

Benefits of Cloud-based Apps for Simulation: Pedestrian Safety



Collaborative Cloud Modeling with quick decision making for Virtual Prototyping

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October 16, 2018

Processes & Workflows

Lots of manual work

Data

Expertise

Time



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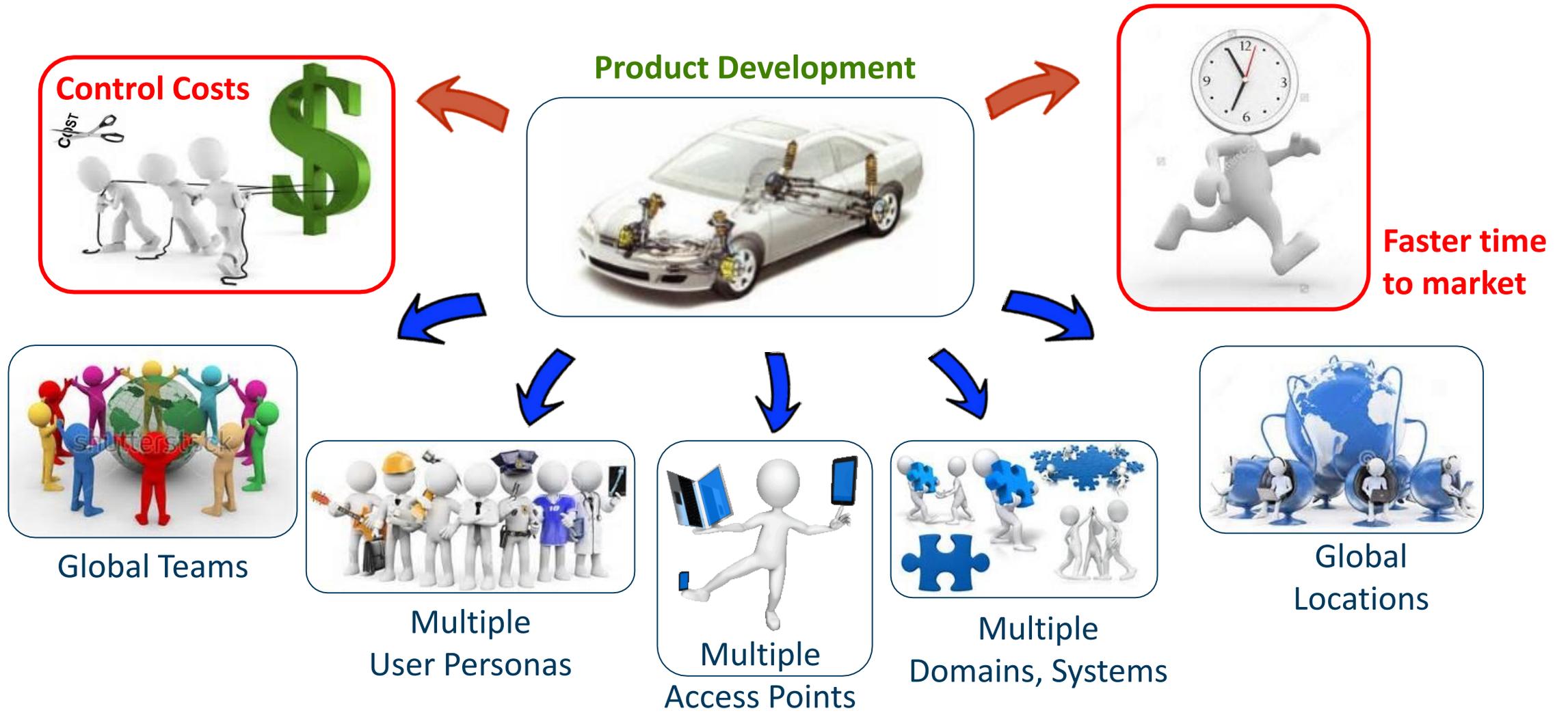
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Collaborative Cloud Modeling with quick decision making for Virtual Prototyping

