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# A Deep Dive Into the Advanced Variant Configuration Data Model for SAP S/4HANA

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Session ID 82492

# About the Speaker

## **Steve Schneider**

- Sr. Consulting Product Data Analyst, Steelcase Inc.
- 41 years employment at Steelcase, 26 years in Product Configuration
- Avid motorcyclist since 1970
- Craft Beer Nerd (not while riding!)

# About Steelcase

For more than 106 years, Steelcase Inc. has helped create great work, education and healthcare experiences for the world's leading organizations. Our family of brands, including Steelcase<sup>®</sup>, Coalesse<sup>®</sup>, Designtex<sup>®</sup>, PolyVision<sup>®</sup>, Turnstone<sup>®</sup> and AMQ<sup>™</sup>, offer a comprehensive portfolio of furniture and technology products and services. Steelcase is globally accessible through a network of dealers, including over 800 Steelcase dealer locations, and is a publicly traded company with fiscal 2019 revenue of \$3.4 billion.

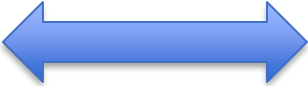




# Key Outcomes/Objectives

1. Understand some of the primary differences between the LO-VC and AVC data models as of release 1809 (on Premise)
2. Understand some of the ways your LO-VC data model may need to change to leverage new capabilities

# Agenda

- Generic Product Configuration Related changes with S/4 HANA
- Specific LO-VC  AVC differences

# Disclaimer



This presentation is to be used as demonstration only. Do not make purchase decisions based on what you see in this presentation! All statements are the authors personal opinion and do not necessarily reflect the opinion of his employer or any other person or company

Note that this presentation is **intended** to be downloaded and studied with the presenter notes as they contain important additional information. Make sure you have the presenter layer turned on in the PDF!

# What You Will See

- This presentation will compare 2 similar Product models. One built using the traditional LO-VC and the other using the new AVC (Advanced Variant Configuration). An overview of the master data differences between both models will be shown along with some important differences that are not master data related.
- **Please note that we will probably NOT get through all the slides. We will stop right at 30 minutes of content to allow time for Questions and Answers.**
- Please remember to download the deck after you get back to your office.
- **All Data Models are built in a S/4HANA 1809 release**  
**On Premise system!**



# What Is The CWG?


- The **ONLY** international user group for SAP Configuration technology
- **THE** best place to influence SAP on the direction of their Configuration technology
- Multiple forums, technical articles, and blogs to get answers to your pressing business questions about utilizing SAP Configuration technology
- **Two** annual conferences, a spring conference in Europe and a fall conference in the Americas
- Membership is **FREE**, but restricted to SAP employees, customers, and partners which accept, respect and follow our bylaws.
  - <http://www.configuration-workgroup.com/node/1850>



# Read This Document!

Mon, 10/08/2018 - 15:55 #1

**Steve Schneider**



Online

Last seen: 12 sec ago

Joined: 08/01/2005 - 04:55

**LOVC to AVC Improvement List and Comparison (in PDF Format!)**

Hello everyone,

Attached to this forum post, please find the newly released "AVC Improvement List 1.0".


This comes directly from the Development team in Walldorf and I am posting it here with their permission.

I'm told there are no plans to release this as a support note, so come back often!





Happy reading!

Cheers!

Steve

**attachment:**  
 AVC Improvement list 1.0.pdf

Edited by: Steve Schneider on 10/08/2018 - 16:02

 Top edit  delete  reply



# In This Presentation

- **Change of Material Length from 18 to 40**
- **Change of Characteristic Length from 30 to 70**
- **Actions going away (replaced with procedures but still working in the AVC model)**
- **Classification as a selection condition going away**
- **Overview page for VC Modeler**
- **Processing Modes**
- **Negative Domain Restriction syntax (including Variant Tables)**
- **All characteristics (Including Multi Value) being restrictable**
- **Pre-Conditions acting like constraints**
- **Characteristic groupings**
- **New AVC Syntax checks**
- **Alternative values**
- **More Precise rounding**
- **BOM Explosion**
- **Intermediate variable values**

# Slide Structure

## LO-VC Model



*Configuration for BICYCLE\_MIXED\_LOVC 21.08.2018*



Object	Description	Status
▼ BICYCLE_MIXED_LOVC	LO-VC Model for CWG Demonstation	
▶ BICYCLE_MIXED_LOVC		■
▶ 300 BICYCLE	Bicycle Class	
▶ 300 BICYCLEMIXOPTLOVC	Options for Bicycle LOVC	
▶ 300 FRAME_SIZE_LOVC	Frame Size LOVC	
▶ 1 01		

## AVC Model

*Configuration for BICYCLE\_MIXEDADVANCEDVARIANTCONFIG 21.08.2018*



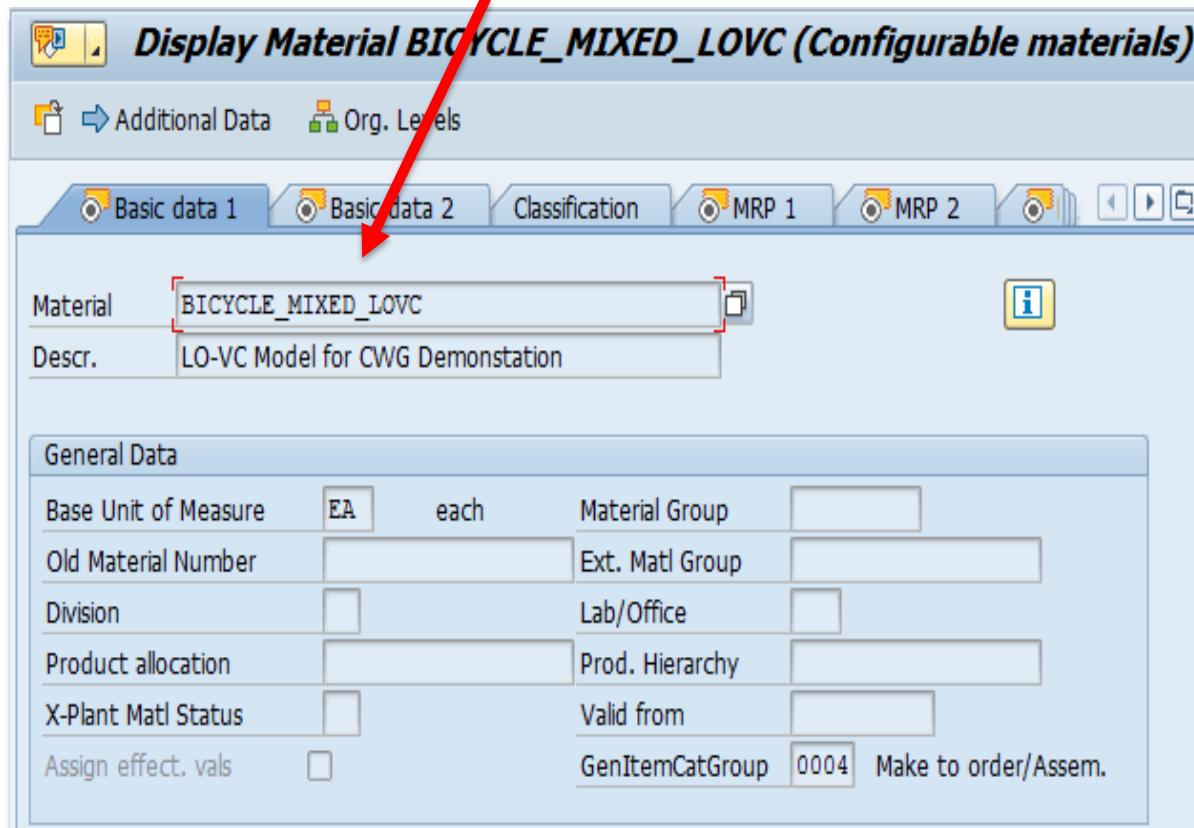
Object	Description	Status
▼ BICYCLE_MIXEDADVANCEDVARIANTCONFIG	AVC Model for CWG Demonstation	
▶ BICYCLE_MIXEDADVANCEDVARIANTCO		■
▶ 300 BICYCLE	Bicycle Class	
▶ 300 BICYCLEMIXOPTAVC	Options for Bicycle AVC	
▶ 1 01		

# Generic Changes With S/4 HANA

The information contained in the next few slides are things that are not specific to the AVC. They are part of the general S/4HANA release but are relevant to understand when moving your VC model into S/4HANA

# The Material Master

18 Characters



Display Material **BICYCLE\_MIXED\_LOVC** (Configurable materials)

Additional Data Org. Levels

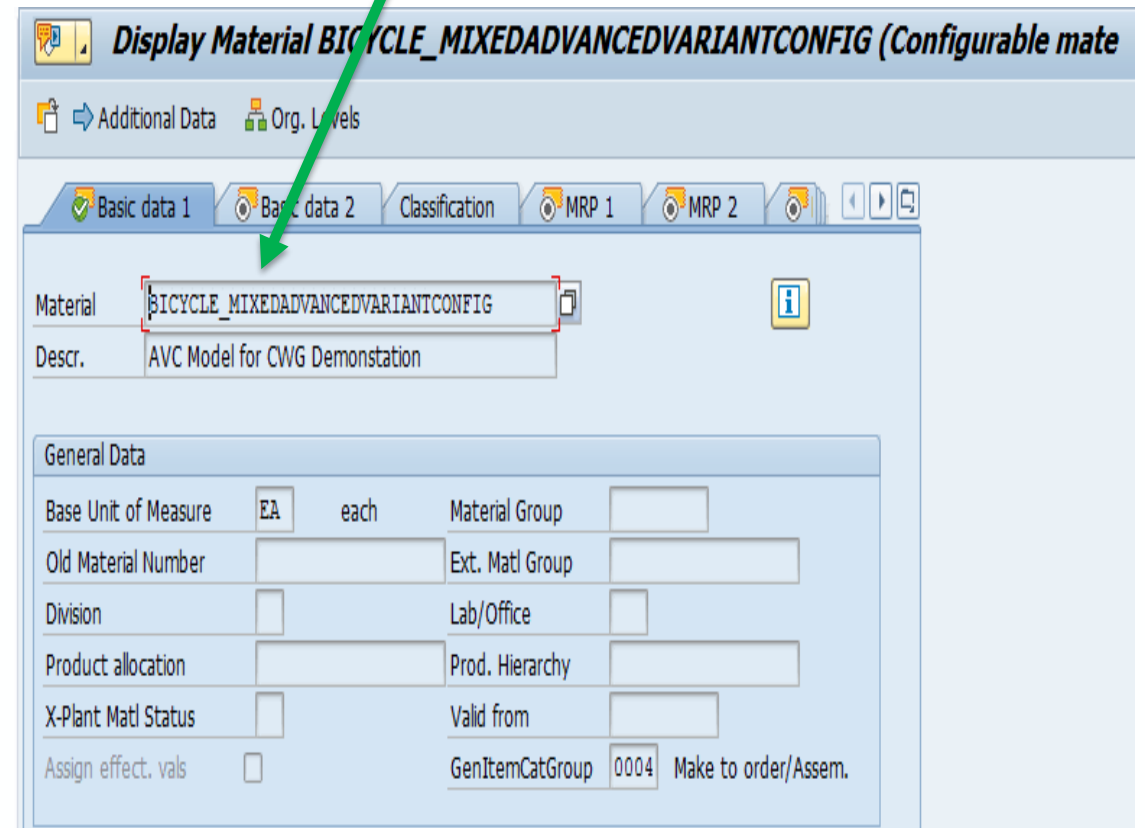
Basic data 1 Basic data 2 Classification MRP 1 MRP 2

Material: BICYCLE\_MIXED\_LOVC  
Descr.: LO-VC Model for CWG Demonstation

General Data

Base Unit of Measure	EA	each	Material Group	
Old Material Number			Ext. Matl Group	
Division			Lab/Office	
Product allocation			Prod. Hierarchy	
X-Plant Matl Status			Valid from	
Assign effect. vals	<input type="checkbox"/>		GenItemCatGroup	0004 Make to order/Assem.

