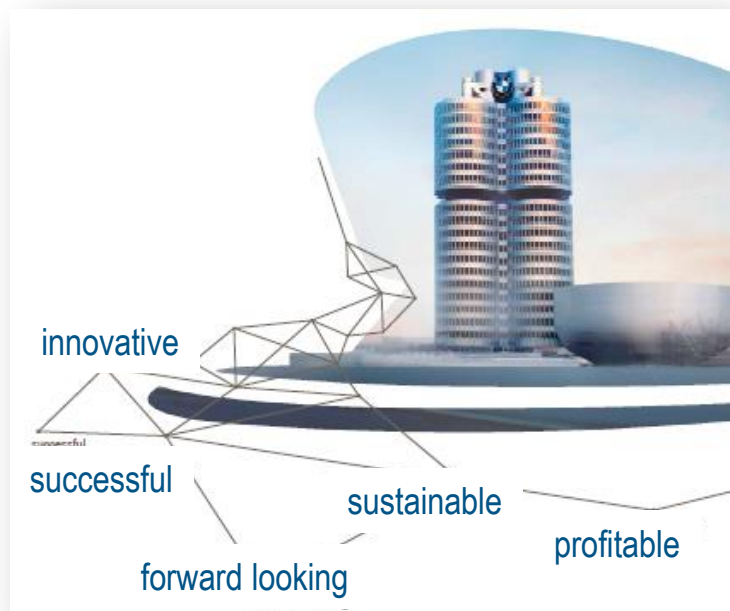




**3DEXPERIENCE®**

Dr.-Ing. Bernhard Behr, Client Director BMW,  
bb3@3ds.com

# The BMW Way of Innovation in the Premium Car Segment



# Introduction - Strategy

BMW's strategy focuses on premium cars and services for individual mobility

**BMW GROUP.  
STRATEGY NUMBER ONE.**

15 new models in 2015

**2014 figures:**



- 2.117.965 vehicles (+ 7,9%)
- 123,495 motorcycles (+ 7,2%)
- Asia: 656.395 (+ 13,8%)
- Europe: 914,587 (+ 6,5%)
- Americas: 482,257 (+ 4%)
- 16.052 i3; 1.741 i8
- Revenue: 80,4 bn€ (+ 5,7%)
- Invest/revenue: 7,6%
- EBIT automotive: 9,6%
- Group net profit: 5,82 bn€
- Workforce: 116,324 (+ 5,4%)

# Introduction - Objectives

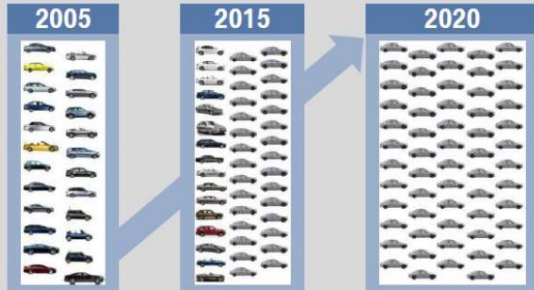
Operational execution focuses on efficiency and combines evolution + revolution



# Introduction - Execution

Efficiency in all disciplines is of paramount importance

OUR GOAL: TO MANAGE A THREE-TIMES LARGER PORTFOLIO WITH RESOURCES THAT HAVE NOT INCREASED PROPORTIONATELY.



Without a Modular Strategy, a three-fold increase in model numbers would send costs and resources spiralling along the process chain. The Modular Strategy enables shorter development cycles and enhanced flexibility in our plants.

THE MODULAR STRATEGY IS THE ENABLER FOR THE EXPANSION OF THE BMW GROUP MODEL RANGE.