Equipment

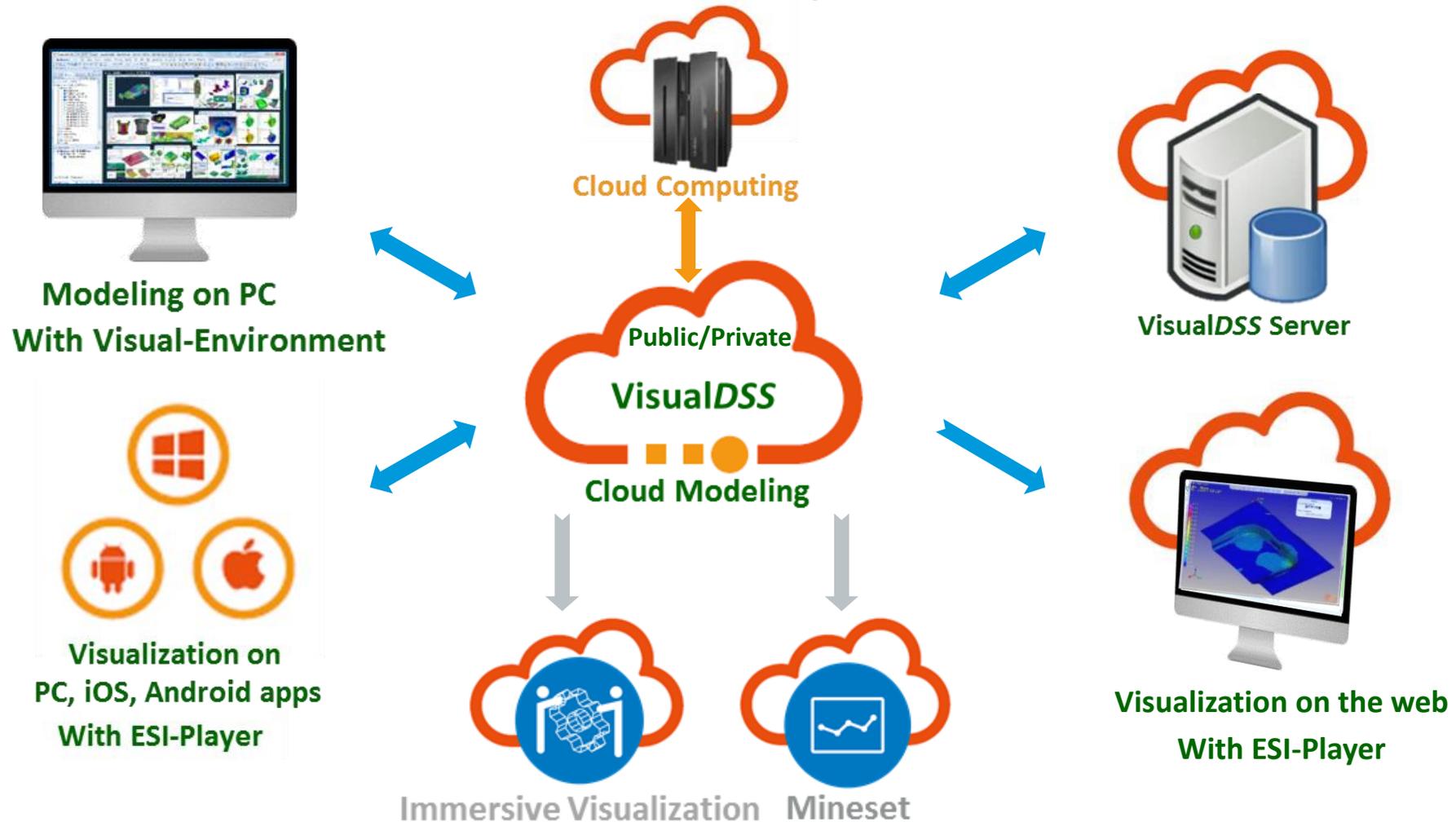
Know-how

Industry Challenges



VisualDSS Cloud

The Smart and Collaborative Cloud Modeling Platform for Virtual Prototyping

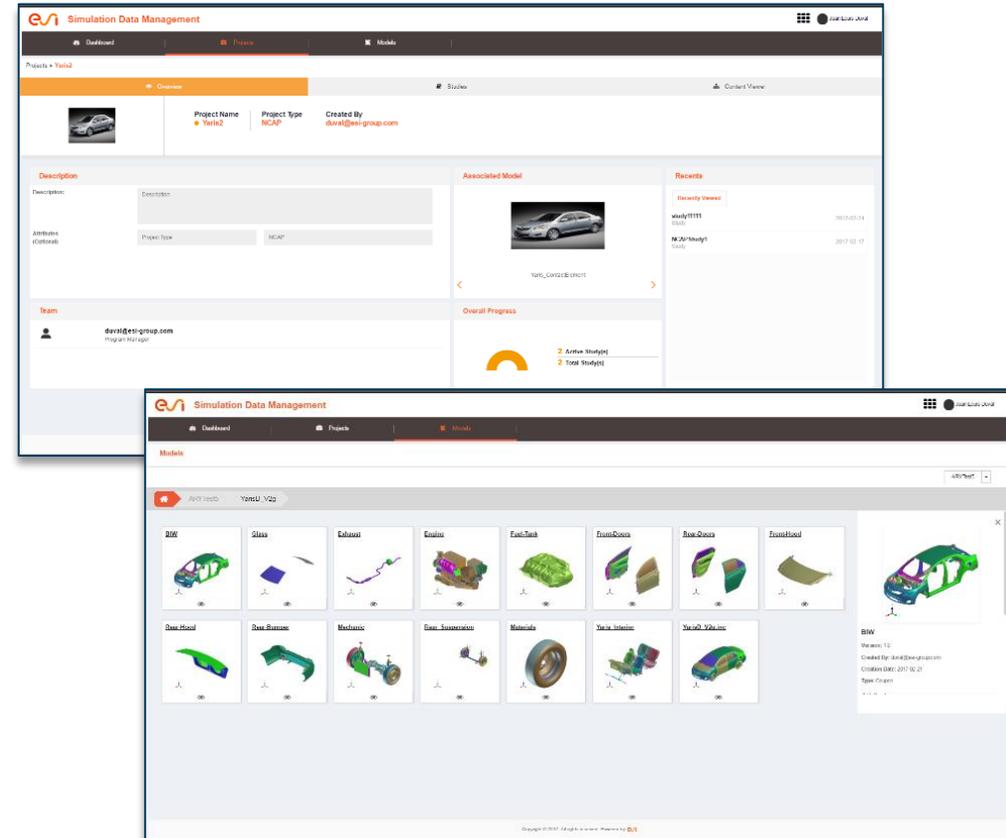


VisualDSS Cloud

- **Fully Cloud-based with support for**
 - Private Cloud – On Premise installation
 - Public Cloud
- **Collaborative Platform**
 - Multi-domain **CAE simulation platform** supporting various physics
 - **Different devices (smart phones, tablets, etc.)**
 - **Customizable** at task, process and solution levels
 - **Connects to Visual-Environment to execute CAE processes**
 - **Connects to HPC clusters**
- **Organized as Apps**
 - Built-in modules: **Simulation Data Management (SDM)**, **ESI-Player (Visualization)**, etc.
 - Customized solutions & Vertical Apps: e.g. **Pedestrian Protection**

Simulation Data Management (SDM)

- Manage **Projects/Studies**
- **Visualize** Simulation Content.
- **Share** Studies and **Review** models
- Manage **Single Core Model** (multiple domains)
- **Multiple CAE** representations
- **Sync CAD/CAE** representations
- Manage **Versions/Revisions**