35 Characters



Display Material **BICYCLE\_MIXEDADVANCEDVARIANTCONFIG** (Configurable mate)

Additional Data Org. Levels

Basic data 1 Basic data 2 Classification MRP 1 MRP 2

Material: BICYCLE\_MIXEDADVANCEDVARIANTCONFIG  
Descr.: AVC Model for CWG Demonstation

General Data

Base Unit of Measure	EA	each	Material Group	
Old Material Number			Ext. Matl Group	
Division			Lab/Office	
Product allocation			Prod. Hierarchy	
X-Plant Matl Status			Valid from	
Assign effect. vals	<input type="checkbox"/>		GenItemCatGroup	0004 Make to order/Assem.

# Characteristics

30 Characters

This screenshot shows the configuration for a characteristic named 'BICYCLE\_MIXED\_OPTIONS\_LOVC'. The 'Number of Chars' field is set to 30. The 'Data Type' is 'CHAR Character Format'. The 'Value Assignment' is set to 'Multiple Values'. The 'Status' is '1 Released'. The 'Description' is 'Options For Bicycle LOVC'. The 'Valid From' date is 21.08.2018. A red arrow points from the text '30 Characters' to the 'Number of Chars' field.

Characteristic	BICYCLE_MIXED_OPTIONS_LOVC
Change Number	
Valid From	21.08.2018
Validity	
Basic Data   Names   Values   Add. Data   Restrictions	
Basic data	
Description	Options For Bicycle LOVC
Char. Group	
Status	1 Released
Auth.Group	
Format	
Data Type	CHAR Character Format
Number of Chars	30
<input type="checkbox"/> Case Sensitive	
Template	
Value Assignment	
<input type="radio"/> Single Value	
<input checked="" type="radio"/> Multiple Values	
<input type="checkbox"/> Restrictable	
<input type="checkbox"/> Entry Required	

70 Characters

This screenshot shows the configuration for a characteristic named 'BICYCLE\_MIXED\_OPTIONS\_AVC'. The 'Number of Chars' field is set to 70. The 'Data Type' is 'CHAR Character Format'. The 'Value Assignment' is set to 'Multiple Values'. The 'Status' is '1 Released'. The 'Description' is 'Options For Bicycle AVC'. The 'Valid From' date is 21.08.2018. A green arrow points from the text '70 Characters' to the 'Number of Chars' field.

Characteristic	BICYCLE_MIXED_OPTIONS_AVC
Change Number	
Valid From	21.08.2018
Validity	
Basic Data   Names   Values   Add. Data   Restrictions	
Basic data	
Description	Options For Bicycle AVC
Char. Group	
Status	1 Released
Auth.Group	
Format	
Data Type	CHAR Character Format
Number of Chars	70
<input type="checkbox"/> Case Sensitive	
Template	
Value Assignment	
<input type="radio"/> Single Value	
<input checked="" type="radio"/> Multiple Values	
<input type="checkbox"/> Restrictable	
<input type="checkbox"/> Entry Required	

# Actions Removed

## LOVC (ECC 6.0)

**Maintain Dependency: Basic Data**

Dependency editor   Descriptions

Dependency:   SCE Format

**General Data**

\* Description:   Documentation

Status:  In creation

Dependency Group:

Maintenance Auth.:

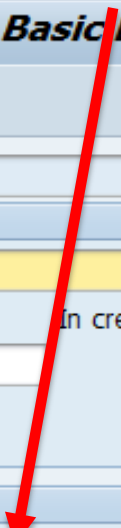
**Dependency Type**

Precondition    Action

Selection condition    Procedure

**Administrative Data**

Created By:    Created On:



## LOVC & AVC (S/4HANA)

Dependency editor   Descriptions   More ▾

Dependency:   SCE Format

**General Data**

\* Description:   Documentation

\* Status:  In Preparation

Dependency Group:

Maintenance Auth.:

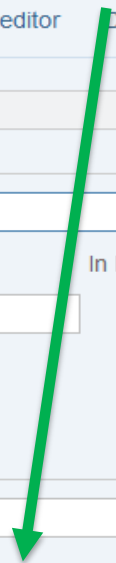
**Dependency Type**

Processing Mode:  ▾

Precondition    Selection condition    Procedure

**Administrative Data**

Created By:    Created On:



# Classification As A Selection Condition

LOVC (ECC 6.0)

**Change material BOM: Item: All data**

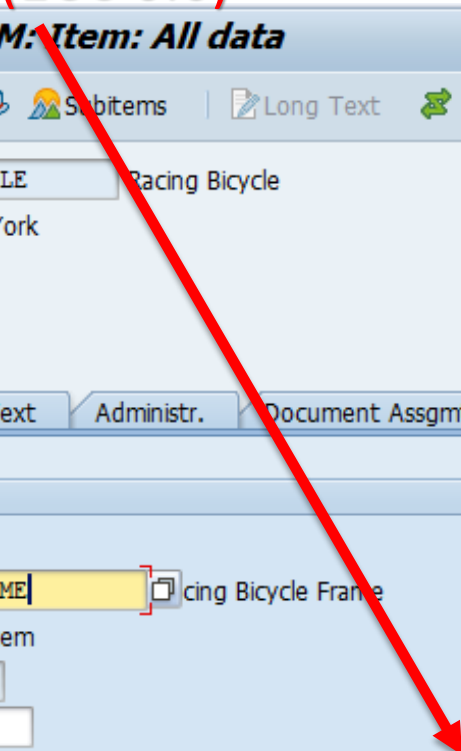
Reference items | Subitems | Long Text

Material: RACE\_BICYCLE Racing Bicycle  
Plant: 3000 New York  
Alternative BOM: 1

Basic Data | Status/Lng Text | Administr. | Document Assgmt

**BOM item**

Item Number: 0010  
Component: RACE\_FRAME Racing Bicycle Frame  
Item Category: I Stock item  
Item ID: 00000001  
Sort String:   
 Sub-item ID  
Class Type: 300  as selection cond.



LOVC & AVC (S/4HANA)

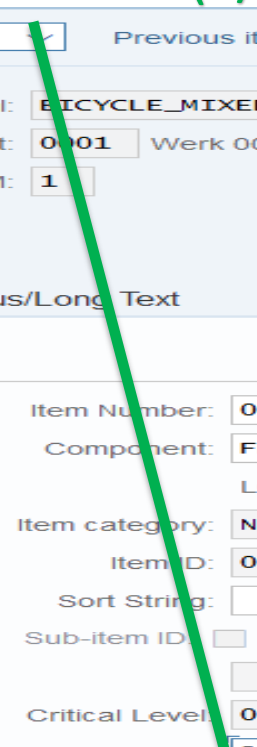
Previous item | Next Item | Header | Subitem

Material: BICYCLE\_MIXED\_LOVC  
Plant: 0001 Werk 0001  
Alternative BOM: 1

Basic Data | Status/Long Text | Purchase | Administration | Do

**BOM item**

Item Number: 0010  
Component: FRAME\_PKG\_LOVC  
LO-VC Model for CWG Demonstration  
Item category: N Non-stock item  
Item ID: 00000001  
Sort String:   
Sub-item ID:   
Critical Component:   
Critical Level: 0  
Class Type: 300   
as selection cond.:





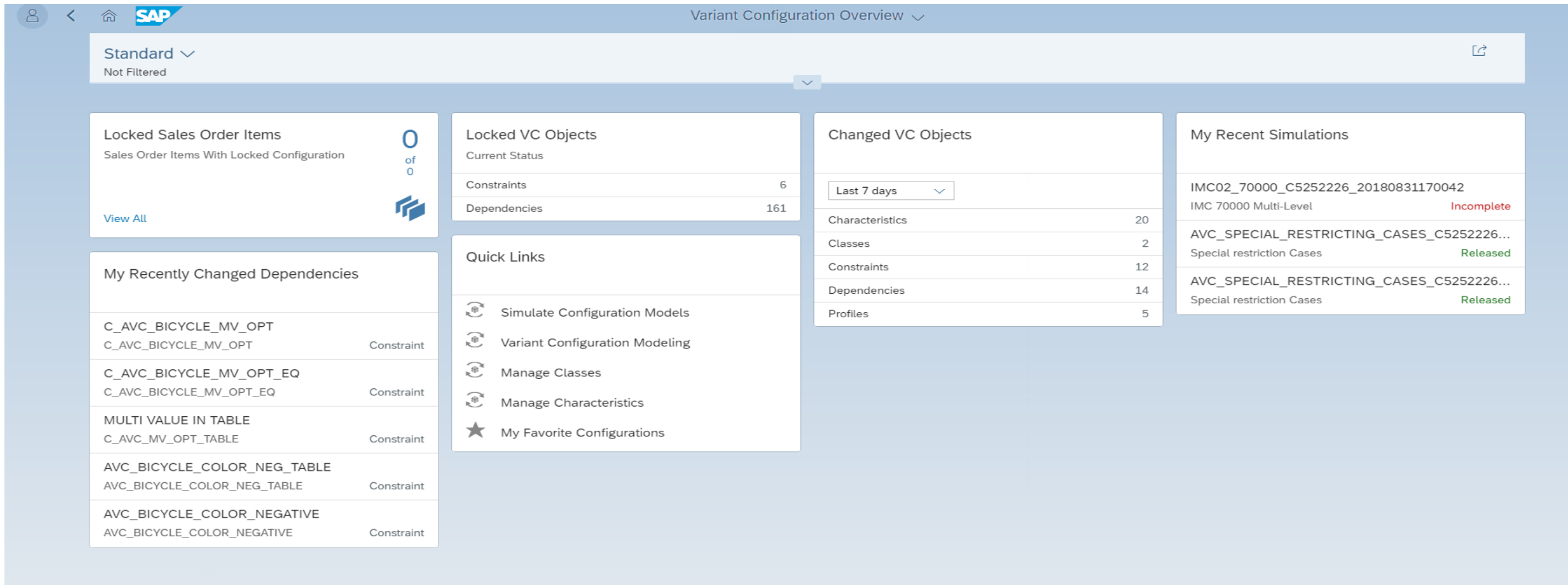
# Specific LO-VC ↔ AVC differences

The information contained in the next slides are specific differences between the LO-VC and AVC data Models.