**Architectures**  
Underbody  
e.g.:  
- Front seat attachments

**Modular product**  
Modular front seat  
Common elements  
e.g.:  
- Structure  
- Head restraint

**Modular system**  
Front seat attachment  
e.g.:  
- Standardised seat installation process

Shorter development time  
Shorter time to market

Lower investment costs  
Lower manufacturing costs

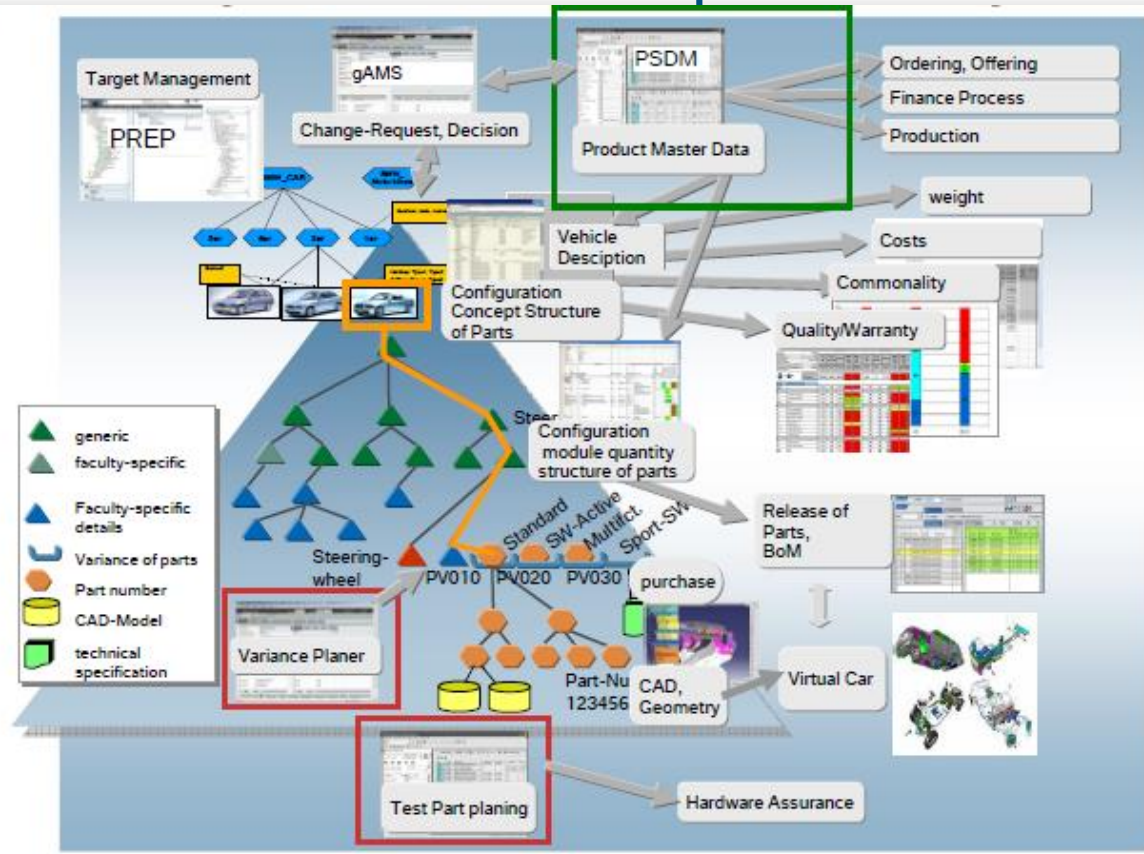
Lower development costs  
Lower fixed costs

CATIA V5 R2014x since Nov 2014, ~4500 users; SIMULIA: world largest crash community, ~500; DYMOLA: world largest community on hybrid propulsion systems simulation; DELMIA: ergonomic studies, ~1000 users; AUTOSAR: ~150 users; 3DEXCITE: ~100 users in engineering + marketing sales: 2500 retailers ww (car configurator)



# BMW R&D IT Landscape Innovation

09.04.2010  
Page 3



## Efficiency programs:

- Increase the collaboration between R&D, Manufacturing & Purchasing
- Standardize Configuration Management
- Introduce a new integrated PDM for Production and Logistics
- Reduce # of strategic IT service providers
- Define new service agreements with strategic IT service providers to increase agility in IT and purchasing