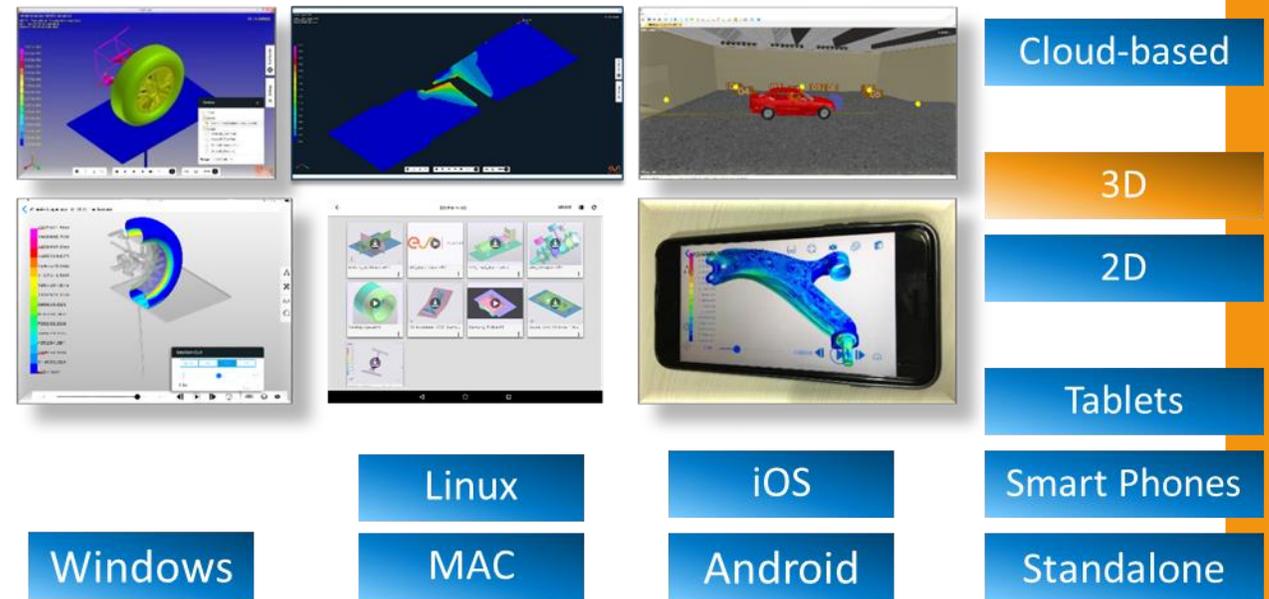
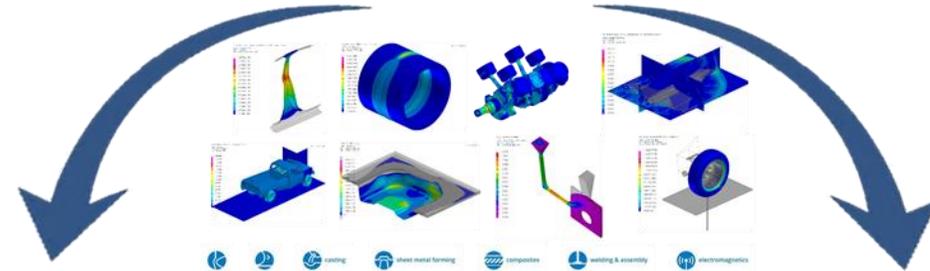




PLAYER

A lightweight visualization solution

- Served by VisualDSS on Cloud
- Direct reading of Result files
- Contour manipulation, Section Cut, Overlay, Part Table, MOR
- Connect from Visual-Environment



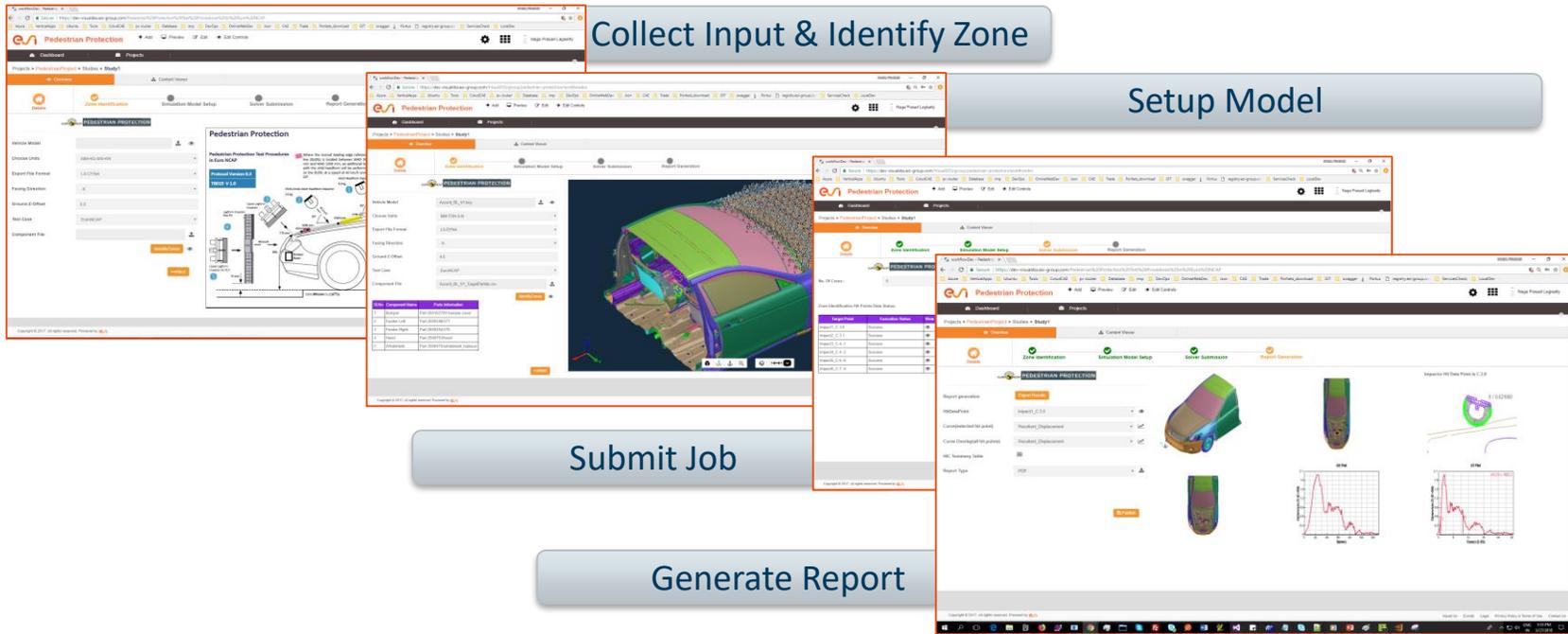
Support for different platforms and devices