Note that in some cases, the exact methods used in LO-VC will provide different results in the AVC!

# Variant Configuration Overview Page

## Primarily AVC Models



The screenshot displays the SAP Variant Configuration Overview page. At the top, there is a navigation bar with the SAP logo and the title "Variant Configuration Overview". Below this, a filter dropdown is set to "Standard" with "Not Filtered" below it. The main content area is divided into several sections:

- Locked Sales Order Items:** Shows "Sales Order Items With Locked Configuration" with a counter of "0 of 0" and a "View All" link.
- Locked VC Objects:** A table showing the current status of locked objects:

Current Status	
Constraints	6
Dependencies	161
- Changed VC Objects:** A table showing objects changed within the last 7 days:

Last 7 days	
Characteristics	20
Classes	2
Constraints	12
Dependencies	14
Profiles	5
- My Recent Simulations:** A list of recent simulation runs:

IMC02_70000_C5252226_20180831170042	IMC 70000 Multi-Level	Incomplete
AVC_SPECIAL_RESTRICTING_CASES_C5252226...	Special restriction Cases	Released
AVC_SPECIAL_RESTRICTING_CASES_C5252226...	Special restriction Cases	Released
- My Recently Changed Dependencies:** A list of recently changed dependencies:

C_AVC_BICYCLE_MV_OPT	C_AVC_BICYCLE_MV_OPT	Constraint
C_AVC_BICYCLE_MV_OPT_EQ	C_AVC_BICYCLE_MV_OPT_EQ	Constraint
MULTI VALUE IN TABLE	C_AVC_MV_OPT_TABLE	Constraint
AVC_BICYCLE_COLOR_NEG_TABLE	AVC_BICYCLE_COLOR_NEG_TABLE	Constraint
AVC_BICYCLE_COLOR_NEGATIVE	AVC_BICYCLE_COLOR_NEGATIVE	Constraint
- Quick Links:** A list of navigation options:
  - Simulate Configuration Models
  - Variant Configuration Modeling
  - Manage Classes
  - Manage Characteristics
  - My Favorite Configurations

# Processing Mode- Configuration Profile

**LOVC**

Configuration for BICYCLE\_MIXED\_LOVC 23.08.2018

Material: BICYCLE\_MIXED\_LOVC  
Configuration Profile: BICYCLE\_MIXED\_LOVC

Object: BICYCLE\_MIXED\_LOVC

Class Type: 300  
Org. Areas:   
Status: 1 Released

Process:  Plan./Production Order  
 Sales Order (SET)  
 Other BOM  
 Knowledge-based  
 Result-oriented

BOM Explosion:  None  
 Single-Level  
 Multi-Level  
Application: PP01 Production - General  
Filter  Only config. assembs

Order Functions:  Component Availability

BOM Components:  Manual Changes Permitted  
 Maintenance In Order Allowed  
 Automatic Fixing  
Fix/Instantiate

Processing Mode: Classic

**AVC**

Configuration for BICYCLE\_MIXEDADVANCEDVARIANTCONF

Material: BICYCLE\_MIXEDADVANCEDVARIANTCONF  
Configuration Profile: BICYCLE\_MIXEDADVANCEDVARIANTCONF

Object: BICYCLE\_MIXEDADVANCEDVARIANTCONF

Class Type: 300  
Org. Areas:   
Status: 1 Released

Process:  Plan./Production Order  
 Sales Order (SET)  
 Other BOM  
 Knowledge-based  
 Result-oriented

BOM Explosion:  None  
 Single-Level  
 Multi-Level  
Application: PP01 Production - General  
 Only config. assembs

Order Functions:  Component Availability

BOM Components:  Manual Changes Permitted  
 Maintenance In Order Allowed  
 Automatic Fixing  
Fix/Instantiate

Processing Mode: A Advanced Variant Configuration

# Processing Mode - Constraints

LOVC

Configuration for BICYCLE\_MIXED\_LOVC 23.08.2018

Constraint Net: BICYCLE\_MIXED\_LOVC\_RESTRICTION

Object: BICYCLE\_MIXED\_LOVC

- BICYCLE\_MIXED\_LOVC
- BICYCLE\_MIXED\_LOVC\_INHERITANCE
- BICYCLE\_MIXED\_LOVC\_RESTRICTION**
- BICYCLE\_MIXEDLOVC
- 300 BICYCLE
- 300 BICYCLEMIXOPTLOVC
- 300 FRAME\_SIZE\_LOVC

Constraint: BICYCLE\_MIXED\_LOVC\_RESTRICTION

Description: BICYCLE\_MIXED\_LOVC\_RESTRICTION

Processing Mode: Classic

Status: 1 Released

Group: [Empty]

Maintenance Auth.: [Empty]

Configuration for BICYCLE\_MIXED\_LOVC 23.08.2018

Constraint Net: BICYCLE\_MIXED\_LOVC\_RESTRICTION

Constraint: BICYCLE\_MIXED\_LOVC\_COLOR\_IN

Object: BICYCLE\_MIXED\_LOVC

- BICYCLE\_MIXED\_LOVC
- BICYCLE\_MIXED\_LOVC\_INHERITANCE
- BICYCLE\_MIXED\_LOVC\_RESTRICTION**
- BICYCLE\_MIXEDLOVC
- 300 BICYCLE
- 300 BICYCLEMIXOPTLOVC
- 300 FRAME\_SIZE\_LOVC

Constraint: BICYCLE\_MIXED\_LOVC\_COLOR\_IN

Description: BICYCLE\_MIXED\_LOVC\_COLOR\_IN

Processing Mode: Classic

Status: 1 Released

Group: [Empty]

AVC

Configuration for BICYCLE\_MIXEDADVANCEDVARIANTCONFIG

Constraint Net: AVC\_BICYCLE\_COLORS

Object: BICYCLE\_MIXEDADVANCEDVARIANTCONFIG

- BICYCLE\_MIXEDADVANCEDVARIANTCONFIG
- BICYCLE\_MIXEDADVANCEDVARIANTCO
- AVC\_BICYCLE\_COLORS**
- AVC\_BICYCLE\_MV\_OPTION
- 300 BICYCLE
- 300 BICYCLEMIXOPTAVC
- 300 FRAME\_SIZE\_AV

Constraint: AVC\_BICYCLE\_COLORS

Description: AVC\_BICYCLE\_COLORS

Processing Mode: Advanced Variant Configuration

Status: Released

Group: [Empty]

Maintenance Auth.: [Empty]

Configuration for BICYCLE\_MIXEDADVANCEDVARIANTCONFIG

Constraint Net: AVC\_BICYCLE\_COLORS

Constraint: AVC\_BICYCLE\_COLOR\_NEGATIVE

Object: BICYCLE\_MIXEDADVANCEDVARIANTCONFIG

- BICYCLE\_MIXEDADVANCEDVARIANTCONFIG
- BICYCLE\_MIXEDADVANCEDVARIANTCO
- AVC\_BICYCLE\_COLORS
- AVC\_BICYCLE\_MV\_OPTION
- 300 BICYCLE
- 300 BICYCLEMIXOPTAVC
- 300 FRAME\_SIZE\_AV
- 300 FRAME\_SIZE\_LOVC

Constraint: AVC\_BICYCLE\_COLOR\_NEGATIVE

Description: AVC\_BICYCLE\_COLOR\_NEGATIVE

Processing Mode: A Advanced Variant Configuration

Status: Released

Group: [Empty]

# Processing Mode – Non Constraint

LOVC

**Maintain Dependency: Basic Data**

Dependency editor Descriptions

Dependency   SCE Format

General Data

Description   Documentation

Status  In Preparation

Dependency Group

Maintenance Auth.

Dependency Type

Processing Mode

Precondition  
 Selection condition  Procedure

Administrative Data

Created By  Created On

AVC

**Maintain Dependency: Basic Data**

Dependency editor Descriptions

Dependency   SCE Format

General Data

Description   Documentation

Status  In Preparation

Dependency Group

Maintenance Auth.

Dependency Type

Processing Mode

Precondition  
 Selection condition  Procedure

Administrative Data

Created By  Created On

# Domain Restrictions Using Constraints (IN)

LO-VC – Can Be Done Exactly the Same Way in AVC

**Configuration for BICYCLE\_MIXED\_LOVC 23.08.2018**

Constraint Net: BICYCLE\_MIXED\_LOVC\_RESTRICTION  
Constraint: BICYCLE\_MIXED\_LOVC\_COLOR\_IN

OBJECTS:  
?A is\_a (300) Bicycle where  
?FC = Frame\_color;  
?FW = Front\_Wheel\_color;  
?RW = Rear\_Wheel\_Color.

Restrictions:  
?FC IN ('Green', 'Blue', 'Black'),  
?FW IN ('Green', 'Blue', 'Black'),  
?RW IN ('Green', 'Blue', 'Black').

Inferences:  
?FC, ?FW, ?RW.

**Characteristic Value Assignment**

Material: BICYCLE\_MIXED\_LOVC  
LO-VC Model for CWG Demonstration

Configuration Structure:  
BICYCLE\_MIXED\_LOVC  
 FRAME\_PKG\_LOVC  
 FRAME\_LOVC  
 WHEEL\_PKG\_LOVC  
 FRONT\_WHEEL\_LOVC  
 WHEEL\_ASM\_LOVC  
 WHEEL\_RIM\_LOVC  
 WHEEL\_SPOKES\_LOVC  
 BRAKE\_ASM\_LOVC  
 REAR\_WHEEL\_LOVC  
 WHEEL\_ASM\_LOVC  
 WHEEL\_RIM\_LOVC  
 WHEEL\_SPOKES\_LOVC  
 BRAKE\_ASM\_LOVC

Characteristic Value Assignment Table:

Char. description	Char. Value
REAR_WHEEL_COLOR	REAR_WHEEL_COLOR
FRONT_WHEEL_COLOR	
FRAME_COLOR	

REAR\_WHEEL\_COLOR Selection Dialog:

S.. Char. Value	Condition	D	Doc
<input checked="" type="radio"/> No Entry			
<input type="radio"/> BLACK			
<input type="radio"/> BLUE			
<input type="radio"/> GREEN			

# Domain Restrictions using NE Statement

## AVC Only – Not Possible in LO-VC

Legend Icons... Test Fullscreen On/Off Explode Model Check Model Reload Model More ▾

Object Description

▼ BICYCLE_MIXEDADVANCEDVARIANTCONFIG	AVC Model for CWG Demonsta
▼ BICYCLE_MIXEDADVANCEDVARIANTCO	
▼ AVC_BICYCLE_COLORS	AVC_BICYCLE_COLORS
▶ AVC_BICYCLE_COLOR_NEGATIVE	AVC_BICYCLE_COLOR_NEGAT
▶ AVC_BICYCLE_COLOR_NEG_TABLE	AVC_BICYCLE_COLOR_NEG_T
▶ AVC_BICYCLE_MV_OPTION	AVC_BICYCLE_MV_OPTION
▶ 300 BICYCLE	Bicycle Class
▶ 300 BICYCLEMIXOPTAVC	Options for Bicycle AVC
▶ 300 FRAME_SIZE_AVC	Frame Size AVC
▶ 300 FRAME_SIZE_LOVC	Frame Size LOVC

Constraint Net: AVC\_BICYCLE\_COLORS  
Constraint: AVC\_BICYCLE\_COLOR\_NEGATIVE

Basic Data Editor Descriptions Change Overview

OBJECTS:  
?A IS\_A (300) BICYCLE WHERE  
?FC = FRAME\_COLOR;  
?FW = FRONT\_WHEEL\_COLOR;  
?RW = REAR\_WHEEL\_COLOR.