# BMW "Virtual Car Process"

New Car Definition Phase

Initial Phase

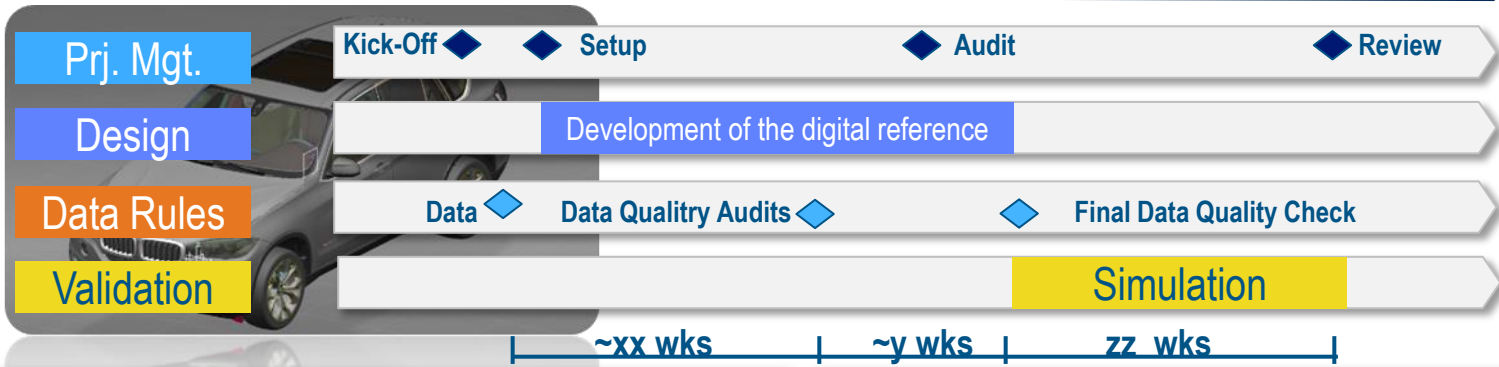
Architecture Concept

Product Concept Phase

Series Development Phase

Start of Production

Virtual Prototypes



Geometry

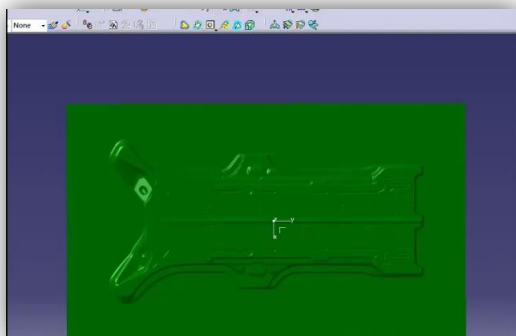


Functional data from various simulations, i.e. FEA

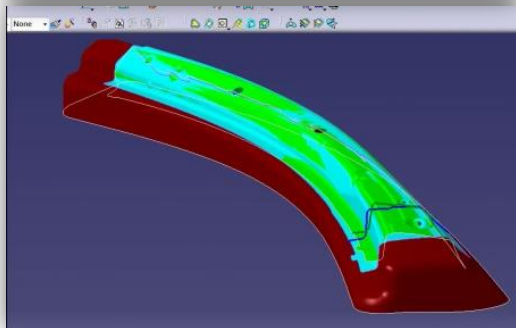
<p>Geometry</p> <p>DMU, Packaging, Virtual process week: manufacturability</p>	<p>Function</p> <p>NVH, CO2, ...</p> <p>Simulation with full crash car model</p>	<p>KPI checks: weight, costs, Etc.</p>
--------------------------------------------------------------------------------	----------------------------------------------------------------------------------	----------------------------------------