Pedestrian Protection App

Cloud-based Pedestrian Protection App

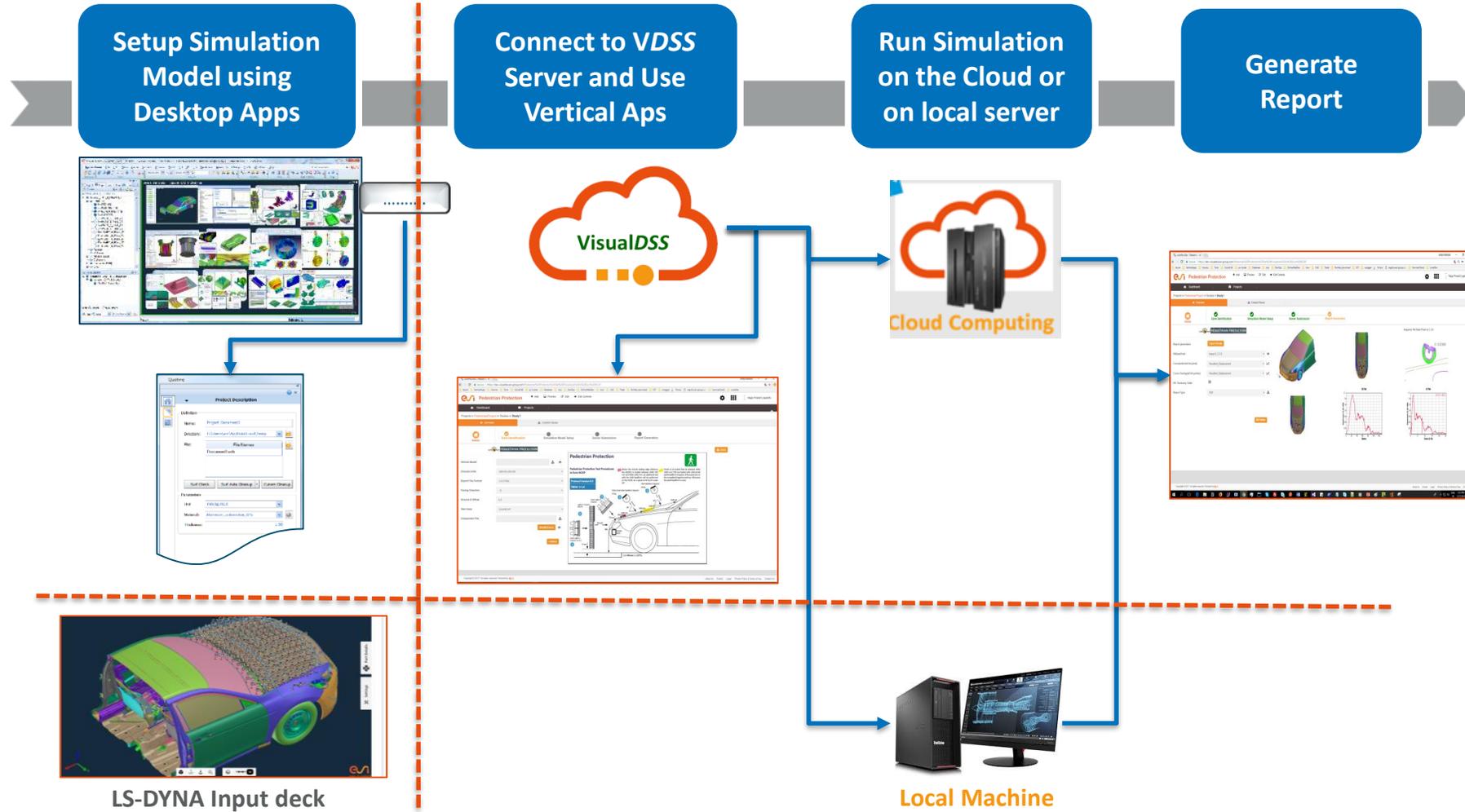
Vertical App for Pedestrian Head Impact: EuroNCAP



Pedestrian Protection App on VisualDSS Cloud (Azure) without direct submission to LS-DYNA solver

Cloud-based Pedestrian Protection App

How to use the app?