RESTRICTIONS:  
?FC NE 'RED',  
?FW NE 'RED',  
?RW NE 'RED'.

No Inferences Section Necessary!

AVC Model for CWG Demonstation  
BICYCLE\_MIXEDADVANCEDVARIANTCONFIG

Configuration Status: Incomplete Date: 22.08.2018 Quantity: 1 Configuration Profile: BICYCLE\_MIXEDADVANCEDVARIANTCO Plant: PP01 BOM Application: PP01

Configurable Items

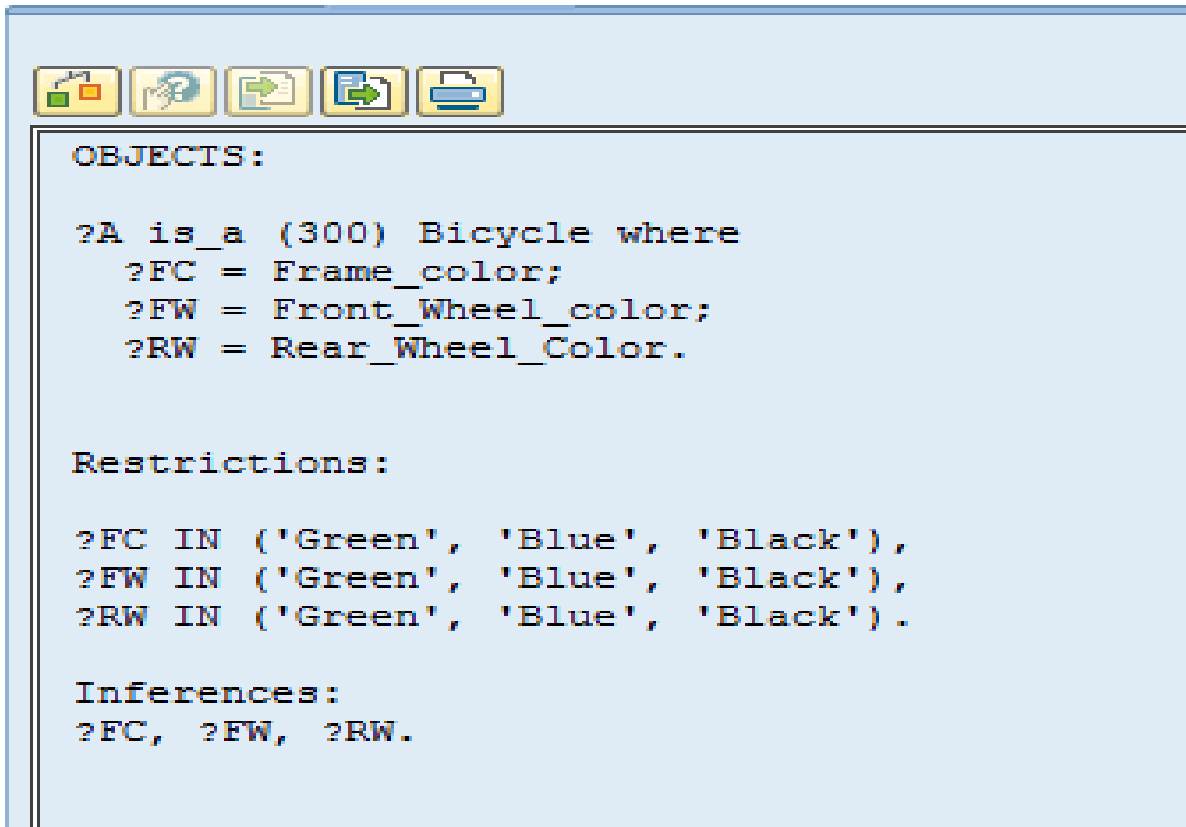
Product	✓	⬆	⚙
BICYCLE_MIXEDADVANCEDV...	⚠		

Colors Group For CWG Bicycle D Options for Bicycle

\*FRAME\_COLOR:  
(None) ▾  
(None)  
BLACK  
BLUE  
GREEN

# Easier Domain Restrictions!

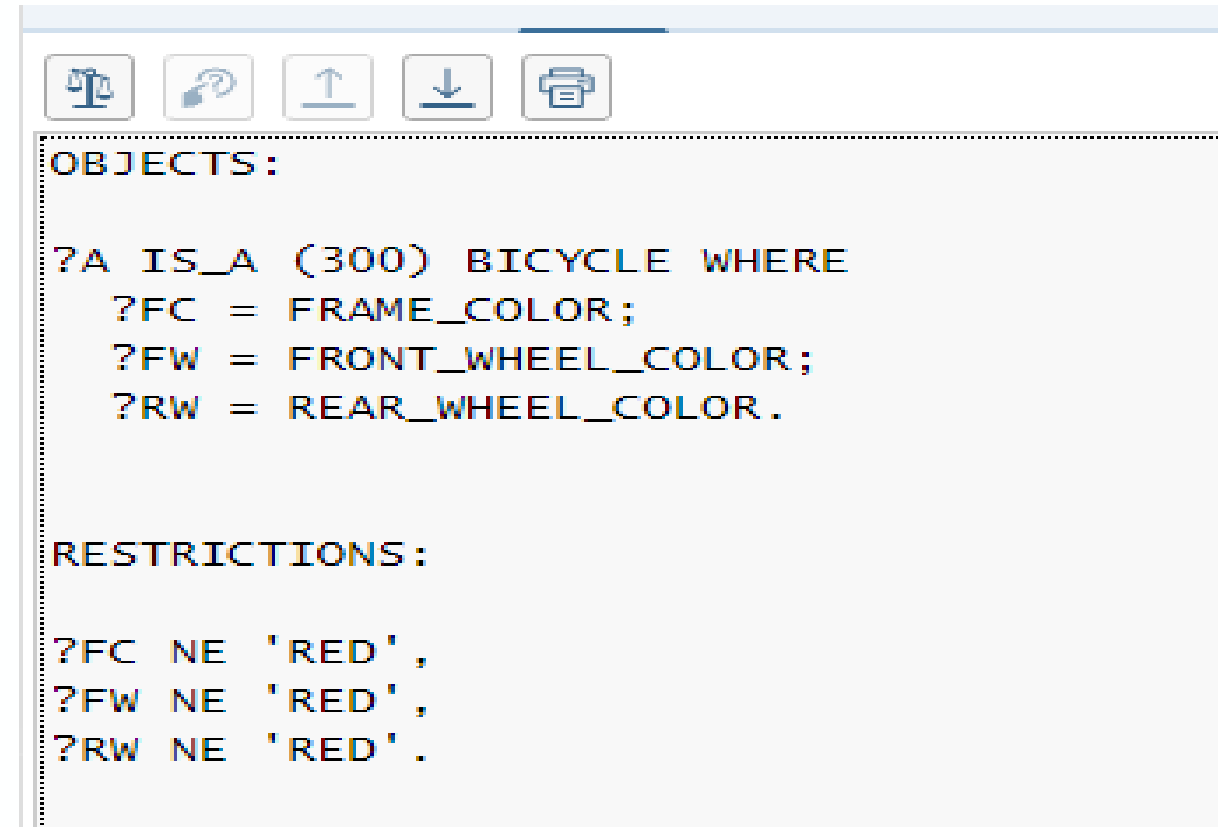
## LO-VC



The LO-VC interface displays a query with domain restrictions. The query is: ?A is\_a (300) Bicycle where ?FC = Frame\_color; ?FW = Front\_Wheel\_color; ?RW = Rear\_Wheel\_Color. The restrictions are: ?FC IN ('Green', 'Blue', 'Black'), ?FW IN ('Green', 'Blue', 'Black'), ?RW IN ('Green', 'Blue', 'Black'). The inferences are: ?FC, ?FW, ?RW.

```
OBJECTS:  
  
?A is_a (300) Bicycle where  
  ?FC = Frame_color;  
  ?FW = Front_Wheel_color;  
  ?RW = Rear_Wheel_Color.  
  
Restrictions:  
  
?FC IN ('Green', 'Blue', 'Black'),  
?FW IN ('Green', 'Blue', 'Black'),  
?RW IN ('Green', 'Blue', 'Black').  
  
Inferences:  
?FC, ?FW, ?RW.
```

## AVC



The AVC interface displays a query with domain restrictions. The query is: ?A IS\_A (300) BICYCLE WHERE ?FC = FRAME\_COLOR; ?FW = FRONT\_WHEEL\_COLOR; ?RW = REAR\_WHEEL\_COLOR. The restrictions are: ?FC NE 'RED', ?FW NE 'RED', ?RW NE 'RED'.

```
OBJECTS:  
  
?A IS_A (300) BICYCLE WHERE  
  ?FC = FRAME_COLOR;  
  ?FW = FRONT_WHEEL_COLOR;  
  ?RW = REAR_WHEEL_COLOR.  
  
RESTRICTIONS:  
  
?FC NE 'RED',  
?FW NE 'RED',  
?RW NE 'RED'.
```



# Domain Restrictions Using Negative Tables

LO-VC

The screenshot shows the 'LO-VC' constraint editor. At the top, the 'Constraint Net' is 'BICYCLE\_MIXED\_LOVC\_RESTRICTION' and the 'Constraint' is 'BICYCLE\_MIXED\_LOVC\_COLORS'. The 'Editor' tab is selected. The main area contains the following text:

```
OBJECTS:
?A IS_A (300) Bicycle where
  ?FC= Frame_Color;
  ?FW = Front_Wheel_Color;
  ?RW = Rear_Wheel_Color.

Restrictions:
Table Bicycle_mixed_LOVC
  (table1_LOVC = ?FC),

Table Bicycle_mixed_LOVC
  (table1_LOVC = ?FW),

Table Bicycle_mixed_LOVC
  (table1_LOVC = ?RW).

Inferences:
?FC, ?FW, ?RW.
```

AVC

The screenshot shows the 'AVC' constraint editor. At the top, the 'Constraint Net' is 'AVC\_BICYCLE\_COLORS' and the 'Constraint' is 'AVC\_BICYCLE\_COLOR\_NEG\_TABLE'. The 'Editor' tab is selected. The main area contains the following text:

```
OBJECTS:

?A is_a(300) BICYCLE where
  ?FC = FRAME_COLOR;
  ?FW = FRONT_WHEEL_COLOR;
  ?RW = REAR_WHEEL_COLOR.

Restrictions:
FALSE IF TABLE AVC_BICYCLE_COLOR
  (TABLE1_AVC = ?FC),

FALSE IF TABLE AVC_BICYCLE_COLOR
  (TABLE1_AVC = ?FW),

FALSE IF TABLE AVC_BICYCLE_COLOR
  (TABLE1_AVC = ?RW).
```

# Table Content Comparison

LO-VC

The screenshot shows a software interface for comparing table contents. At the top, there are two tabs: 'Contents' and 'Basic D'. Below the tabs is a toolbar with five icons: a magnifying glass, a list icon, a filter icon, a home icon, and a plus icon. The main area displays a table with the following content:

TABLE1_LOVC
BLACK
BLUE
GREEN

AVC

The screenshot shows a software interface for comparing table contents. At the top, there are two tabs: 'Contents' and 'Basic'. The 'Contents' tab is highlighted with a dashed border. Below the tabs is a toolbar with five icons: a magnifying glass, a list icon, a filter icon, a magnifying glass, and a magnifying glass with a plus sign. The main area displays a table with the following content:

TABLE1_AVC
RED

# Multi Value Domain Restrictions

## Pre-Conditions

Characteristic: BICYCLE\_MIXED\_OPTIONS\_LOVC  
Change Number:   
Valid From: 21.08.2018

Basic Data | Names | Values | Add. Data | Restrictions

Additional Values Other Value Check

Char. Value	Description	D	O	S
LOUDLYRINGINGBELLFORCHILDREN	Loudly Ringing Bell For Children	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
REALSMALLCARRYBAGFORHANDLEBARS	Real Small Carry Bag For Handlebars	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HARDRACINGSEAT	Hard Racing Seat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SOFTPADDEDRACINGSEAT	Soft Padded Seat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LONGSTRINGYTHINGSFORHANDLEBARS	Long Stringy Things For Handlebars	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
NEATBASEBALLCARDSFORSPOKESOUND	NeatBaseballCardForSpokeSounds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## No Pre-Conditions!