# BMW example: efficient BiW functions

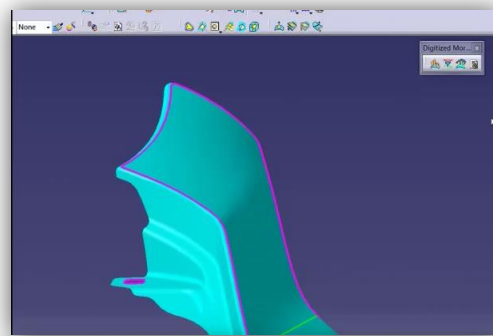
Examples for Evolution: xx% efficiency gains with CATIA V5 R2014x



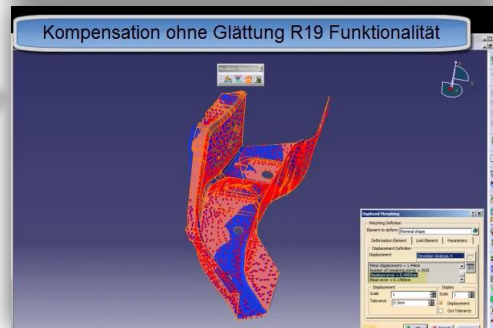
*Data quality  
Improvements for  
symmetry  
operations*



*Automatic surface  
replacement for  
spring back  
compensation*

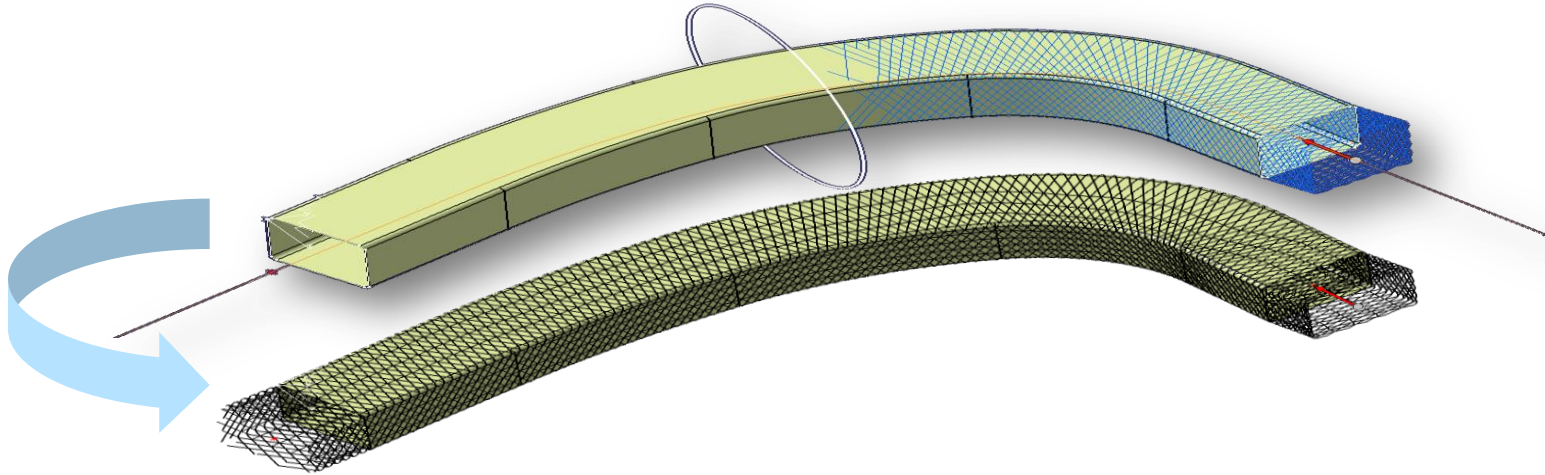


*Data quality  
improvements  
for complex cutting  
operations of die faces*



*New surface smoothing  
operators to increase  
surface quality*

# BMW example: Joint development in braiding

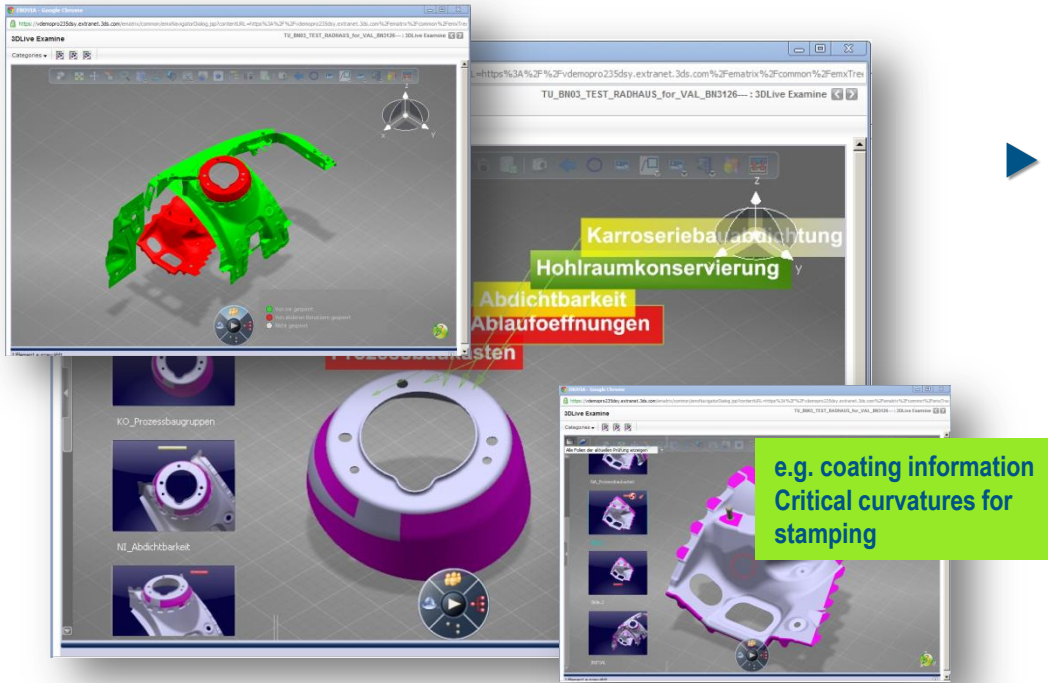


