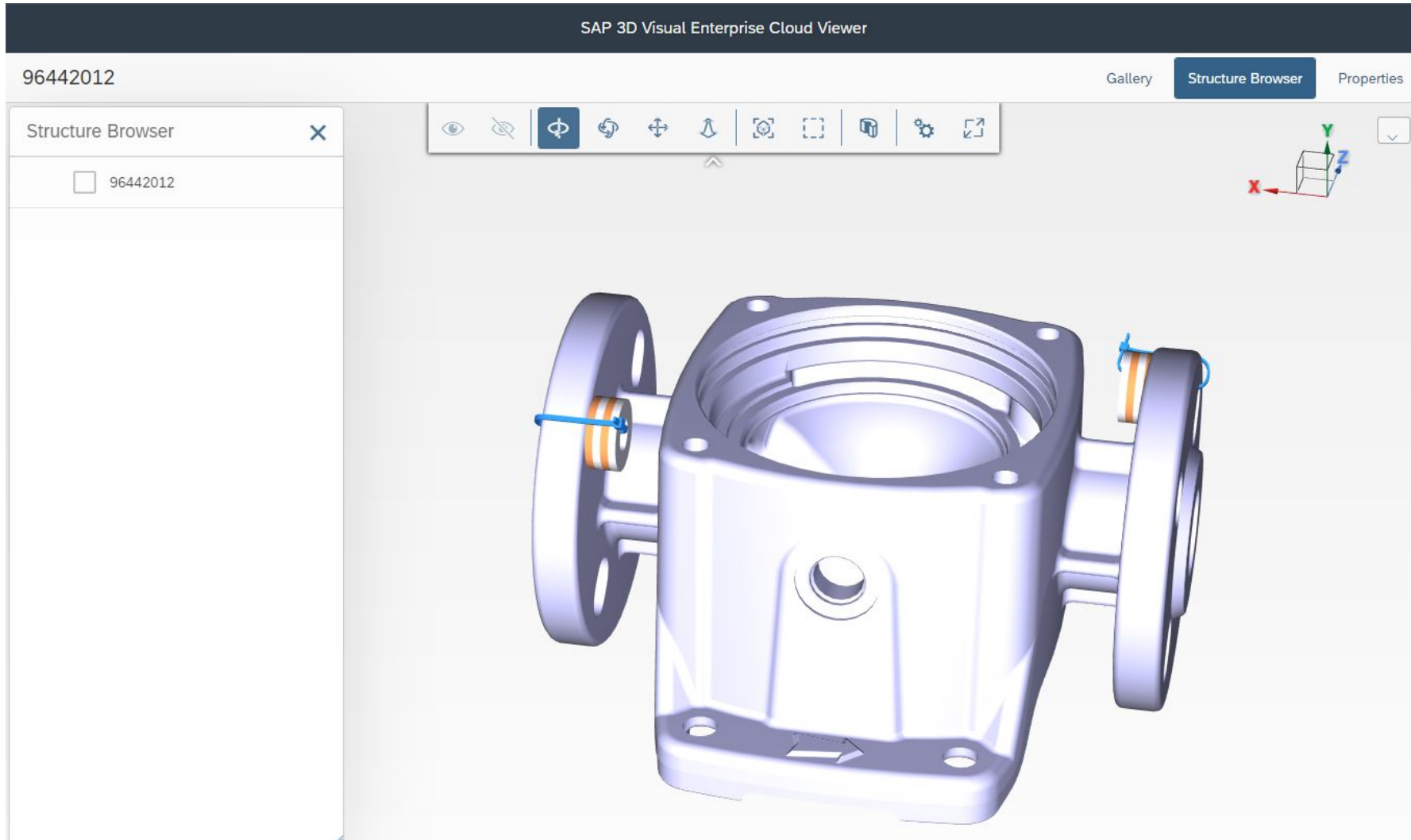
# Visualization Manager

The screenshot displays the SAP Visualization Manager interface. At the top, the SAP logo and 'Visualization Manager' title are visible. The interface is divided into three main sections:

- Imports:** A sidebar on the left with a 'Create' button and a search bar. A list entry for 'Pump Base' is shown, indicating '1 visualization created' on '5/8/2019, 1:01:40 PM' with a 'Completed' status.
- Pump Base:** The main content area shows a green notification bar: 'Import process completed. 1 visualization created.' Below this is a 'Messages' section with a message: 'Visualizations Stored (1)' for '96442012.CATPart'. A 'Navigate to Visualizations' button is also present.
- Files (1 Total):** A table on the right showing one file: '96442012.CATPart'.