Characteristic: BICYCLE\_MIXED\_OPTIONS\_AVC  
Change Number:   
Valid From: 21.08.2018

Basic Data | Names | Values | Add. Data | Restrictions

Additional Values Other Value Check

Char. Value	Description	D	O	S
LOUDLYRINGINGBELLFORCHILDRENAND...	Loudly Ringing Bell For Children	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
REALSMALLCARRYBAGFORHANDLEBARS...	Real Small Carry Bag For Handlebars	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HARDRACINGSEATANDIREALLYLIKELON...	Hard Racing Seat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SOFTPADDEDRACINGSEATANDIREALLY...	Soft Padded Seat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LONGSTRINGYTHINGSFORHANDLEBARS...	Long Stringy Things For Handlebars	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NEATBASEBALLCARDSFORSPOKESOUN...	NeatBaseballCardForSpokeSounds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

# Multi Value Precondition Vs Constraint

## LO-VC Pre-Conditions

**Change Characteristic**

Precondition	PC_BELL_FRAME_SIZE_LOVC	Pre Condition for Bell
Characteristic	BICYCLE_MIXED_OPTIONS_LOVC	Options For Bicycle LOVC
Char. Value	LOUDLYRINGINGBELLFORCHILDREN	Loudly Ringing Bell For Children

Editor

```
Self.Frame_Size_LOVC IN (50 - 60)
```

## AVC Constraint!

Constraint Net: AVC\_BICYCLE\_MV\_OPTION

Constraint: C\_AVC\_BICYCLE\_MV\_OPT

Basic Data Editor Descriptions Change Overview

Object	Description	Stat...
BICYCLE_MIXEDADVANCEDVARIANTCONFIG	AVC Model for CIWG Dem...	
BICYCLE_MIXEDADVANCEDVARIANTCO		
AVC_BICYCLE_COLORS	AVC_BICYCLE_COLORS	
AVC_BICYCLE_MV_OPTION	AVC_BICYCLE_MV_OPTI...	
300 BICYCLE	Bicycle Class	
300 BICYCLEMIXOPTAVC	Options for Bicycle AVC	
300 FRAME_SIZE_AVC	Frame Size AVC	
300 FRAME_SIZE_LOVC	Frame Size LOVC	
101		

Objects:

```
?A is_a(300) BICYCLEMIXOPTAVC where  
?BMO = BICYCLE_MIXED_OPTIONS_AVC,  
  
?B is_a(300)FRAME_SIZE_AVC where  
?FZA = FRAME_SIZE_AVC.  
  
Restrictions:  
  
?BMO NE 'LOUDLYRINGINGBELLFORCHILDRENANDREALLYLIKELONGSTICVALUES' if  
?FZA SPECIFIED and ?FZA IN ( 10 - 49 ) OR ?FZA IN (70 - 200),  
  
?BMO NE 'LONGSTRINGYTHINGSFORHANDLEBARSANDREALLYLIKELONGSTICVALUES'  
if  
?FZA SPECIFIED and ?FZA IN ( 10 - 49 ) OR ?FZA IN (70 - 200).
```

# Interface Design Using Characteristic Groups

LO-VC

**Configuration for BICYCLE\_MIXED\_LOVC 23.08.2018**

Material: BICYCLE\_MIXED\_LOVC  
Configuration Profile: BICYCLE\_MIXED\_LOVC

Object: BICYCLE\_MIXED\_LOVC

- BICYCLE\_MIXED\_LOVC
- BICYCLE\_MIXED\_LOVC\_INHERITANCE
- BICYCLE\_MIXED\_LOVC\_RESTRICTION
- BICYCLE\_MIXEDLOVC
- 300 BICYCLE
- 300 BICYCLEMIXOPTLOVC
- 300 FRAME\_SIZE\_LOVC

Basic Data | Dependencies | **User Interface**

Interface Design: BICYCLE\_MIXEDLOVC

Configuration Browser

Allowed Screens	Start With
<input checked="" type="checkbox"/> Char. Value Asmt.	<input checked="" type="radio"/> Char. Value Asmt.
<input checked="" type="checkbox"/> Result	<input type="radio"/> Result
<input type="checkbox"/> Master Data	<input type="radio"/> Master Data
<input type="checkbox"/> Confign Structure	<input type="radio"/> Confign Structure

Further Settings

AVC

Material: BICYCLE\_MIXEDADVANCEDVARIANTCONFIG  
Configuration Profile: BICYCLE\_MIXEDADVANCEDVARIANTCO

Basic Data | Dependencies | **User Interface**

Configuration Browser

Allowed Screens	Start With
<input checked="" type="checkbox"/> Char. Value Asmt.	<input checked="" type="radio"/> Char. Value Asmt.
<input checked="" type="checkbox"/> Result	<input type="radio"/> Result
<input type="checkbox"/> Master Data	<input type="radio"/> Master Data
<input type="checkbox"/> Confign Structure	<input type="radio"/> Confign Structure

Assign Characteristic Groups

# Characteristic Groups

## AVC ONLY

BICYCLE\_MIXEDADVANCEDVARIANTCO BICYCLE\_MIXEDADVANCEDVARIANTCONFIG [Edit](#) [Delete](#) [Share](#)

### Characteristic Groups

Search  [Q](#) [Settings](#)

Characteristic Group	Description	Number of Characteristics	Sorting Order
Characteristic Group: BICYCLE_MIXED_AVC			
BICYCLE_MIXED_AVC	Colors Group For CWG Bicycle Demonstration	3	1
Characteristic Group: HIDDEN_AVC_BICYCLE			
HIDDEN_AVC_BICYCLE	Used to hide a cstic assigned incorrectly that I cannot delete	1	3
Characteristic Group: OPTIONS_BICYCLE_MIXED_AVC			
OPTIONS_BICYCLE_MIXED_AVC	Options for Bicycle	2	2

Configuration Profile

BICYCLE\_MIXEDADVANCEDVARIANTCO BICYCLE\_MIXEDADVANCEDVARIANTCONFIG [Edit](#) [Delete](#) [Share](#)

### Characteristic Groups

Search  [Q](#) [Settings](#)

Characteristic Group	Description	Number of Characteristics	Sorting Order
Characteristic Group: BICYCLE_MIXED_AVC			
BICYCLE_MIXED_AVC	Colors Group For CWG Bicycle Demonstration	3	1
Characteristic Group: HIDDEN_AVC_BICYCLE			
HIDDEN_AVC_BICYCLE	Used to hide a cstic assigned incorrectly that I cannot delete		
Characteristic Group: OPTIONS_BICYCLE_MIXED_AVC			
OPTIONS_BICYCLE_MIXED_AVC	Options for Bicycle		

Characteristics in BICYCLE\_MIXED\_AVC

Characteristic	Description
FRAME_COLOR	Frame Color
FRONT_WHEEL_COLOR	Front Wheel Color
REAR_WHEEL_COLOR	Rear Wheel Color

# User Interface

LO-VC

The screenshot displays the SAP LO-VC (Local Variant Configuration) interface. At the top, there is a navigation bar with tabs: Result, Master data, Pricing, Planned order, Costing, and More. Below this is a 'Configuration Structure' table with columns for 'Configuration Structure' and 'St...'. The structure is expanded to show a hierarchy of components: BICYCLE\_MIXED\_LOVC, FRAME\_PKG\_LOVC, FRAME\_LOVC, WHEEL\_PKG\_LOVC, FRONT\_WHEEL\_LOVC, WHEEL\_ASM\_LOVC, WHEEL\_RIM\_LOVC, WHEEL\_SPOKES\_LOVC, BRAKE\_ASM\_LOVC, REAR\_WHEEL\_LOVC, and WHEEL\_ASM\_LOVC. To the right, the 'Material' is set to 'BICYCLE\_MIXED\_LOVC'. Below the structure is the 'Characteristic Value Assignment' section, which includes tabs for 'COLORS', 'OPTIONS', and 'SIZE'. A table with 'Char. description' is partially visible at the bottom.

AVC

The screenshot shows the SAP AVC (Advanced Variant Configuration) model for 'CWG Demonstration'. The title is 'AVC Model for CWG Demonstration' with the configuration ID 'BICYCLE\_MIXEDADVANCEDVARIANTCONFIG'. Key data points include: Configuration Status: Released; Date: 06.09.2018; Quantity: 1; Configuration Profile: BICYCLE\_MIXEDADVANCEDVARIANTCO; Plant: Werk 0001; BOM Application: PP01. Below this is a 'Configurable Items' table with columns for 'Product', a checkmark, and icons. The table lists 'BICYCLE\_MIXEDADVANCEDV...' and 'FRAME\_PKG\_ADVANCEDV...' both with checkmarks. To the right, the 'AVC Model for CWG Demonstration' is further detailed with 'Colors Group For CWG Bicycle D' and 'Options for Bicycle'. Two dropdown menus are shown: '\*FRAME\_COLOR:' set to 'BLACK' and '\*FRONT\_WHEEL\_COLOR:' set to 'BLUE'.