- Braiding simulation is a mission critical application for the development in the carbon domain
- Joint BMW/3DSdevelopment in CATIA V5-6 R20



# BMW example: efficient production checks

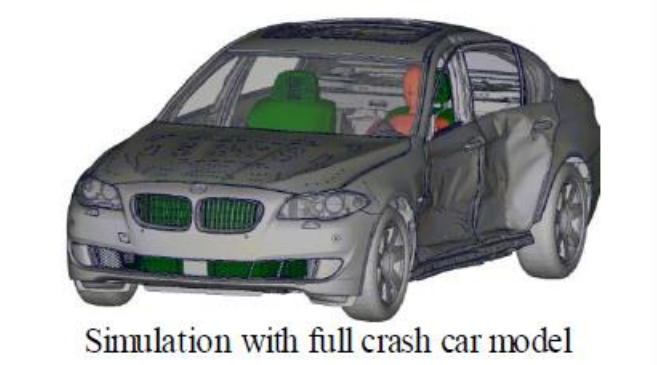
Examples for Evolution: xx% efficiency gains based on V5 manufacturability checks



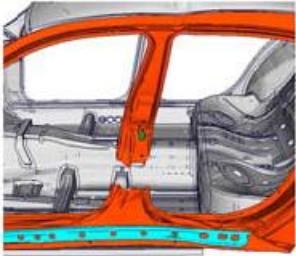
- ▶ Enrich with own information, e.g.:
  - ▷ 3D Sectioning
  - ▷ Redlining information with annotation features
  - ▷ Added information propagated to downstream users/suppliers via EXCEL export

