



Prozess-
und IT-Beratung



Individual-
Softwarelösungen



Integrationsplattformen
und Werkzeuge



Standard-
Softwarelösungen

P|D|Tec.

Simulation Data Management for CarMaker

Apply & Innovate TECH WEEKS 2020

P|D|Tec.

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Oct 26th., 2020



Agenda:

- Who is PDTEC
- Simulation Data Management for CarMaker
 - Requirements for data management
 - Solution SDM4CM
 - Live examples
- Summary



Albrecht Pfaff

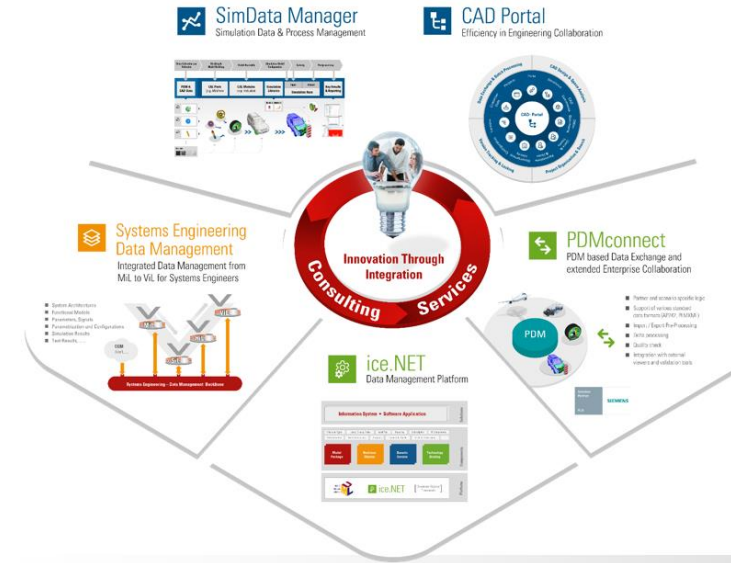


Dr. Alex Ehrler



Who is PDTEC ?

- PDTEC
 - Stands for ... **P**roduct **D**ata **T**echnology
 - Founded 1998
 - Headquartered at Technology Park Karlsruhe, Germany
 - Focus on Engineering Data Management & Data Xchange

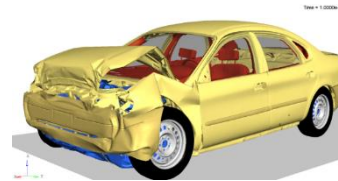
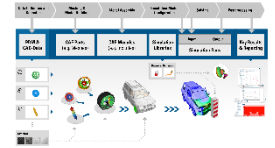