Cloud-based Pedestrian Protection App

Step 1: Collect Input & Zone Identification

The screenshot displays the 'Pedestrian Protection' application interface. The top navigation bar shows the workflow: Zone Identification (active), Simulation Model Setup, Solver Submission, and Report Generation. The left sidebar contains configuration options for Vehicle Model, Choose Units, Export File Format, Facing Direction, Test Case, and Component File. The central workspace shows a 3D model of a car with a pedestrian protection zone identified. A table of component names and part information is visible in the bottom right of the workspace.

Sl No	Component Name	Parts Information
1	Bumper	Part 200102781 Bumper cover
2	Fender Left	Part 2000248071
3	Fender Right	Part 2000252275
4	Hood	Part 2000751hood
5	Windshield	Part 2000470Windshield_toplayer

- Collect Input

- ▶ Vehicle Model
- ▶ Model Unit System
- ▶ Vehicle Facing Direction
- ▶ Ground Offset
- ▶ Component Data

- Zone Identification

- ▶ Batch mode execution of zone identification process
- ▶ Model annotation with adult/child target point
- ▶ Target point available for download

Cloud-based Pedestrian Protection App

Step 2: Simulation Model Setup

The screenshot displays the ESI Pedestrian Protection web application interface. At the top, a progress bar shows four stages: Zone Identification (completed), Simulation Model Setup (current step), Solver Submission, and Report Generation. The main interface includes a sidebar with navigation options like Dashboard, Projects, and Details. The central area shows the 'Simulation Model Setup' configuration, including fields for Vehicle Model, Impactor Model, Component File, and Units. A table titled 'Select RunId's for ModelSetup' lists various impactor configurations. Below the table, there are six 3D visualizations of a vehicle model with impactor positions marked, labeled as impact_C4.2, impact_C4.6, impact_C3.8, impact_C3.1, impact_C3.4, and impact_C3.1.

RunId	Tx	Ty	Tz	Alpha	Beta	IV
✓ C.3.0	604.282	0.213	909.595	0.000	50.000	11100.000
✓ C.3.1	604.282	100.213	907.735	0.000	50.000	11100.000
✓ C.4.1	703.136	100.213	922.945	0.000	50.000	11100.000
✓ C.4.2	703.136	200.213	917.868	0.000	50.000	11100.000
✓ C.6.6	901.496	600.213	922.692	0.000	50.000	11100.000
✓ C.7.-4	1000.882	-399.787	940.470	0.000	50.000	11100.000

- Simulation Model Setup
 - ▶ Information from previous step is carried forward
 - ▶ Select Impactor Model
 - ▶ Select target points for model setup
 - ▶ Batch mode execution of model setup process
 - ▶ View the positioned impactor for selected points
 - ▶ Option to download the data after model setup