# BMW example: crash & prediction of crack initiation

Confidential Information | 4/9/2015 | ref.: 3DS\_Document\_2014



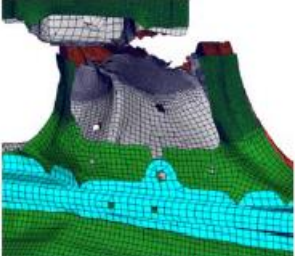
**SIMULATION**



Simulation



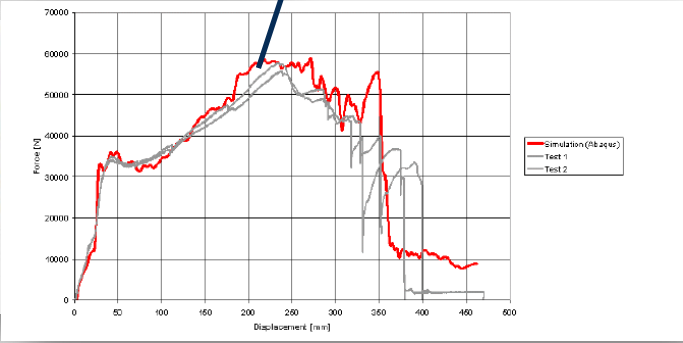
Experiment



Simulation

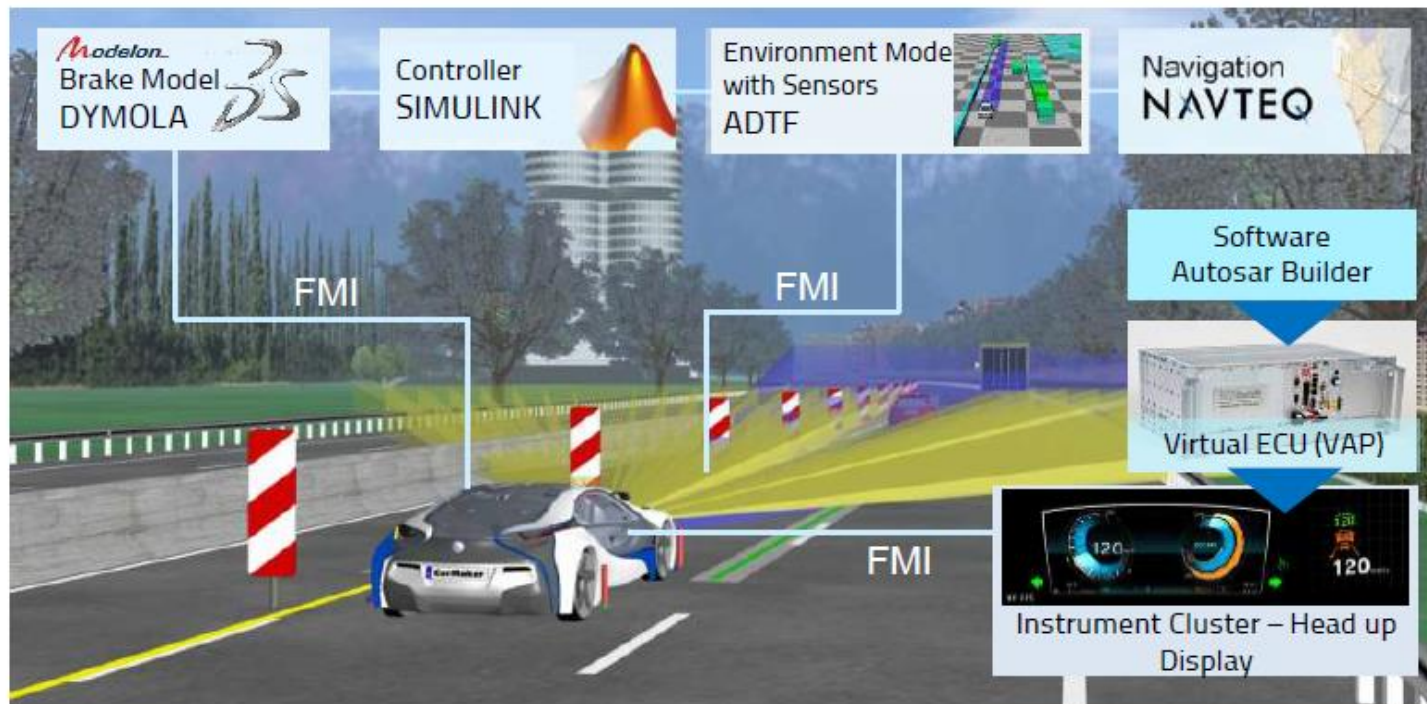


Experiment



# BMW example: System simulation

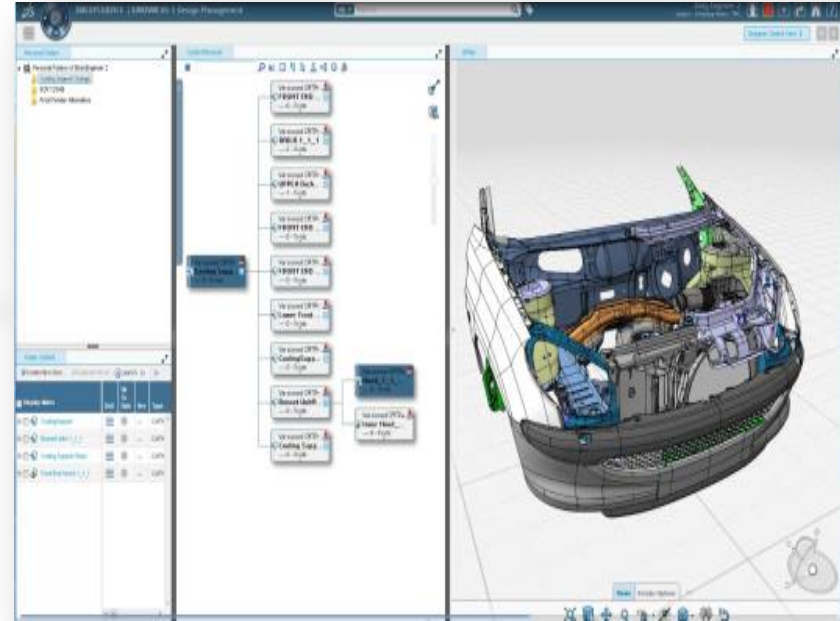
## Multiple function behavior testing Adaptive Cruise Control and Emergency Brake Assistance