- Innovation through integration

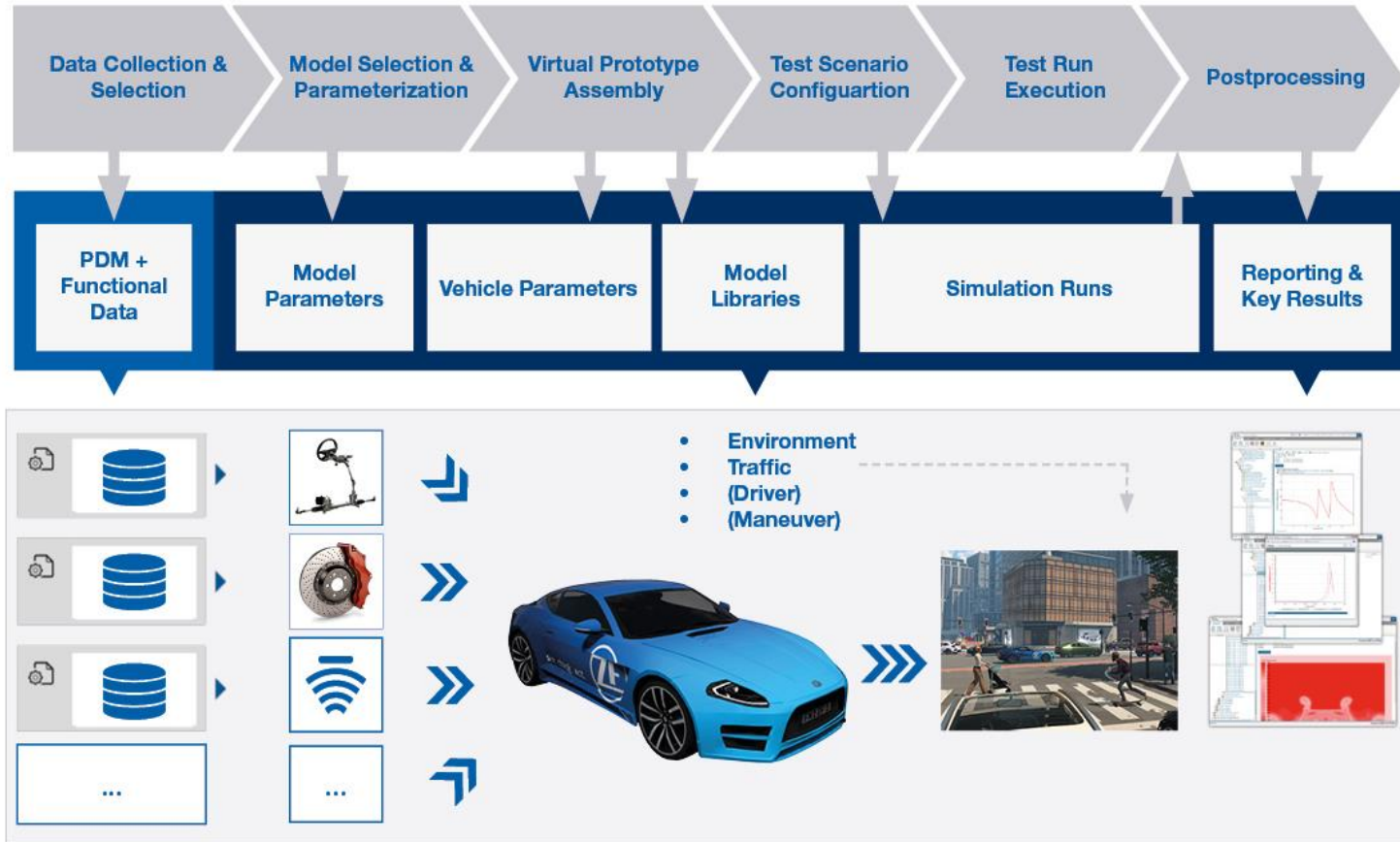
20 1999 - 2019 YEARS **P|D|Tec.**

SimData Manager for CAE data management

- ✓ **MANAGE** the constantly increasing CAE data in a structured (IT) environment
- ✓ **SHARE** CAE data across multiple teams, disciplines, locations, suppliers,...
- ✓ **LINK** CAD & CAE data for simultaneous development
- ✓ **MAP** CAD models to CAE assemblies
- ✓ **RE-USE** FE-models, minimize redundancy
- ✓ **TRACK** and trace the CAE data, simulation results, variants, versions,...
- ✓ **AUTOMATE** simulation process (e.g. workflows, reporting)
- ✓ **CAPTURE** the knowledge of simulations
- ✓ **KEEP** simulation results accessible (compliance)
- ✓ **REDUCE** simulation data (delete rules)
- ✓ **PROTECT** the company IP
- ✓ **INCREASE** engineering capacity & efficiency
- ✓ **IMPROVE** simulation quality



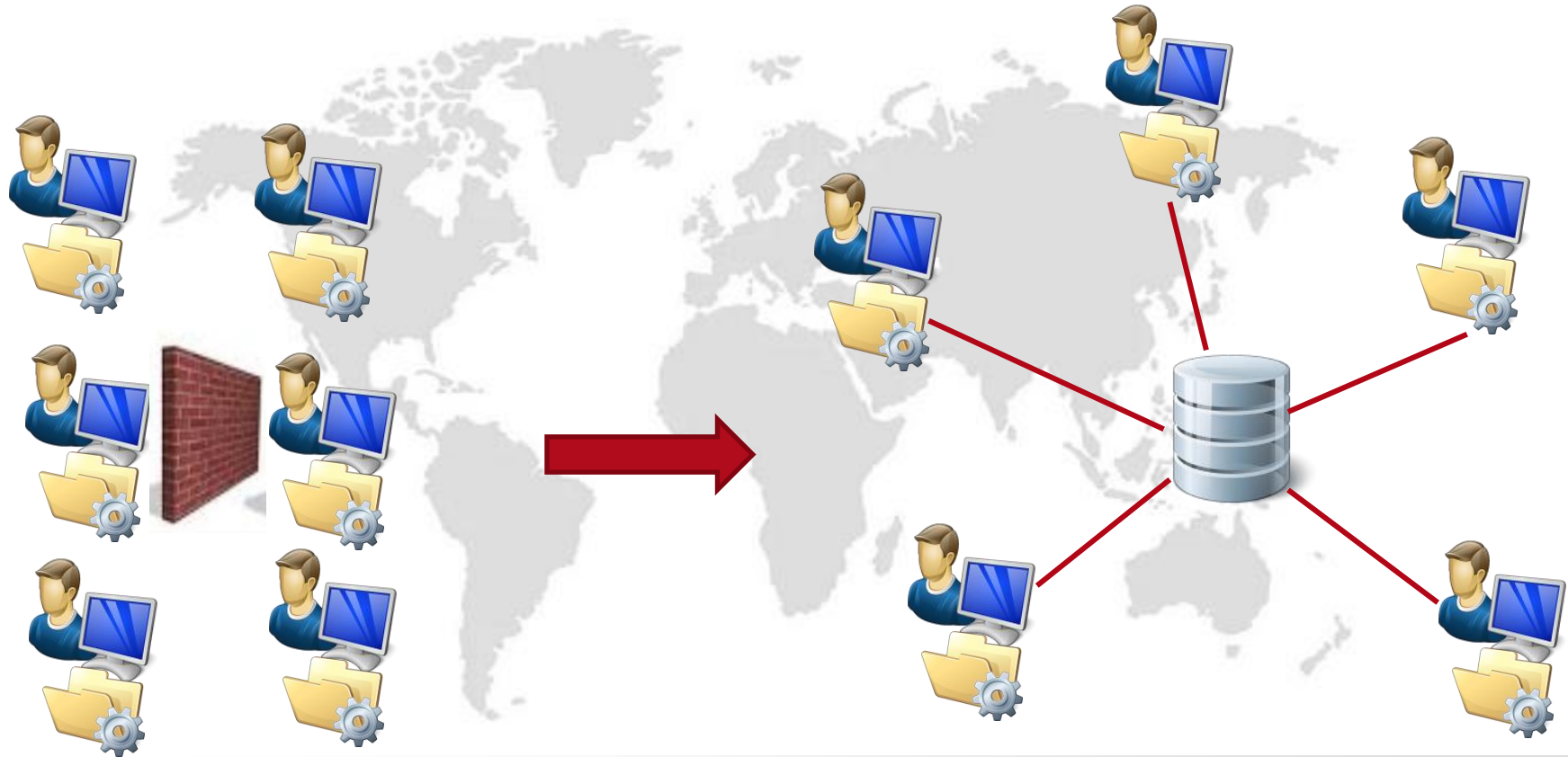
Simulation Process for Virtual Test Driving with CarMaker