Cloud-based Pedestrian Protection App

Step 3: Solver Submission

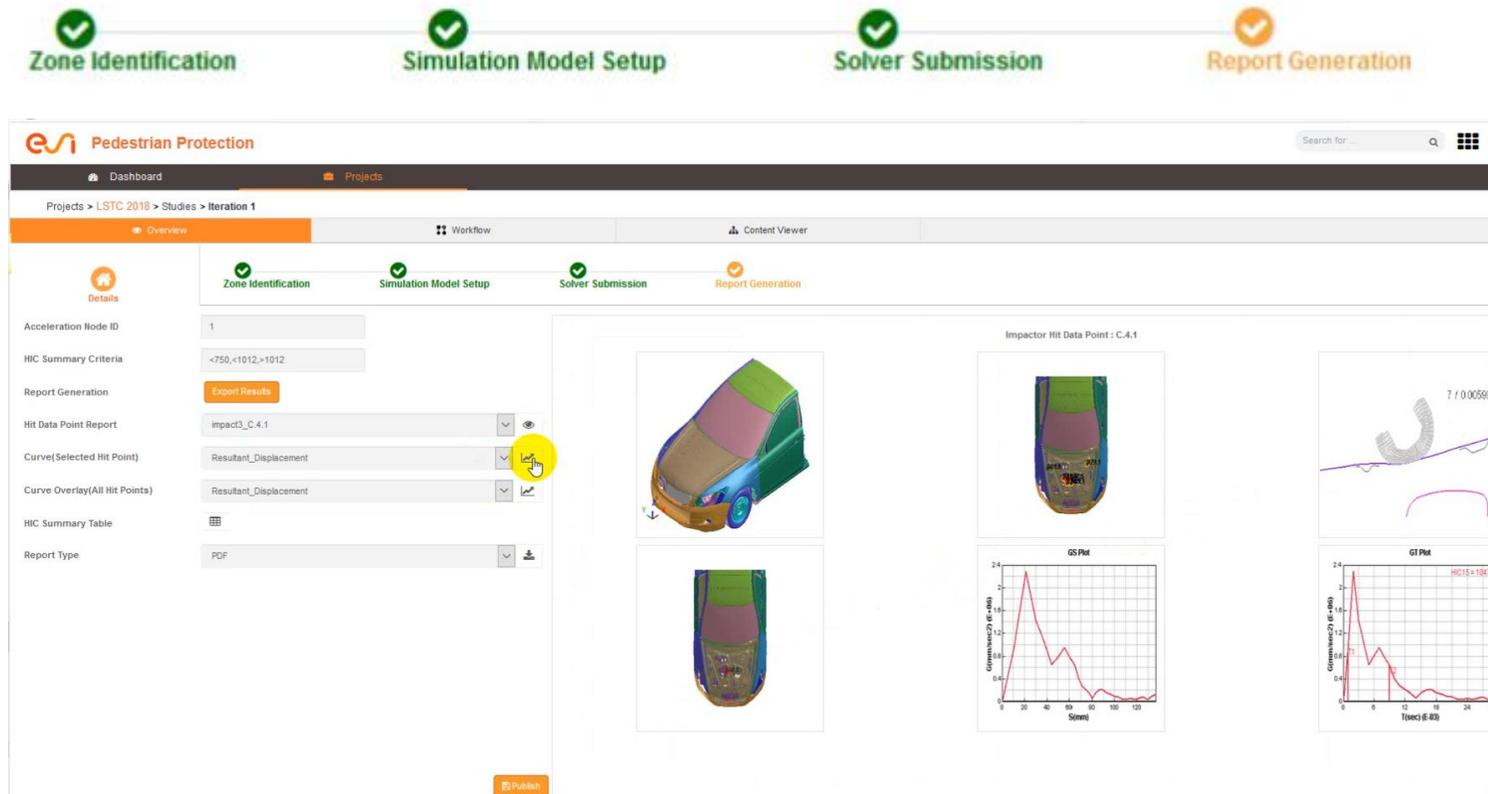
The screenshot displays the ESI Pedestrian Protection web application interface. At the top, a progress bar shows four steps: Zone Identification (completed), Simulation Model Setup (completed), Solver Submission (current step, highlighted in orange), and Report Generation (pending). Below the progress bar, the application header includes the ESI logo, the text 'Pedestrian Protection', a search bar, and navigation tabs for 'Dashboard' and 'Projects'. The main content area shows the 'Projects > LSTC 2018 > Studies > Iteration 1' path. A sub-progress bar indicates the current step is 'Solver Submission'. On the left, there are controls for 'Simulation' (On Cloud or On Local Machine/Cluster), 'Download Model Setup Data', and 'Result folder' (set to 'PedestrianResultsPedestrian_Demo_Project/PP_Iteration_1'). Below these are options to 'Upload results to directory:' and a table titled 'Zone Identification Hit Points Data Status:'. The table has columns for 'SI No', 'Target Point', 'Execution Status', and 'View'. The main right-hand area shows a 3D CAD model of a car's interior and chassis, with various components highlighted in different colors (purple, green, orange, brown). A toolbar at the bottom of the 3D view includes navigation and playback controls.

