JT via VR devices
JT Day Nov 5th 2018
instant3Dhub for VR/AR application
Johannes Behr
Fraunhofer IGD

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Industrial VR/AR Hardware level: From custom to consumer devices

25 years
1993 - 2018

Link to the YouTube Video:
https://youtu.be/YNRPJWsHvi8
Industrial VR/AR Software level: From PoC to Dynamic Service/Data Meshups

**PoC: Fix Use-Case/Service + Fix Data**
e.g. AR Service Prototypes / Game Engines

**Fix Use-Case/Service + Dynamic Data**
e.g. Virtual Assembly/Disassembly

Dynamic Service/Data Mesh-ups

25 years
1993 - 2018

Service Mesh-up

Data Mesh-ups

Industrial VR/AR Apps

VR/AR Games
instant3Dhub for VR/AR application

Link to the YouTube Video: https://youtu.be/9M57NeLhT70
Thank you for your Attention
Using JT to Create Workflows and Design Reviews in the world of Digital Realities

David Shackleton/Trevor Leeson
Theorem Solutions

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Design Review Experience

Allows design reviews to be undertaken capturing user comments and videos for future reference. Also supports multi-user, multi-device, multi-location collaboration.

Manufacturing Build Experience

Work instruction created using Teamcenter Visualization Mockup Snapshots published to Digital Realities Server and accessed by various clients.
Digital Realities working with JT data

Link to the YouTube Video: https://youtu.be/xRKrBXlq6SA
Digital Realities working with JT data

Link to the YouTube Video: https://youtu.be/M37hx17q40
Thank you for your Attention

for further information please contact Theorem Solutions at
www.theorem.com
JT via VR Devices
Dr.-Ing. Matthias Roth
Siemens

JT via VR Devices
JT Day Nov 5th 2018
Siemens PL Visualization
Immersive Visualization Across Product Lifecycle

Virtual Reality (VR)

Concept
Design
Engineering
Planning
Assembly
Marketing
Sales
Maintenance

Virtual product review
• Concept
• Aesthetics

Virtual design and review
• Packaging
• Clearance

Virtual plant planning and review

Virtual Reality Collaboration, Conferencing

Virtual sales room and configurator
On-site training, support/collaboration
In field data overlay

Shared Technology-Framework
Intro

- What was…
  - Geographically distributed, silo’ed organizations
  - Slow, incompatible, locally-hosted toolsets

- Becomes…
  - Connected, collaborative, virtual organizations
  - Cloud-hosted, unified, development environments
  - 3D immersive, dynamic experiences
  - An accessible tool on every engineer’s desk

"A computer on every desk, and in every home, running Microsoft software."
Teamcenter Visualization
Single User VR / Low cost VR devices

- Native support for the following device
  - HTC Vive
  - Oculus Rift
  - zSpace
- Allows the user to immerse themselves
  - Tracking – users can poke „inside“ camera movement sync’d with device signals
  - Navigate within virtual environment
- Richness of Visualization and DMU functions exposed through immersive menu
  - Navigation
  - Analysis
  - Collaboration
- PLM integrated VR at a keypress
  - Data can be loaded directly from Teamcenter
  - Issues found during an immersive session can be stored and managed in Teamcenter
User Interaction & Tracking

- Camera Position Tracking
  - Synchronization of headset / glasses with stereoscopic display

- Controller Tracking & Assignment can be used for many different purposes
  - Selection and Actions
  - Reachability
  - User Configurable assignment of functions to „buttons“
  - „Teleporting“ and other Navigation Functionality

- User Interaction
  - Immersive Menu with rich set of relevant DMU functions
  - Customizable UI capabilities to allow for casual – as well as expert users
Richness of Visualization and DMU functions in Immersive

- No additional training required
  - All Functions identical to traditional Teamcenter Visualization interaction behavior on Desktop environments
- Relevant base functions accessible in Immersive Environment
  - Use of Snapshots with their associated assets (e.g. behaviors) to quickly „get to the point“
  - Selection, Pre-highlighting to interact with the model
Richness of Visualization and DMU functions in Immersive

Major analysis functions directly accessible
- Section to cut through the mist
- Measure to understand impact
- Move parts to disassemble
- Check Collisions to understand form & fit
- Automatically disassemble to understand maintainability