Benefits SDM4CM



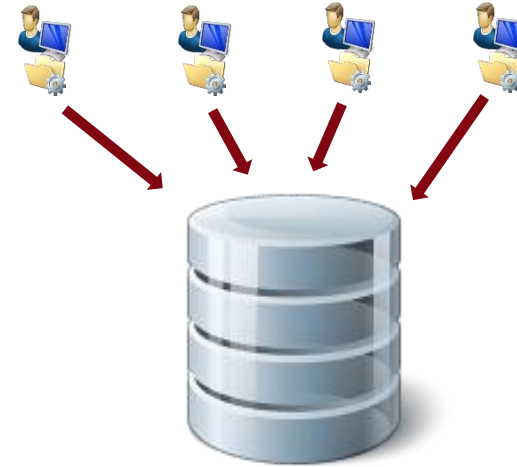
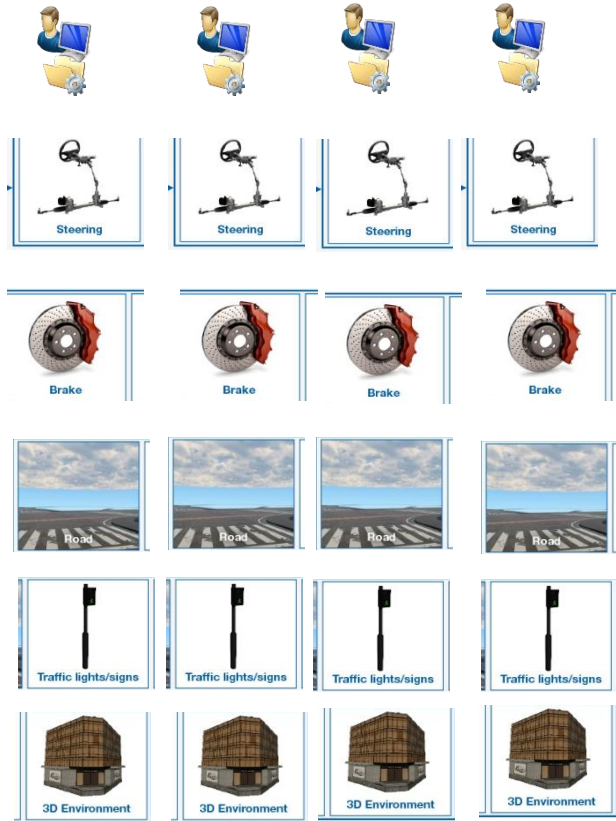
Central Data Storage & Collaboration



Benefits SDM4CM



Links vs. Copies

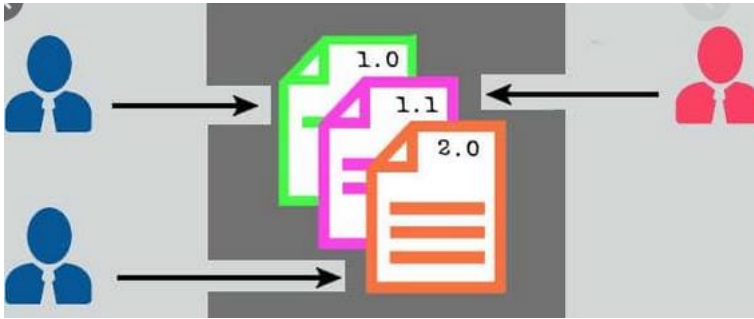


Libraries:

- Models
- Sensors
- Traffic
- Environment
- Parameters
- ...

Benefits SDM4CM

Versions & Variants



Version management

Variant management

Diff, Merge, Compare,...



The screenshot displays the SDM4CM software interface. The top navigation bar includes 'Product Components', 'Configurations', 'Parameter Sets', 'Models', and 'Pools'. The current configuration is 'ZF CarMaker TestRun Master Data/TestRun/LSA_CountryRoad'. The configuration details table is as follows:

Property	Value
Id	24200
Name	Data/TestRun/LSA_CountryRoad
Description	
Pool	Inter48 Pool
Path	Data/TestRun/LSA_CountryRoad
TestRun Description	
Created	6/19/2019 10:14:17 AM [berndt]
Changed	6/19/2019 10:14:17 AM [berndt]

Below the details is a 'Configuration Versions' tree diagram:

```
graph TD; 24200_0["24200.0  
2019-06-19"] --> 24200_5["24200.5  
2019-06-19"]; 24200_5 --> 24200_6["24200.6  
2019-06-19"]; 24200_5 --> 24200_7["24200.7*  
2019-06-21"]; 24200_5 --> 24200_10["24200.10*  
2019-06-21"]; 24200_5 --> 24200_11["24200.11  
2019-06-24"]; 24200_7 --> 24200_8["24200.8*  
2019-06-21"]; 24200_8 --> 24200_9["24200.9  
2019-06-21"]; 24200_11 --> 24200_12["24200.12  
2019-06-24"]; 24200_11 --> 24200_13["24200.13  
2019-06-24"]; 24200_12 --> 24200_14["24200.14*  
2019-06-25"]; 24200_13 --> 24200_14; 24200_14 --> 24200_15["24200.15*  
2019-06-25"];
```