SI No	Target Point	Execution Status	View
1	impact1_C_3.0	Success	👁
2	impact2_C_3.1	Success	👁
3	impact3_C_4.1	Success	👁
4	impact4_C_4.2	Success	👁
5	impact5_C_6.6	Success	👁
6	impact6_C_7_4	Success	👁

- Solver Submission
 - ▶ On Cloud
 - Select number of cores
 - Specify solver license path
 - ▶ On Local HPC Cluster
 - Submit data downloaded from previous step on local HPC cluster
 - Upload results for review
 - ▶ View the results in ESI-Player

Cloud-based Pedestrian Protection App

Step 3: Report Generation



- Report Generation

- ▶ Input

- Acceleration Node ID
- HIC Summary Criteria

- ▶ Batch mode execution of report generation process

- ▶ Results available for review

- Acceleration and Displacement plots
- HIC Summary table
- Option to download report in ppt/pdf format

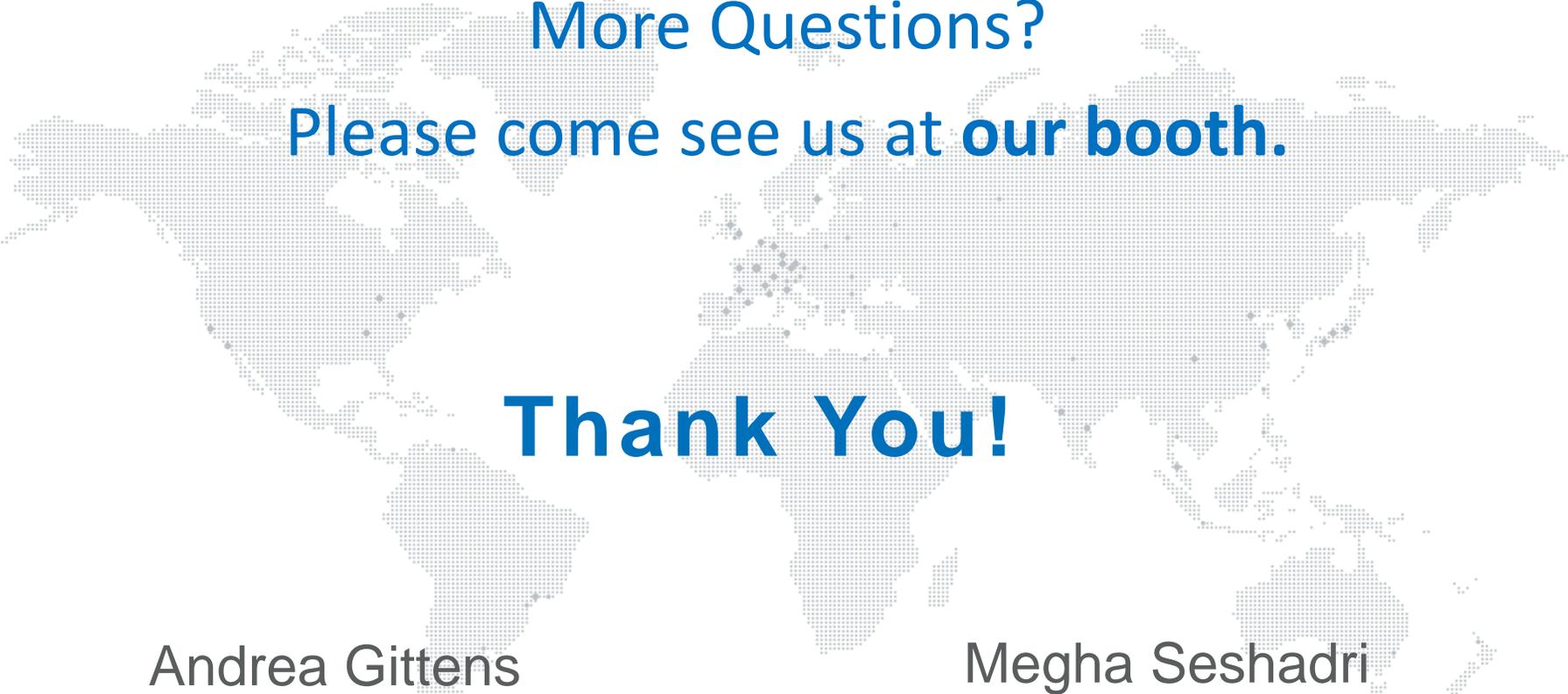
Demo

Conclusion

Vertical Apps support CAE Democratization

- **Customize** the solution to extend and simplify its adoption
- **Link** necessary solutions in a single environment
- **Automate** the process
- **Cloud based applications** with integrated simulation methodologies and workflow tools
- **Fit-for-purpose tool** with easy accessibility from anywhere





More Questions?
Please come see us at **our booth.**

Thank You!

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