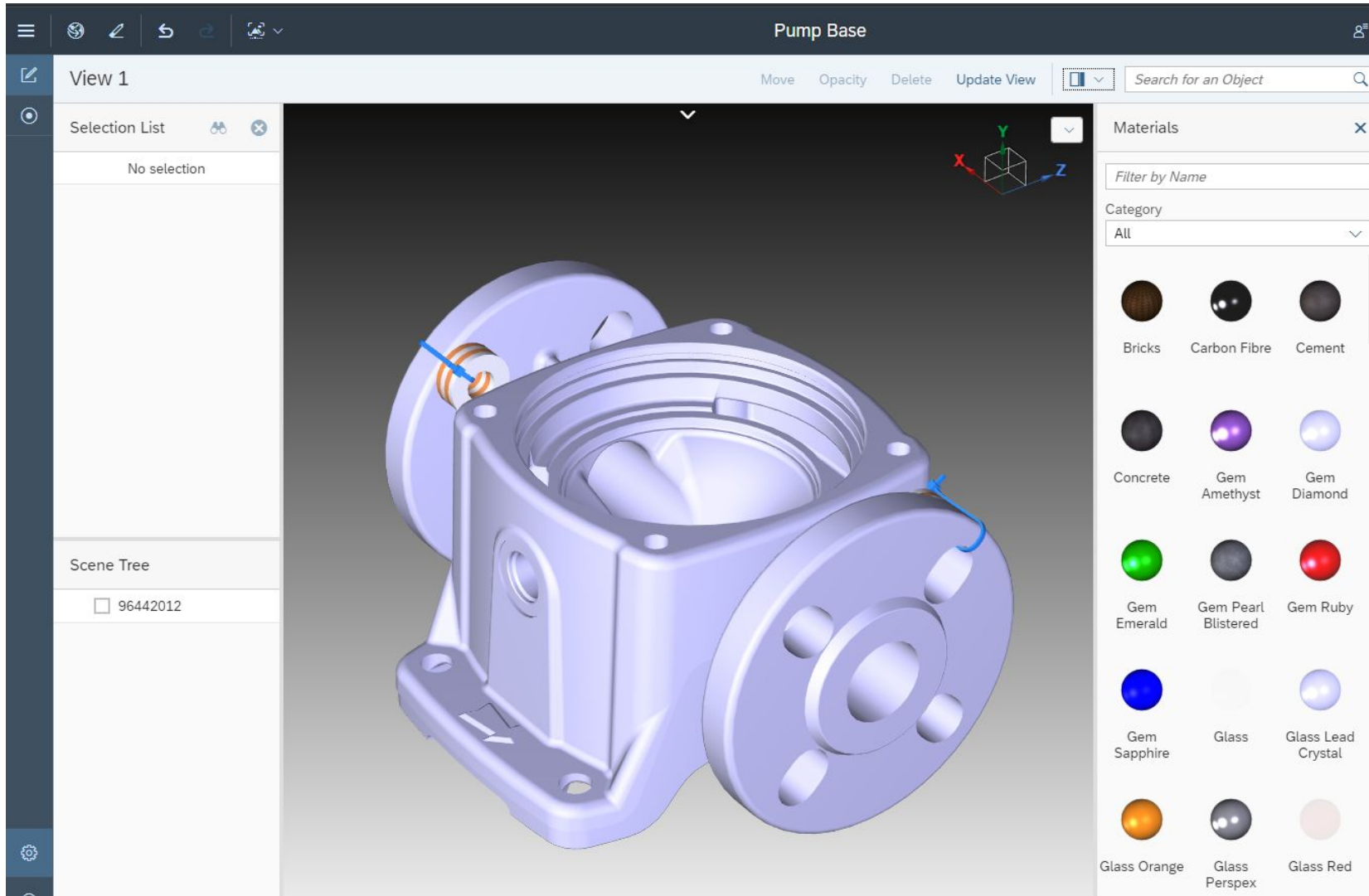
Upload assets directly in native format and organize (names/tags).