# Where to go from a 3DS Perspective

The 3DEXPERIENCE provides IT based step-by-step innovation

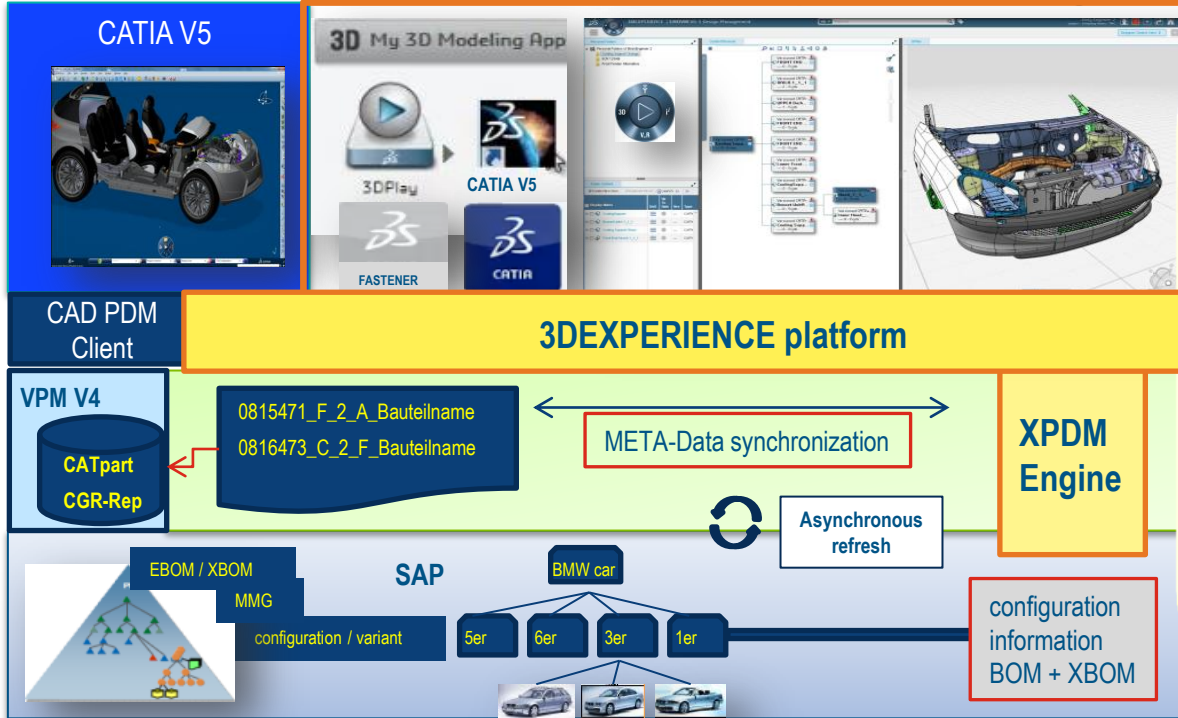
- ▶ Progressive transition towards 3DEXPERIENCE as CV5 successor including team data management
- ▶ Single source of truth, avoidance of redundant data formats – manage multiple representations from different sources and across disciplines
- ▶ Configured DMU: Viewing, DMU analysis, collaboration, planning tasks in a configured environment – take into account the product variants
- ▶ Protected collaboration with engineering partners, CLOUD option
- ▶ Extended collaboration tools (validation, review)
- ▶ Mobile device support
- ▶ Reduction of IT systems - cost reduction





# New Approach with 3DEXPERIENCE Platform

The 3DS innovation: Collaboration platform, configurable environment



# New Approach with 3DEXPERIENCE Platform

The 3DS innovation: Collaboration prototype with seamless V5 coexistence

The screenshot displays the 3DEXPERIENCE platform interface for the 'Planungs Cockpit EK-XXX Rohkarosse' project. The interface is divided into several sections:

- Projects Overview:** A grid of project thumbnails, each with a 3D model and project name. One thumbnail is circled in orange.
- Projects Details:** A table listing project details. One row is circled in orange.
- Metrics:** Three bar charts showing 'Pending Tasks', 'Pending Issues', and 'My Pending Tasks by Project'. One bar chart is circled in orange.
- BOM PowerView:** A section showing the Bill of Materials (BOM) for a selected part, including a 3D visualization of the part. One part is circled in orange.

Name	Type	Description
P-000100	Project Space	0
P921223_EXTERIOR_X15	Project Space	Umfang P921223
P921230_UNTERFLUR_X15	Project Space	P921230__A__1__A_SP_V15
P6G5989_HECKKLAPPE_X15	Project Space	P6G5989 HECKKLAPPE_X15
P921235_UNTERBAU	Project Space	P921231 UNTERFLUR_X15
P925291_FRONTKLAPPE_X15	Project Space	P925291 FRONTKLAPPE_X15
P921227_TUER_HI_X15	Project Space	P921227 TUER_HI_X15
P921232_UNTERBODEN	Project Space	007131 UNTERBODEN

Projects Overview

Projects Details

BOM PowerView

3D Visualization

Up to date Metrics by project

# Summary

The change is happening now based on efficient combustion engines, alternative drive trains, alternative materials, as well as mobility services (APPs) → supported by dedicated IT landscape refurbishments