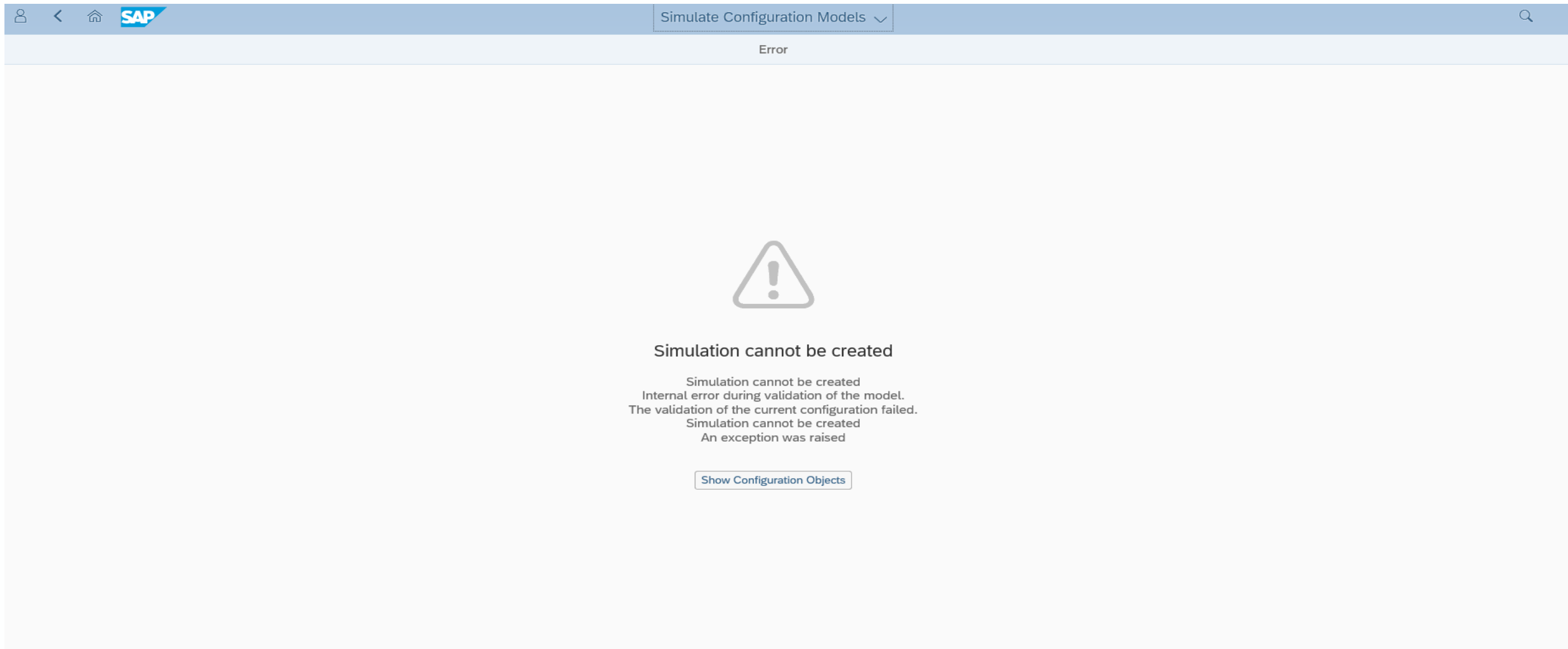


## Coming Attractions (Release Dates TBD)!

- Ability to maintain assignment of Characteristic Groups to Configuration Profiles with ECM
- Ability to maintain assignment of characteristics within characteristic groups with ECM




# AVC Syntax Check – If You See This....



The screenshot shows the SAP user interface for 'Simulate Configuration Models'. The top navigation bar includes the SAP logo, navigation icons, and a search icon. The main content area displays an error message with a warning icon (a triangle with an exclamation mark). The error text reads: 'Simulation cannot be created', 'Simulation cannot be created', 'Internal error during validation of the model.', 'The validation of the current configuration failed.', 'Simulation cannot be created', and 'An exception was raised'. A button labeled 'Show Configuration Objects' is positioned below the error text.

Simulate Configuration Models

Error



**Simulation cannot be created**

Simulation cannot be created  
Internal error during validation of the model.  
The validation of the current configuration failed.  
Simulation cannot be created  
An exception was raised

Show Configuration Objects

# Run The New AVC Syntax Check

The screenshot displays the SAP configuration interface for BICYCLE\_MIXEDADVANCEDVARIANTCONFIG 30.08.2018. The interface is divided into several sections:

- Top Bar:** SAP logo, navigation arrows, and the title "Configuration for BICYCLE\_MIXEDADVANCEDVARIANTCONFIG 30.08.2018".
- Toolbar:** Legend Icons..., Test, Fullscreen On/Off, Check Model, Reload Model, and More.
- Left Panel:** A tree view showing the object hierarchy. The selected object is BICYCLE\_MIXEDADVANCEDVARIANTCO. Below the tree are "Favorites" and "Environment" sections.
- Check Options Dialog:** A modal dialog box titled "Check Options" with a close button (X). It contains several checkboxes:
  - Consistency Checks
  - Integration Checks
  - Performance Checks
  - Knowledge-Base Checks (IPC only)
  - Advanced Syntax Checks (AVC only)
  - Customer-Specific ChecksA "Continue" button is located at the bottom right of the dialog.
- Right Panel:** Configuration details for the selected object.
  - Constraint Net:** AVC\_BICYCLE\_MV\_OPTION
  - Constraint:** C\_AVC\_BICYCLE\_MV\_OPT
  - Basic Data Tab:** Includes tabs for Basic Data, Editor, Descriptions, and Change Overview.
  - Description:** C\_AVC\_BICYCLE\_MV\_OPT
  - Processing Mode:** A Advanced Variant Configuration
  - Status:** Released
  - Group:** (empty)
  - Documentation:** (checkbox)

# AVC Syntax Check

Constraint Net:

Constraint:

Basic Data Editor Descriptions Change Overview

Description:   Documentation

Processing Mode:

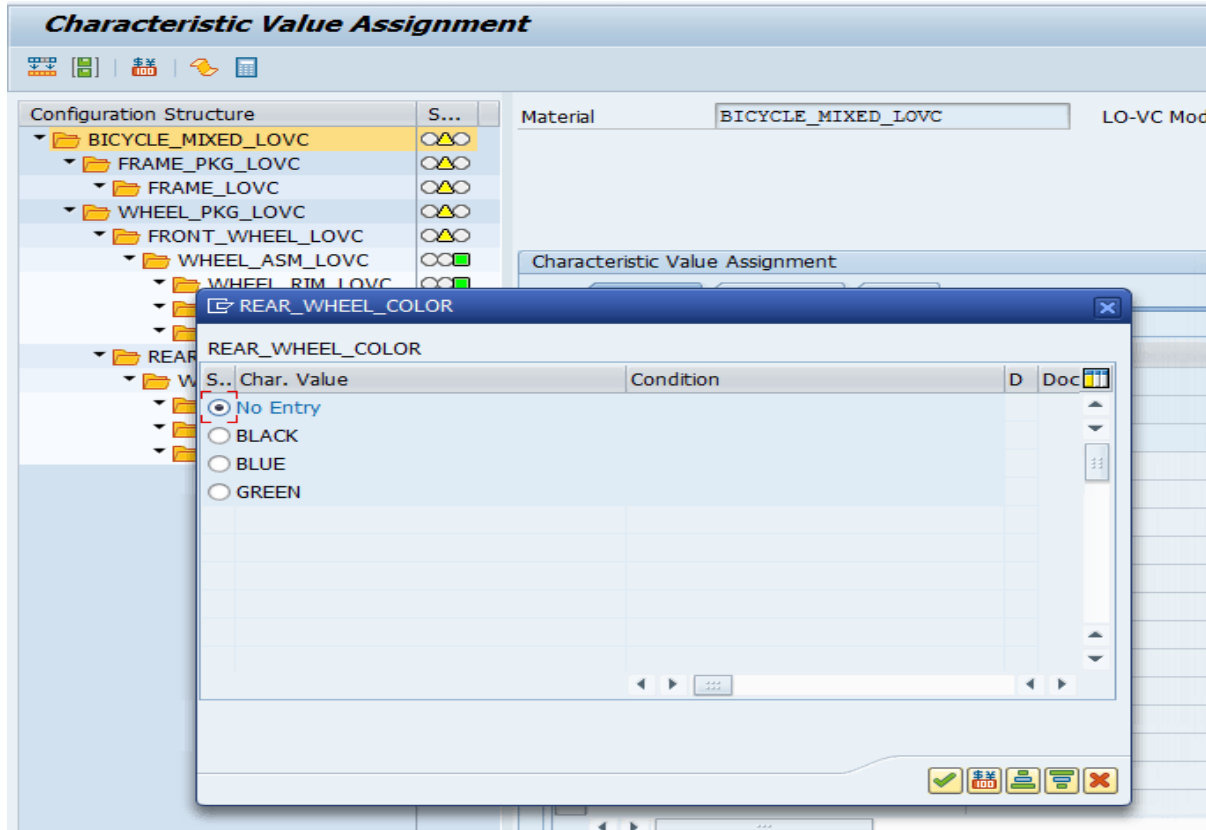
Status:

Group:

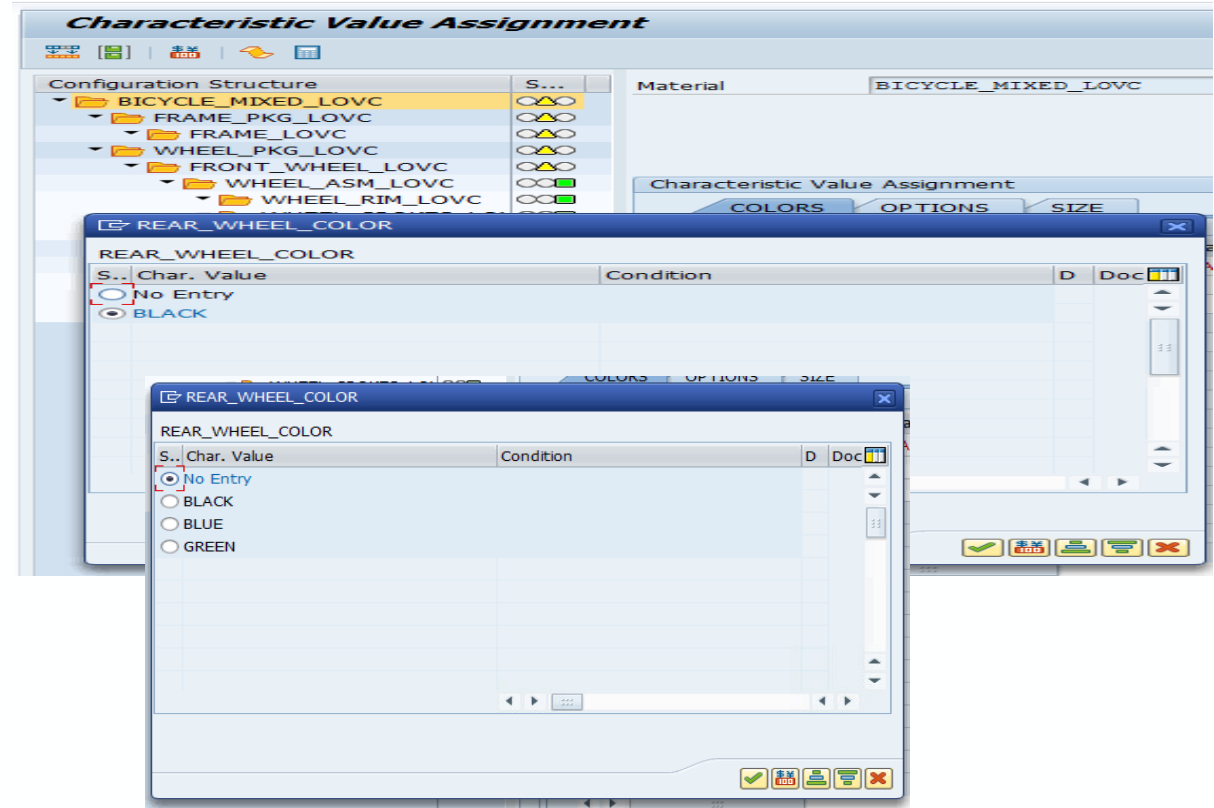
Type	Text	Category	Long Text	Message ID	Me...
	Dependency C_AVC_MV_OPT_TABLE: multivalued characteristic bound to variant table column.	AVC Syntax		VCH_HL_EN...	115
	No syntax errors found in object dependency AVC_BICYCLE_COLOR_NEGATIVE.	AVC Syntax		VCH_HL_EN...	106
	No syntax errors found in object dependency C_AVC_BICYCLE_MV_OPT.	AVC Syntax		VCH_HL_EN...	106