(1) Link to the YouTube Video: https://youtu.be/LmXw6H4BXFA
(2) Link to the YouTube Video: https://youtu.be/HMavpOTfq6g
(3) Link to the YouTube Video: https://youtu.be/Lj8uDELR3L8
Tailor your Immersive VR user experience to your needs (I)

- Configurable Immersive UI
  - Preconfigured UI for different use cases
    - Basic
    - Targeted for Review & Markup
  - Advanced
    - Contains all functions exposed
    - Targeted for expert user for DMU studies
- Custom
  - Users can edit the (XML) configuration file and tailor to their needs
Tailor your Immersive VR user experience to your needs (II)

- Configurable Controller
  - Allows you to change mapping of buttons to actions
- 3D Cursor
  - Provides you with the ability to select any JT dataset and attach it to the hand controller
Specific Functionalities in Immersive

- **Teleporting**
  - A way to get around without having to walk …
- **3D Markup**
  - „True“ 3D Markup leveraging the immersive controller to define paint location in 3D
- **3D Navigation**
  - Use trackpad to navigate
PLM integrated VR at a Keypress

- Information readily available to the users
  - Teamcenter Visualization with VR capabilities directly connected to Teamcenter
    - Access to bulk data without any additional conversion process requirements
    - Rich set of configuration and persistence mechanisms
    - Integrated DMU functions
  - Analysis & Issues found in VR managed in Teamcenter leveraging existing Teamcenter Visualization Sessions, Snapshots, Markups etc.
Functionality

- Relevant base functions accessible in Immersive Environment
  - **Use of Snapshots** with their associated assets (e.g. behaviors) to quickly „get to the point“
  - Selection, Pre-highlighting to interact with the model
- **Sectioning**
- **Part Manipulation**
- **Measuring** – also precise!
- Multiple Selection
- **3D-Markups**
  - Markups as Label (Part Name)
- **Collision** Check/Clearance
DMU functions in Immersive

- Major analysis functions directly accessible
  - Section to cut through the mist
  - Measure to understand impact
  - Move parts to disassemble
  - Check Collisions to understand form & fit
- Automatically disassemble to understand maintainability

Link to the YouTube Video:
https://youtu.be/xNWr6Y1PN-o
CONFERENCING

- Do you remember the silos?
CONFRENCING

- Conferencing via Remote Sites
- Low Bandwidth needed
- Synchronized Actions i.e.
  Part Manipulate, Markups,
  Sections,..
**Benefits**

- Improve productivity during design reviews by allowing users to interact with the product in an immersive virtual reality environment.
- Reduce costs by leveraging a new generation of virtual reality devices while evaluating the digital twin.
- Develop better products by making realistic spatial trade-off decisions during digital mockup.
- Increase manufacturability and serviceability by enabling users to better assess line of sight and part reachability.
- Maximize the value of your PLM managed CAD data using ISO-certified JT files.
- Minimize training time and learning curve through a familiar Teamcenter Visualization interaction paradigm.
- Real sized models before production starts let you see problems before they get too expensive.
- Overview in complex models.
- Remote collaboration.
- Work done in VR is stored in PLM and can be passed on to others.
What did we see?

- Virtual Reality directly integrated in Teamcenter Visualization
  - Single User like HTC Vive, Oculus Rift, ZSpace – also Cave is supported
  - No Conversion

- Rich set of relevant DMU functions integrated, from basic navigation to advanced
  DMU tools like collision check, exact(!) measurement, behaviours, path
  generation and animations

- Remote collaboration within the same VR environment

- Tight integration in Teamcenter – start the VR session directly from your PLM
  system – also saving Sessions with Markups, Snapshots in TC
  - Also standalone, of course
Thank you for your Attention
Explore the Infinite Possibilities of Point Cloud JT
Dr.-Ing. Alexander Christ
Elysium

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Point Cloud JT
Digital Trainings, Meetings & Inspection

- Collaborate virtually inside your digital twin
  - Facilities
  - Production lines
  - Customer environments
- Use the Oculus Rift for an immersive VR experience
- Communicate and share information in real-time
Experience Point Cloud JT

Link to the YouTube Video: https://youtu.be/v7yPkJrBrfg
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