Benefits SDM4CM

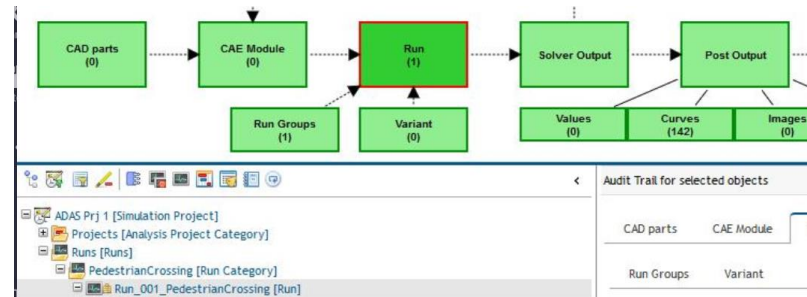


Configurations & Audit Trail



Traceability along the complete simulation process

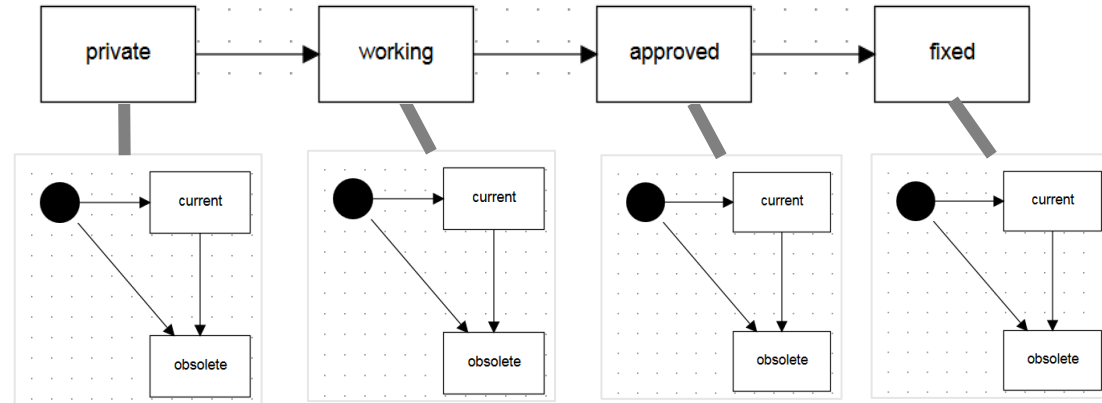
ISO certification



Benefits SDM4CM

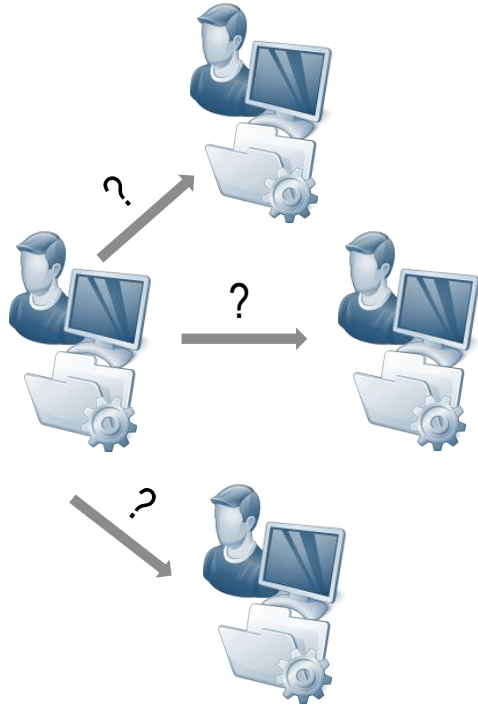


Life Cycle Management



Benefits SDM4CM

Fast & global SEARCH



A screenshot of the SDM4CM search interface. The interface is titled "Search" and includes a navigation bar with options like "Product Components", "Configurations", "Parameter Sets", "Models", "Environments", and "Pools". The search criteria are as follows:

Field	Value
Pool	CM Examples
Type	PD Tec CarMaker TestRun Master
Name	= (exact match)
Description	= (exact match)
Created by	= (exact match)
Created on	=
Changed by	= (exact match)
Changed on	=
Path	= (exact match)
Search with Product Components	<input checked="" type="checkbox"/>
Product Component Type	PD Tec Tire
Name	= (exact match)
Width	= mm
Aspect Ratio	=
Rim Diameter	= mm

The interface also includes a sidebar with "General", "Search", "Debug Mode", "AtlasClient", and "Logout" options.



Benefits SDM4CM

User Management & Access Control



The screenshot displays the 'Pools' configuration page in the SDM4CM software. The page title is 'Pools / PD Tec Carmaker Pool'. The main content area shows the following details for the 'PD Tec Carmaker Pool':

- Id:** 6
- Name:** PD Tec Carmaker Pool
- Description:** PD Tec Carmaker Pool
- Vault Name:**
- Changed:** 2/7/2019 2:27:02 PM [Administrator]

Below these details is the 'Pool Authorizations' section, which contains a table with the following data:

Party	Description	Permissions
<input type="checkbox"/> Administrator		Administration permission (50)
<input type="checkbox"/> Everyone		Read permission (10)

There is a 'Remove' button below the table. Below the table is the 'Add permission' section, which includes a 'Party' dropdown menu set to 'Group Everyone' and a 'Permission' dropdown menu set to 'Read permission'. An 'Add' button is located below these dropdowns.

The interface also features a top navigation bar with 'Product Components', 'Configurations', 'Parameter Sets', 'Models', 'Environments', and 'Pools'. A right-hand sidebar contains icons for 'General', 'Attachments', 'Vault', 'Debug Mode', 'AdasClient', and 'Logout'.