# Alternative Values in LO-VC

## Restricted Domain



## Alternative Values



# Alternative Values in AVC

## Restricted Domain

AVC Model for CWG Demonstration  
BICYCLE\_MIXEDADVANCEDVARIANTCONFIG

Configuration Status: **Incomplete** Date: 06.09.2018 Quantity: 1 Configuration Profile: BICYCLE\_MIXEDADVANCEDVARIANTCO Plant: BO Werk 0001

Configurable Items

Product	✓	⬆	⚙
BICYCLE_MIXEDADVANCEDV...	⚠		
FRAME_PKG_ADVANCEDV...	⚠		

AVC Model for CWG Demonstration  
Colors Group For CWG Bicycle D Options for f

\*FRAME\_COLOR:

- (None)
- (None)
- BLACK
- BLUE
- GREEN

## Alternative Values

AVC Model for CWG Demonstration  
BICYCLE\_MIXEDADVANCEDVARIANTCONFIG

Configuration Status: **Incomplete** Date: 16.09.2018 Quantity: 1 Configuration Profile: BICYCLE\_MIXEDADVANCEDVARIANTCO Plant: Werk 0001

Configurable Items

Product	✓	⬆	⚙
BICYCLE_MIXEDADVANCEDVAI	⚠		
FRAME_PKG_ADVANCEDVAI	✓		
WHEEL_PKG_ADVANCEDVAI	⚠		⚙

AVC Model for CWG Demonstration  
Colors Group For CWG Bicycle D Options f

\*FRAME\_COLOR:

- BLUE
- (None)
- BLACK
- BLUE
- GREEN

Inspector Trace

FRAME\_COLOR  
Characteristic

Predefined Value

- BLACK  
BLACK
- BLUE  
BLUE **Selected**
- GREEN  
GREEN
- RED  
RED **Excluded**

## More Precise Rounding

Note that for this particular item, there are no master data differences between LO-VC and AVC..

It's all in how the underlying engine does math..

# Same Mathematics

## LO-VC

Constraint Net: BICYCLE\_MIXED\_LOVC\_INHERITANCE  
Constraint: INHERIT\_FRAME\_SIZE\_LOVC

Basic Data | Editor | Descriptions | Change Overview

OBJECTS:  
?A IS\_A (300) Frame\_Size\_LOVC where  
    ?FS = Frame\_Size\_LOVC,  
?B IS\_A (300) Frame where  
    ?FS1 = Frame\_Size.

Restrictions:  
?FS1 = (?FS\*0.39370154693125).

## AVC

Constraint Net: BICYCLE\_MIXED\_AVC\_INHERITANCE  
Constraint: INHERIT\_FRAME\_SIZE\_AVC

Basic Data | Editor | Descriptions | Change Overview

OBJECTS:  
?A IS\_A (300) Frame\_Size\_AVC where  
    ?FS = Frame\_Size\_AVC,  
?B IS\_A (300) Frame where  
    ?FS1 = Frame\_Size\_AVC\_1.

Restrictions:  
?FS1 = (?FS\*0.39370154693125).

# More Precise Rounding

LO-VC

What you first see on screen

FRAME_SIZE	49,212693366406 "
------------	-------------------

AVC

FRAME_SIZE_AVC_1:	~ 49,212693366406 "
-------------------	---------------------

What you see if clicking the "Information" Button

The screenshot shows a dialog box titled 'FRAME\_SIZE' with the value '49,212693366406 "' in the title bar. The main content area displays the following information:

Characteristic	FRAME_SIZE	Frame size
Value	4.9212693366406249E+01 4.9212693366406249E+01	
The value was set by		
Constraint	INHERIT_FRAME_SIZE_LOVC	INHERIT_FRAME_SIZE_LOVC

At the bottom of the dialog, there are three buttons: a checkmark, a magnifying glass labeled 'Detail', and a close button.

What you see if clicking into the field

FRAME_SIZE_AVC_1:	49.21269336640625  "
-------------------	----------------------



# More Precise Rounding

## Precision and Rounding



AVC uses up to 34 digits for computation results

- $1.23456789876543 * 3.45678987654321$  can be computed exactly
- That's  $4.2676418143575609510750492303$  (in case you wondered)



Obviously, that is not always enough:  $X = 1 / 3$

- AVC applies advanced algorithms to further control rounding errors (based on IEEE'1788-2015 standard)

# Bill Of Material Explosion

LO-VC

**Configuration for BICYCLE\_MIXED\_LOVC 07.09.2018**

Dependency: SET\_LOVC\_BOM\_CSTIC

Object	Description	S.
BICYCLE_MIXED_LOVC	LO-VC Model for CWG De...	
BICYCLE_MIXED_LOVC		
300 BICYCLE	Bicycle Class	
300 BICYCLEMIXOPTLOVC	Options for Bicycle LOVC	
300 FRAME_SIZE_LOVC	Frame Size LOVC	
1 01		
0010 N FRAME_PKG_LOVC	LO-VC Model for CWG De...	
0020 N WHEEL_PKG_LOVC	LO-VC Model for CWG De...	
WHEEL_PKG_LOVC	LO-VC Model for CWG De...	
0010 SET_LOVC_BOM_CSTIC	SET_LOVC_BOM_CSTIC	

Basic Data Editor Descriptions Usage Change C

§SELF.BOM\_CSTIC = 'VALUESETBYPROCEDURE'

AVC

Legend Icons... Test Fullscreen On/Off Explode Model Check Model Reload Model More v

Dependency: SET\_AVC\_BOM\_CSTIC

Object	Description	Status	Ove...
BICYCLE_MIXEDADVANCEDVARIANTCON	AVC Model for CWG De		
BICYCLE_MIXEDADVANCEDVARIANTC			
300 BICYCLE	Bicycle Class		
300 BICYCLEMIXOPTAVC	Options for Bicycle AVC		
300 FRAME_SIZE_AVC	Frame Size AVC		
1 01			
0010 N FRAME_PKG_ADVANCEDVAI	AVC Model for CWG De		
0020 N WHEEL_PKG_ADVANCEDVAI	AVC Model for CWG De		
WHEEL_PKG_ADVANCEDVARIAN	AVC Model for CWG De		
0010 SET_AVC_BOM_CSTIC	SET_AVC_BOM_CSTIC		

Basic Data Editor Descriptions Usage Change Overview

§SELF.BOM\_CSTIC = 'VALUESETBYPROCEDURE'

**Characteristic Value Assignment**

Configuration Structure

Configuration Structure	S...
BICYCLE_MIXED_LOVC	○○○
FRAME_PKG_LOVC	○○○
FRAME_LOVC	○○○
WHEEL_PKG_LOVC	○○○
FRONT_WHEEL_LOVC	○○○
WHEEL_ASM_LOVC	○○○
WHEEL_RIM_LOVC	○○○
WHEEL_SPOKES_LOV	○○○
BRAKE_ASM_LOVC	○○○
REAR_WHEEL_LOVC	○○○
WHEEL_ASM_LOVC	○○○

Material: WHEEL\_PKG\_LOVC  
LO-VC Model for CWG Demonstration

Date: 07.09.2018

Char. description	Char. Value
REAR_WHEEL_COLOR	BLACK
FRONT_WHEEL_COLOR	BLACK
BOM_CSTIC	VALUESETBYPROCEDURE

AVC Model for CWG Demonstration  
BICYCLE\_MIXEDADVANCEDVARIANTCONFIG

Configuration Status: Released Date: 06.09.2018 Quantity: 1 Configuration Profile: BICYCLE\_MIXEDADVANCEDVARIANTCO Plant: Werk 0001 BOM Application: PP01

Configurable Items

Product	✓	↑	⊗
BICYCLE_MIXEDADVANCEDVAI	✓		
FRAME_PKG_ADVANCEDVAI	✓		

AVC Model for CWG Demonstration WHEEL\_PKG\_ADVANCEDVARIANTCONFIG Released

\*FRONT\_WHEEL\_COLOR: BOM\_CSTIC: \*REAR\_WHEEL\_COLOR: BLACK



# Bill Of Material Explosion - Trace

LO-VC

**Configuration Structure**

- BICYCLE\_MIXED\_LOVC
- FRAME\_PKG\_LOVC
- FRAME\_LOVC
- WHEEL\_PKG\_LOVC
- FRONT\_WHEEL\_LOVC
- WHEEL\_ASM\_LOVC
- WHEEL\_RIM\_LOVC
- WHEEL\_SPOKES\_LOVC
- BRAKE\_ASM\_LOVC
- REAR\_WHEEL\_LOVC
- WHEEL\_ASM\_LOVC
- WHEEL\_RIM\_LOVC
- WHEEL\_SPOKES\_LOVC
- BRAKE\_ASM\_LOVC

**Material:** WHEEL\_PKG\_LOVC  
**Date:** 07.09.2018

**Characteristic Value Assignment**

Char. description	Char. Value
REAR_WHEEL_COLOR	BLACK
FRONT_WHEEL_COLOR	BLACK
BOM_CSTIC	VALUESETBYPROCEDURE

**Trace Settings**

Trace Level:  
 Rough  
 More Detailed

Trace Areas:

- Prerequisites
- Selection Conditions
- Actions
- Procedures
- Constraints
- Perf.Const. PMS
- Tables
- Functions
- Dynamic Database

AVC

**AVC Model for CWG Demonstration**  
BICYCLE\_MIXEDADVANCEDVARIANTCONFIG

Configuration Status: Released | Date: 06.09.2018 | Quantity: 1 | Configuration Profile: BICYCLE\_MIXEDADVANCEDVARIANTCO | Plant: Werk 0001 | BOM Application: PP01

**Configurable Items**

Product	✓	↕	⊗
BICYCLE_MIXEDADVANCEDVAI	✓		
FRAME_PKG_ADVANCEDVAI	✓		
WHEEL_PKG_ADVANCEDVAI	✓		⊗

**AVC Model for CWG Demonstration** WHEEL\_PKG\_ADVANCEDVARIANTCONFIG | Released

Default Group

\*FRONT\_WHEEL\_COLOR: BLACK | BOM\_CSTIC:

**Trace Filter**

Trace Level: High-Level Configuration

Message Type: Value Assignment

Value Assignment By: Procedure

Characteristic:

Go Reset Cancel

# BOM Explosion – High Level Configuration

## LO-VC

**Characteristic Value Assignment**

Configuration Structure

- BICYCLE\_MIXED\_LOVC
- FRAME\_PKG\_LOVC
- FRAME\_LOVC
- WHEEL\_PKG\_LOVC
- FRONT\_WHEEL\_LOVC
- WHEEL\_ASM\_LOVC
- WHEEL\_RIM\_LOVC
- WHEEL\_SPOKES\_LOVC
- BRAKE\_ASM\_LOVC
- REAR\_WHEEL\_LOVC
- WHEEL\_ASM\_LOVC
- WHE...
- WHE...
- BRAN...