# Visual Cloud Viewer



Works in all modern browsers using WebGL

# Visual Cloud Authoring Tool



- Convert uploaded 3D to editable visualization.
- Move / Rotate / Scale / Delete components
- Adding Points of Interest (POIs)
- Creating (exploded) views
- Publishing

# Visual Tree Mapper API (experimental)

- Prepare mapped business data to 3D scene objects

## File Format:

ParentId – The ID of the parent of the current node in the hierarchy.

ChildId – The hierarchy ID of the current node.

ApplicationId – The application provided identifier for the product structure element.

Index - Used to specify an order among sibling items.

Name – A display name for the product structure node.

The first line of the CSV file is expected to provide column names although they do not need to match the names provided above and the api allows the mapping to be provided when importing the structure.

## Example CSV:

Parent,Child,Material,Index,Name

root,root,M00000100,1,Gear

root,c1,M00000101,10,Bearing

root,c2,M00000102,20,Spacer

root,c3,M00000103,30,Clutch Housing

root,c4,M00000105,40,Clutch housing bolts

root,c5,M00000106,50,Clutch Housing washers

root,c6,M00000107,60,Rubber Pads

root,c7,M00000108,70,Clutch Drum

root,c8,M00000109,80,Lock Washer

## Service Tree Upload

File: \*

Choose File Pump\_Association.csv

Tree name \*

Pump Association

Name column \*

Name

Child ID column \*

Child

Parent ID column \*

Parent

Application ID column \*

Material

Root Tree Item ID

The Child ID of the root tree item.

root

Sibling index column

Used to specify an order among sibling tree items.

Index

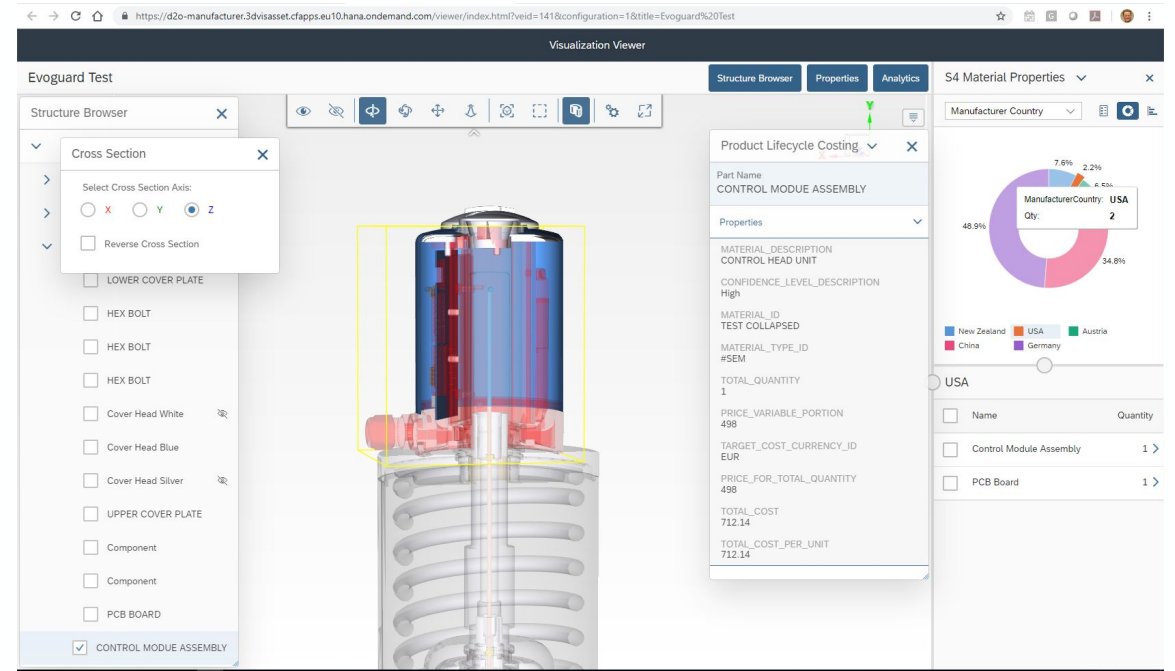
# 3D Visual Enterprise in the cloud future – Codename “Edmund”