Benefits SDM4CM



HPC integration



SimData Manager

Navigation Edit Inspect New Run configuration Compare Input

Python scripts Debugger

CarMaker Job Submit.sdmjpy

Training_Project_01 [Simulation Project]

- CM_Simulations [Runs]
- Back&Forth [Run Category]
- Run_001 [Run]

Input [Input]

- Data/ResRun/Examples/BackFunctions/Driver/BackAndForth
- Data/Whide/Examples/DemoCar [8258.0]
- Movie/3D/Vehicles/VW_Beetle_2012_top.png [8236.0]
- Data/Time/Examples/RT_195_65R15 [8240.0]
- Data/Plc/VW_Beetle_2012_top.png [8242.0]
- Movie/3D/Vehicles/VW_Beetle_2012_preview.png [8244.0]
- Data/Chassis/Examples/McPherson_FrontAxle.skc [8246.0]
- Movie/3D/Vehicles/VW_Beetle_2012.objInfo [8248.0]
- Data/Plc/VW_Beetle_2012.png [8250.0]
- Data/Misc/HyESP_DemoParam [8252.0]
- Movie/3D/Vehicles/VW_Beetle_2012.mobj [8256.0]

Output [Output]

Submit CarMaker Job

Solver Parameters

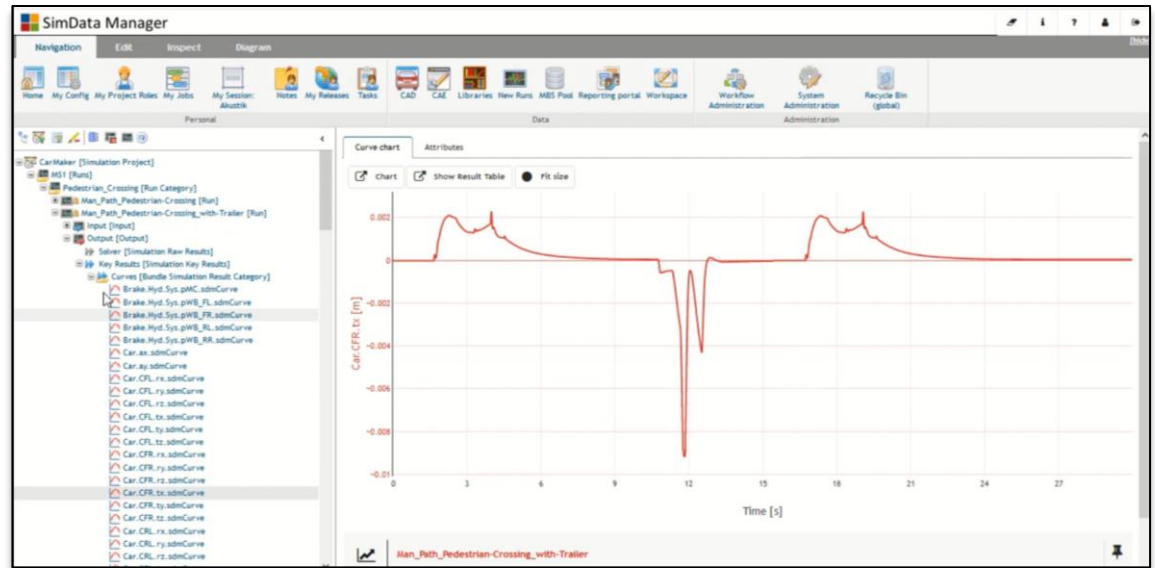
Simulation End Time (tstop) 30

Log

Submit Close

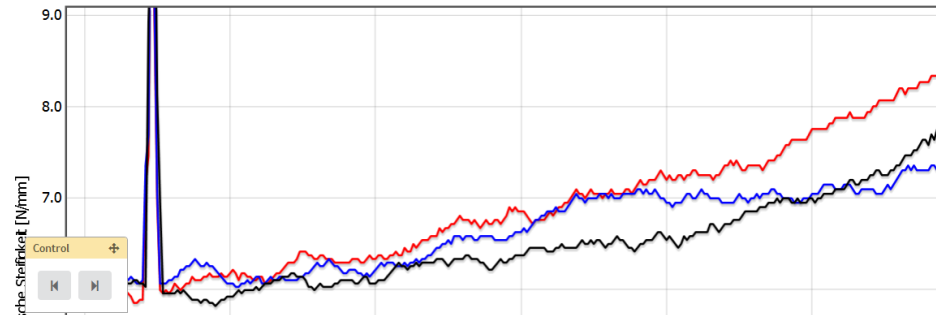
Benefits SDM4CM

Results Evaluation



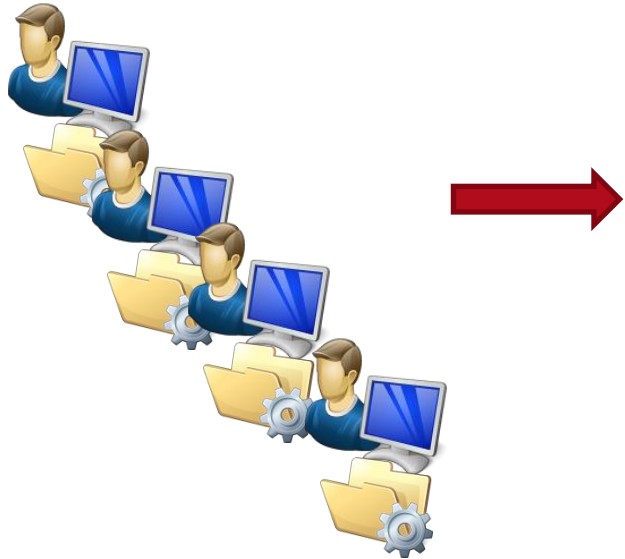
Options (Auswertungspunkt=10011)

Compare	Attribute	Dim1	Dim2	Dim3
Selected [6/6]	LDS	Subsystem	Auswertungspunkt	Richtung
		Anbauteile	10011	x