## Product Vision

Edmund is a Visual Index – a 3D graphical interface to business insights and applications across the digital supply chain, unlocking the power of the Network of Digital Twins

### • Product Characteristics

- A secure overview application to visualize the Digital Twin
- A compelling visual experience – fast, simple navigation through 3D to and from real-time business data and applications
- A visual user interface to “Design to Operate”
  - For all users across the distributed supply chain
  - Integrated out of the box to a distributed master data layer
  - Easy, controlled access to real-time enterprise apps and data
  - Incorporating intelligent assistants and machine learning



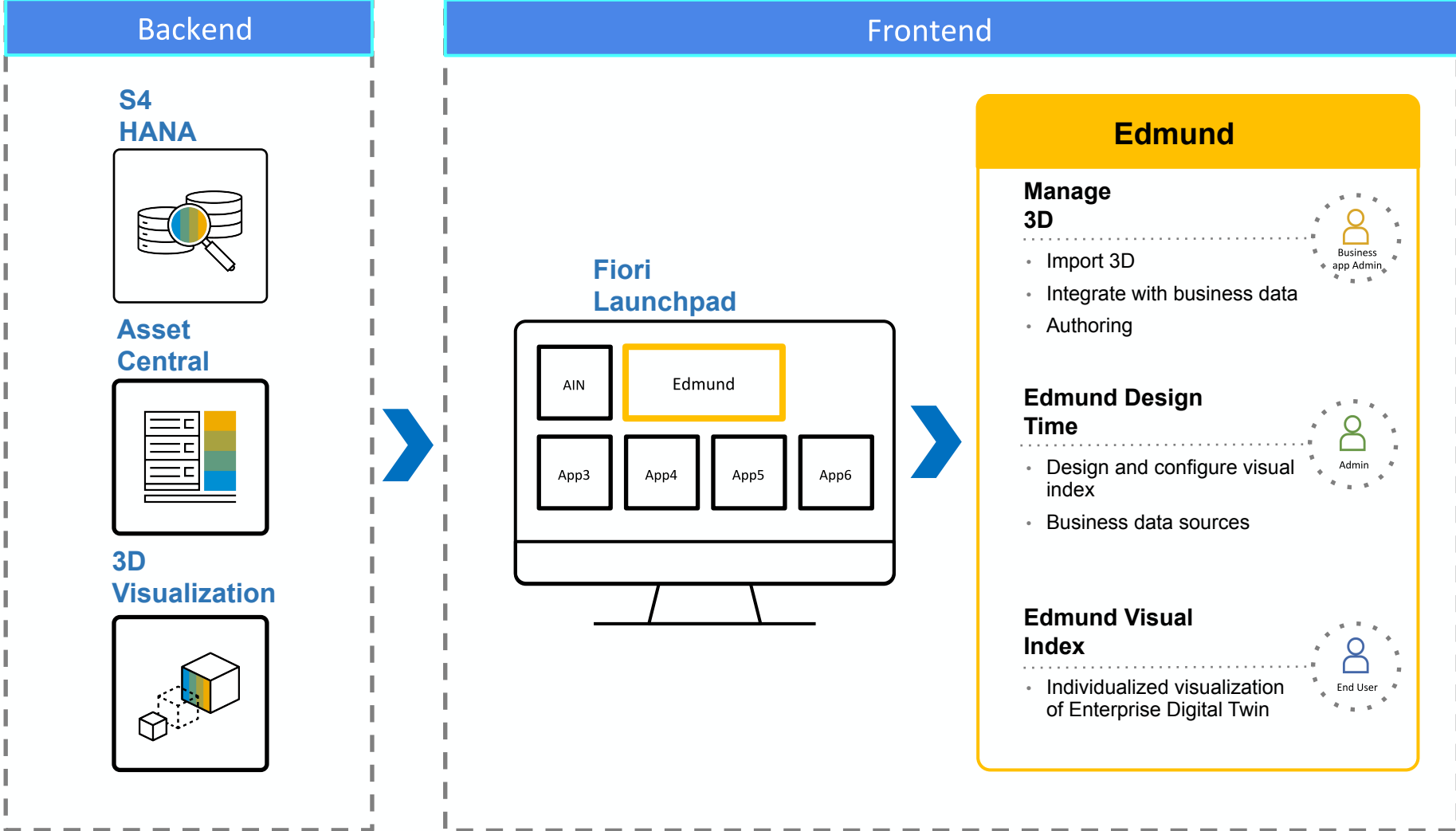
# The Business Value of Edmund

- Use a Visual Digital Twin as the most natural user interface to **simplify insight to action** on complex products or assets.
- Find what you want quickly and accurately, just by visually drilling-down and selecting. Take role-based, appropriate action on your selection. A visual index to the right business data and the right business application.
- **All users in the distributed digital supply chain** have transparency - secure, controlled access to the live, distributed Network of Digital Twins





# EDMUND 3D VISUALIZATION IN THE CLOUD



# Year 2019 (Edmund : Microservices, Applications, Design Time)

Q1

Q2

Q3

Q4

Beta

Early Adopter

GA

## Microservices

Conversion, storage, integration and business data source

- Support for all major CAD and other 3D file formats
- APIs to manipulate and query visualization asset content (undoable)
- Increment streamed delivery of visualization asset content
- Ability to associate multiple business hierarchy with 3D visualization
- Ability to connect to different business system (S4HANA, Asset Central, Product Lifecycle Costing)

## Applications

Managing 3D visualization, cloud authoring

- Move, rotate, pan, zoom
- Author guided navigation user experience
- Associate visualization content to business data
- Create views.
- Publish authored visualization asset content
- Animation
- Annotation

## Design Time

Capabilities to manage UI layout, configure different data sources and actions

- Configure data sources (S4HANA, Asset Central, PLC) to connect different business data with 3D Visualization
- Templates to configure UI layout for visual work instruction and analytical dashboard