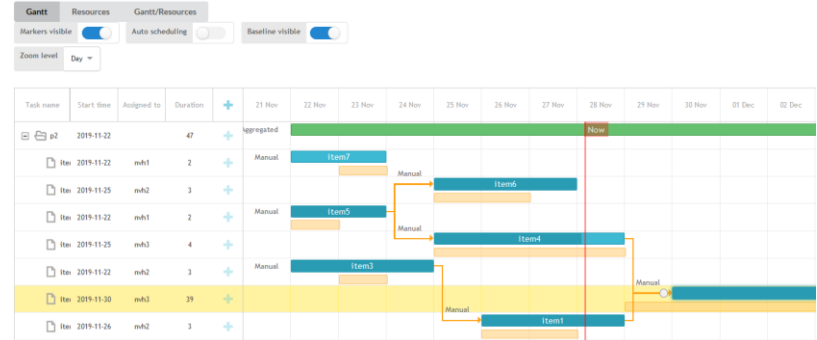


Benefits SDM4CM

Project Management



Name	Description	Assigned to	Progress	Rating	Milestone	Actual start	Actual end	Due date	Planned start	Planned end
Item3		mh2	<div style="width: 100%;"></div>	middle		11/23/2019 1:00:00 AM	11/26/2019 1:00:00 AM		11/23/2019 1:00:00 AM	11/24/2019 1:00:00 AM
Item6		mh2	<div style="width: 100%;"></div>	critical		11/22/2019 1:00:00 AM	11/25/2019 1:00:00 AM		11/23/2019 1:00:00 AM	11/24/2019 1:00:00 AM
Item2		mh3	<div style="width: 100%;"></div>			11/24/2019 1:00:00 AM	11/29/2019 1:00:00 AM		11/23/2019 1:00:00 AM	11/24/2019 1:00:00 AM
Item5		mh1	<div style="width: 100%;"></div>	bad		11/22/2019 1:00:00 AM	11/24/2019 1:00:00 AM		11/23/2019 1:00:00 AM	11/24/2019 1:00:00 AM
Item1		mh2	<div style="width: 100%;"></div>	good		11/24/2019 1:00:00 AM	11/27/2019 1:00:00 AM		11/23/2019 1:00:00 AM	11/24/2019 1:00:00 AM
Item4		mh3	<div style="width: 100%;"></div>			11/22/2019 1:00:00 AM	11/27/2019 1:00:00 AM		11/23/2019 1:00:00 AM	11/24/2019 1:00:00 AM
Item7		mh1	<div style="width: 100%;"></div>			11/22/2019 1:00:00 AM	11/24/2019 1:00:00 AM		11/23/2019 1:00:00 AM	11/24/2019 1:00:00 AM

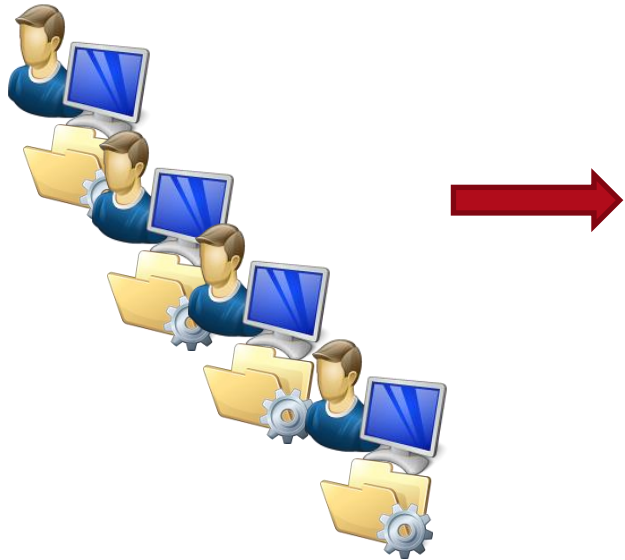


Benefits SDM4CM



Target Value Management

Management View



Agenda:

- Who is PD Tec
- Simulation Data Management for for CarMaker
 - Requirements for data management
 - Solution SDM4CM
 - Live examples
- Summary



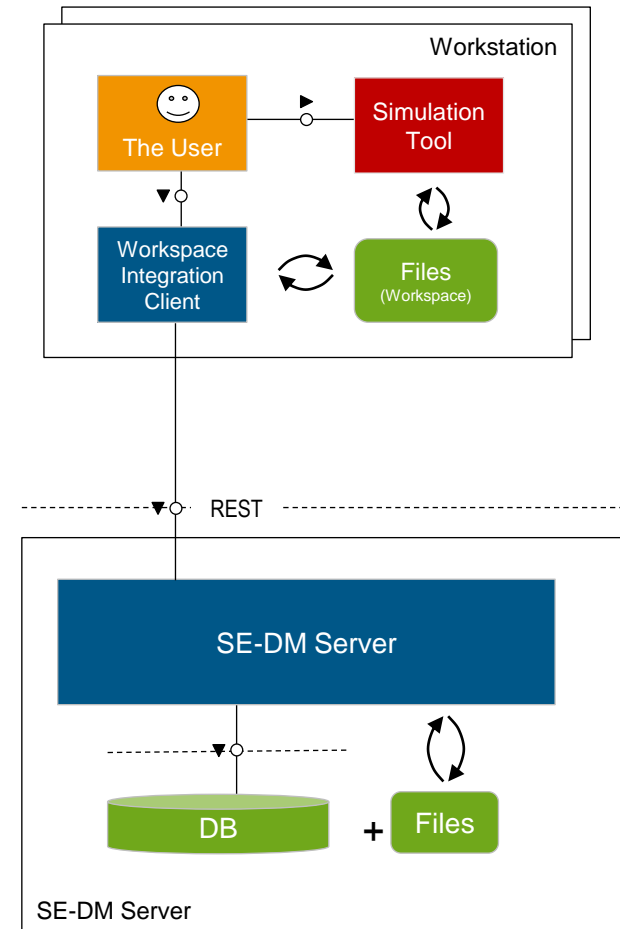
SDM4CM (SDM_for_CarMaker) – Introduction

Background, Objectives

- Virtual Test Drive Simulations require data management solutions to address data volume and data complexity.

Solution

- Generic data management solution for 1D Simulation Input Data
- Specialized data model for CarMaker documents + structures
- Integration into SimData Manager for Job Submit + Post Processing



Simulation Data Management for CarMaker

SDM4CM Enables

- Transparency & Traceability
 - Data Structure Versioning
 - Where-Used Analysis
 - Meta Data & Search Functions
 - ISO 26262 conform
- Collaboration & Reuse
 - References instead of Copies
 - User Workspace Synchronization
 - Branch, Diff & Merge Support
 - Library Data Management
- Security & Organization
 - Central Data Storage & Backup
 - User Management & Access Control
 - HPC / Batch Processing

The screenshot displays the 'CarMaker TestRun Master' interface. The top section shows configuration details for a test run named 'ErsterTestlauf' with ID 1033. Below this, a 'Konfigurationsversionen' (Configuration Versions) diagram illustrates the lineage of configurations, with version 1033.0 (dated 2018-11-08) highlighted in orange. The interface also includes a terminal window on the left showing file scanning progress and a configuration editor on the right with fields for vehicle, trailer, tires, and load.

Simulation Data Management for CarMaker

SDM4CM Features

- HTML Web User Interface
- Workspace Client
- Model, Parameter Set and Test Run Management
- Versioning, Release and Data Freeze Management
- Data Model Customization
- Graphical Structure Views
- Service-oriented Software Architecture
- Scripting / Service Integration API
- HPC / Batch Processing
- Multisite Installation

The screenshot displays the PDTEC CarMaker Pool interface, which is used for managing simulation data. It is divided into several key sections:

- Configurations Panel:** Shows a hierarchical tree structure for the configuration 'Data/TestRun/Roundabout_Slinks'. The tree includes nodes for 'Roundabout_Slinks', 'DemoCar_BA', and various vehicle models like 'VW_Beetle_2012_top.png', 'VW_Beetle_2012.mob', 'McPherson_FrontAxle.slc', and 'RT_195_EGR15.kin'.
- Job Queue Table:** A table listing simulation jobs with columns for Lane, ID, Description, Status, and Completion %.
- 3D Simulation View:** A real-time rendering of a virtual environment showing a road with a yellow car and a white trailer, overlaid with a semi-transparent yellow simulation volume.

Lane	ID	Description	Status	Completion %
2	7db4fa11-6503-4044-9054-e3e0ebd0234	-/-	Completed	Success
1	dca2b4f2-7942-4eaf-883b-130a0d074c3	-/-	Completed	Success
2	2797640d-8842-46f1-ba01-2a6b7a260027	-/-	Completed	Success
0	d8396548-0449-48cf-923c-8ac8f6e38008	-/-	Completed	Success
1	47120c0d-eeeb-4998-4f65-c8e6d0452a23	-/-	Completed	Success
2	cfe26def-6943-4843-8c3c-a21497bea0d8	-/-	Completed	Success
0	b6b3943b-ea4d-424f-b125-3474d5e99a99	-/-	Completed	Success
1	0e2df68b-d713-4f4a-b122-9b2d4d414640	-/-	Completed	Success
0	84ad9f83-9c8c-4c3b-9a35-4e09f73e6f5c	-/-	Completed	Success
1	7232b443-4f78-4264-4963-443a62486359	-/-	Completed	Success

SDM4CM User Interface: Details View and Navigation

The screenshot displays the SDM4CM User Interface with the following components:

- Left Sidebar:** Contains navigation icons for Home, Recent, Favorites, and other functions.
- Main Content Area (Details View):** Shows the configuration details for 'ZF CarMaker TestRun'.
 - Configuration:** Data/TestRun/Examples/DriverAssistance/CruiseControl/ACC_CountryRoad / 18995.1
 - Version:** 18995.1
 - Name:** Data/TestRun/Examples/DriverAssistance/CruiseControl/ACC_CountryRoad
 - Description:** spttted
 - Pool:** PDTec Carmaker Pool
 - Created:** 5/14/2019 7:40:25 AM (ptwlar)
 - Changed:** 5/14/2019 7:40:25 AM (ptwlar)
- Parameter Sets Table:**

ID	Name	Description	Pool
18949	Data/Vehicle/Examples/Demo_BMW_5		PDTec Carmaker Pool
18989	Data/Road/Examples/ACC_30_0ig		PDTec Carmaker Pool
18991	Movie/Textures/Ground/Roadside_Gravel.png		PDTec Carmaker Pool
18993	Movie/Textures/PS/Lugs_IP0_03.png		PDTec Carmaker Pool
19000	Data/Senarios/S_TEST_01		PDTec Carmaker Pool
- Models Table:**

ID	Name	Description	Pool
No items found			
- Central Diagram View:** A hierarchical tree diagram showing the structure of the configuration. The root node is '18995.0' (Data/TestRun/Examples/DriverAssistance/CruiseControl/ACC_CountryRoad). It branches into several sub-nodes, including '18941.0' (BMW_5_2017.png), '18945.0' (1899999_FrontView.stl), '18947.1' (181_275_50R17_20.50), '18953.1' (Audi_TT_2015.mobi), '18955.1' (Cruise_C3_2015.mobi), '18963.1' (Jaguar_XType_2009.mobi), '18965.0' (Renault_Magnum_2006.mobi), and '18969.0' (Porsche_911Turbo_2012.mobi). Each sub-node further branches into more detailed model files.
- Right Sidebar (Version Control):**
 - Id:** 3892847
 - Name:** Vehicle.txt
 - Description:** Some new tires
 - Buttons:** Save, Cancel
 - Version Control Table:**

Version	Based On	Name	Description
3	3	Vehicle.txt	and stuff
2	2	Vehicle.txt	some changes
1	1	Vehicle.txt	Initial commit
 - Log Window:** Clear Log, adas wo status 1

SDM4CM User Interface: Versioning and Search

The screenshot displays the 'Inter48 Pool' configuration page. The top navigation bar includes 'Product Components', 'Configurations', 'Parameter Sets', 'Models', and 'Pools'. The main content area shows the configuration details for 'Data/TestRun/LSA_CountryRoad'.