## Microservices

Conversion, storage, integration and business data source

- Import new version of original visualization
- Export to VDS
- Support for importing 2D

## Applications

Managing 3D visualization, cloud authoring

- Enhanced search in 3D visualization browser
- User action history
- Detail Views
- Highlight authoring
- Change render modes
- Preliminary support for change management

## Design Time

Capabilities to manage UI layout, configure different data sources and actions

- Configure IoT data sources

## Microservices

Conversion, storage, integration and business data source

- Support for importing larger files
- Automatic model optimization
- Support for 2D automatic hotspot
- Automatable authoring actions

## Applications

Managing 3D visualization, cloud authoring

- 2D authoring
- Manual model optimization
- Advance automatic explosion of 3D visualization
- Ability to view big models

## Design Time

Capabilities to manage UI layout, configure different data sources and actions

- Template for Time series player

# Year 2019 (Edmund : Visual Index players/dashboard)

Q1

Q2

Q3

Q4

## Dashboards

### Analytical Player

- Connected to S4HANA, PLC and Asset Central to show 3D visualization connected to business data
- Specific use case targeted is country of origin for parts and cost information
- Possible to configure any use case using design time

### Visual Work Instruction Player : Basic

- Player to show visual work instruction for maintenance procedure using features from cloud authoring app.

## Dashboards

### Analytical Player

- Connected to IoT data source
- Possible to configure any use case using design time

### Visual Work Instruction Player : Advanced

- Player to show visual work instruction for maintenance procedure using features from cloud authoring app like symbols, highlight, detail views

## Dashboards

### Time Series player

- Connected to business data
- Possible to configure any use case using design time

## Take the Session Survey.

We want to hear from you! Be sure to complete the session evaluation on the SAPPHIRE NOW and ASUG Annual Conference mobile app.



# Presentation Materials

Access the slides from 2019 ASUG Annual Conference here:

<http://info.asug.com/2019-ac-slides>



# Q&A

For questions after this session, contact me at  
[daniel.naus@configair.com](mailto:daniel.naus@configair.com)

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