ZF CarMaker TestRun Master Data/TestRun/LSA_CountryRoad

Id	24200
Name	Data/TestRun/LSA_CountryRoad
Description	
Pool	Inter48 Pool
Path	Data/TestRun/LSA_CountryRoad
TestRun Description	
Created	6/19/2019 10:14:17 AM [berndt]
Changed	6/19/2019 10:14:17 AM [berndt]

Configuration Versions

A tree diagram illustrates the versioning structure:

- 24200.0 (2019-06-19) is the root version.
- 24200.5 (2019-06-19) is a child of 24200.0.
- 24200.6 (2019-06-19), 24200.7* (2019-06-21), 24200.10* (2019-06-21), and 24200.11 (2019-06-24) are children of 24200.5.
- 24200.8* (2019-06-21) is a child of 24200.7*.
- 24200.9 (2019-06-21) is a child of 24200.8*.
- 24200.12 (2019-06-24) and 24200.13 (2019-06-24) are children of 24200.10*.
- 24200.14* (2019-06-25) is a child of 24200.12.
- 24200.15* (2019-06-25) is a child of 24200.14*.

The screenshot displays the 'PD Tec Carmaker Pool' search page. The top navigation bar includes 'Product Components', 'Configurations', 'Parameter Sets', 'Models', and 'Pools'. The main content area shows search filters for 'Parameter Set Master'.

Parameter Set Master

Type	Parameter Set Master
Name	= (exact match)
Description	= (exact match)
Created by	= (exact match)
Created on	=
Changed by	= (exact match)
Changed on	=
Search with Product Components	<input checked="" type="checkbox"/>
Product Component Type	ZF Tire
Name	= (exact match)
Width	= mm
Aspect Ratio	=
Rim Diameter	= mm
Tire Type	* x
Measurement Date	=
Wheel Contact Force	Between KN
Speed Index	= (exact match)
Model Year	=

A 'Search' button is located at the bottom left of the filter area.

Workspace Client

The screenshot displays the ADAS Client workspace interface. The main window is titled "ADAS Client" and has a menu bar with "File", "Tools", "Window", and "Help". Below the menu bar is a toolbar with icons for "Checkout", "Commit", "Close", "Diff", and "Exit".

The workspace path is set to "C:/_test/adas/ws6". The main area shows a file tree with columns for "Filename", "Status", and "Version". The tree is expanded to show the following structure:

- Data/TestRun/PDTec/Man_Path_PedestrianCrossing [new]
 - Data/Vehicle/Examples/DemoCar +[ok] 425436.0
 - Data/Pic/VW_Beetle_2012.png [ok] 425420.0
 - Data/Pic/VW_Beetle_2012.top.png [ok] 425422.0
 - Movie/3D/Vehicles/VW_Beetle_2012.mobj [ok] 425426.0
 - Movie/3D/Vehicles/Wheel_10S.mobj [ok] 425424.0
 - Data/Misc/HydESP_DemoParam [ok] 425428.0
 - Data/Chassis/Examples/McPherson_FrontAxle.skc [ok] 425430.0
 - Data/Tire/Examples/RT_195_65R15 [ok] 425434.0
 - Data/Tire/Examples/Mapping/RT_195_65R15.bin [ok] 425432.0
 - Movie/3D/People/Pedestrian_Male_Casual_01.manim +[ok] 425652.0
 - Movie/3D/People/Data_M/Casual01_m.maf [ok] 425650.0
- Data/TestRun/PDTec/Man_Path_PedestrianCrossing_w_Trailer [new]
 - Data/Vehicle/Examples/DemoCar +[ok] 425436.0
 - Data/Pic/VW_Beetle_2012.png [ok] 425420.0
 - Data/Pic/VW_Beetle_2012.top.png [ok] 425422.0
 - Movie/3D/Vehicles/VW_Beetle_2012.mobj [ok] 425426.0
 - Movie/3D/Vehicles/Wheel_10S.mobj [ok] 425424.0
 - Data/Misc/HydESP_DemoParam [ok] 425428.0
 - Data/Chassis/Examples/McPherson_FrontAxle.skc [ok] 425430.0

Filename	Data/Vehicle/Examples/DemoCar	Created By	Administrator
Id	425436.0	Created On	2019-09-20 12:56:29
Name	Data/Vehicle/Examples/DemoCar	Changed By	Administrator
Description		Changed On	2019-09-20 12:56:29

Version

Version	Based On	Name	Description
0		Data/Vehicle/Examples/DemoCar	CM Examples

Log

Getting workspace status [C:/_test/adas/ws6]...
Scanning files 19/19 [100%] done.
Finding file references 17/17 [100%] done.
Finding server objects 40 done.

Getting workspace status [C:/_test/adas/ws6]...

Summary

- Simulation for Virtual Test Driving require data management solutions to address data volume and data complexity
- Specific data model to manage all data in a centralized enterprise system
- Reuse and standardization of simulation models, environment, parameters
- Enable collaboration in global engineering teams
- Traceability for all simulation results
- Enable AI / big data analysis tomorrow, data better be collected and organized today.



If you are interested to test the new data management for CarMaker pls. send us a mail and we will arrange cloud access for you.

Contacts:

Albrecht Pfaff

pfaff@pdtec.de

Tel. +49 172 8531664

<https://www.linkedin.com/in/albrechtpfaff/>

Dr. Alex Ehrler

ehrlar@pdtec.de