Material: WHEEL\_PKG\_LOVC  
Date: 07.09.2018  
LO-VC Model for CWG Demonstration

Char. description	Char. Value
REAR_WHEEL_COLOR	BLACK
FRONT_WHEEL_COLOR	BLACK
BOM_CSTIC	VALUESETBYPROCEDURE

Trace Display of Configurator

Row Number	Message Text
000001	599 Procedure SET_LOVC_BOM_CSTIC executed
000002	599 Procedure SET_LOVC_BOM_CSTIC executed

## AVC

Simulate Configuration Models

AVC Model for CWG Demonstration  
BICYCLE\_MIXEDADVANCEDVARIANTCONFIG

Configuration Status: Released  
Date: 06.09.2018  
Quantity: 1  
Configuration Profile: BICYCLE\_MIXEDADVANCEDVARIANTCO  
Plant: Werk 0001  
BOM Application: PP01

Configurable Items

Item	Product	Check	Info
BICYCLE_MIXEDADVANCEDVAI		✓	
FRAME_PKG_ADVANCEDVAI		✓	
WHEEL_PKG_ADVANCEDVAI		✓	

AVC Model for CWG Demonstration

Default Group

Filtered By: Value Assignment + Procedure + High-Level Configuration

No trace messages to display.

\*FRONT\_WHEEL\_COLOR: BLACK

BOM\_CSTIC:

\*REAR\_WHEEL\_COLOR: BLACK

# Trace – Low Level Configuration

LO-VC

Material: WHEEL\_PKG\_LOVC  
Date: 07.09.2018  
LO-VC Model for CWG Demons

Char. description	Char. Value
REAR_WHEEL_COLOR	BLACK
FRONT_WHEEL_COLOR	BLACK
BOM_CSTIC	VALUESETBYPROCEDURE

Trace Settings

Trace Level:  Rough  More Detailed

Trace Areas:

- Prerequisites
- Selection Conditions
- Actions
- Procedures
- Constraints
- Perf.Const. PMS
- Tables
- Functions
- Dynamic Database

AVC

AVC Model for CWG Demonstration

Default Group

\*FRONT\_WHEEL\_COLOR: BLACK

BOM\_CSTIC:

\*REAR\_WHEEL\_COLOR: BLACK

Trace Filter

Trace Level: Low-Level Configuration

Message Type: Selection Condition Fulfilled

Go Reset Cancel

AVC Model for CWG Demonstration

Default Group

\*FRONT\_WHEEL\_COLOR: BLACK

BOM\_CSTIC:

\*REAR\_WHEEL\_COLOR: BLACK

Trace Filter

Trace Level: Low-Level Configuration

Message Type: Procedure Executed

Value Assignment By:

Characteristic:

Go Reset Cancel

# BOM Explosion – Low Level Configuration

## LO-VC

**Characteristic Value Assignment**

Configuration Structure: BICYCLE\_MIXED\_LOVC, FRAME\_PKG\_LOVC, FRAME\_LOVC, **WHEEL\_PKG\_LOVC**, FRONT\_WHEEL\_LOVC, WHEEL\_ASM\_LOVC, WHEEL\_RIM\_LOVC, WHEEL\_SPOKES\_LOVC, BRAKE\_ASM\_LOVC, REAR\_WHEEL\_LOVC, WHEEL\_ASM\_LOVC, WHE..., WHE..., BRAK...

Material: WHEEL\_PKG\_LOVC  
Date: 07.09.2018  
LO-VC Model for CWG Demonstration

Char. description	Char. Value
REAR_WHEEL_COLOR	BLACK
FRONT_WHEEL_COLOR	BLACK
BOM_CSTIC	VALUESETBYPROCEDURE

Trace Display of Configurator

Row Number	Message Text
000001 599	Procedure SET_LOVC_BOM_CSTIC executed
000002 599	Procedure SET_LOVC_BOM_CSTIC executed

## AVC

Configuration Profile: BICYCLE\_MIXEDADVANCEDVARIANTCO  
Plant: Werk 0001  
BOM Application: PP01

AVC Model for CWG Demonstration

Inspector Trace

Filtered By: Procedure Executed + Low-Level Configuration

- 6 Procedure SET\_AVC\_BOM\_CSTIC executed on component WHEEL\_PKG\_ADVANCEDVARIANTCONFIG
- 7 Procedure SET\_AVC\_BOM\_CSTIC executed on component WHEEL\_PKG\_ADVANCEDVARIANTCONFIG

# BOM Explosion – Low Level Configuration

LO-VC

When to utilize the "undocumented feature" known as..



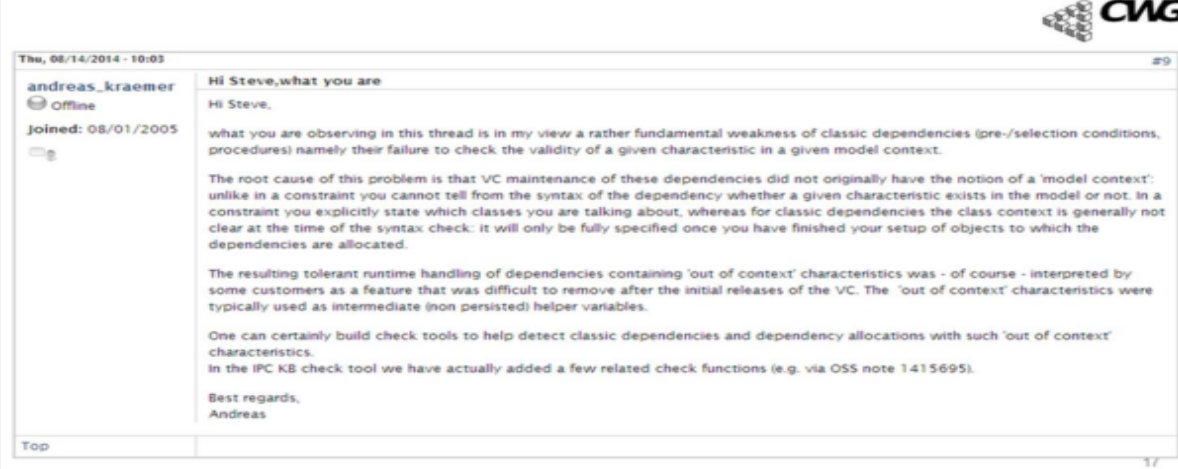
## ANY OLD CHARACTERISTIC



5

[LO-VC Presentation Given in Berlin](#)

AVC



Thu, 08/14/2014 - 10:03

andreas\_kraemer  
Offline  
joined: 08/01/2005

Hi Steve,what you are  
Hi Steve,  
what you are observing in this thread is in my view a rather fundamental weakness of classic dependencies (pre-/selection conditions, procedures) namely their failure to check the validity of a given characteristic in a given model context.  
The root cause of this problem is that VC maintenance of these dependencies did not originally have the notion of a 'model context': unlike in a constraint you cannot tell from the syntax of the dependency whether a given characteristic exists in the model or not. In a constraint you explicitly state which classes you are talking about, whereas for classic dependencies the class context is generally not clear at the time of the syntax check: it will only be fully specified once you have finished your setup of objects to which the dependencies are allocated.  
The resulting tolerant runtime handling of dependencies containing 'out of context' characteristics was - of course - interpreted by some customers as a feature that was difficult to remove after the initial releases of the VC. The 'out of context' characteristics were typically used as intermediate (non persisted) helper variables.  
One can certainly build check tools to help detect classic dependencies and dependency allocations with such 'out of context' characteristics. In the IPC KB check tool we have actually added a few related check functions (e.g. via OSS note 1415695).  
Best regards,  
Andreas

Top

Here is SAP's response, from both OSS and the CWG (Andreas Kraemer is a long time SAP employee in the VC space)..

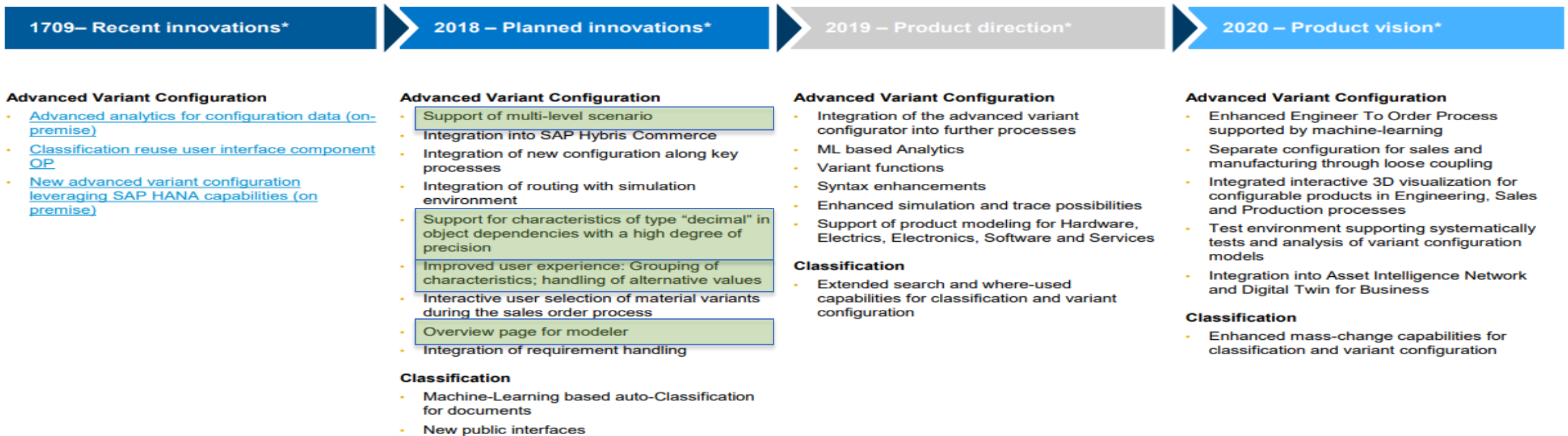
Bottom line, it's "standard, expected" functionality in high level configuration. Meaning we can use it without the same fears of SAP closing the hole with a support package in ECC 6. This means that as long as we run ECC 6 we won't have any issues with using this technique.

We know that this hole has been closed in the IPC and SSC. It also turns out that the AVC will NOT allow this technique. All cstics must be assigned to classes in the AVC.

ASUG

# Roadmaps

## SAP S/4HANA for advanced variant configuration – On Premise (Additional license)



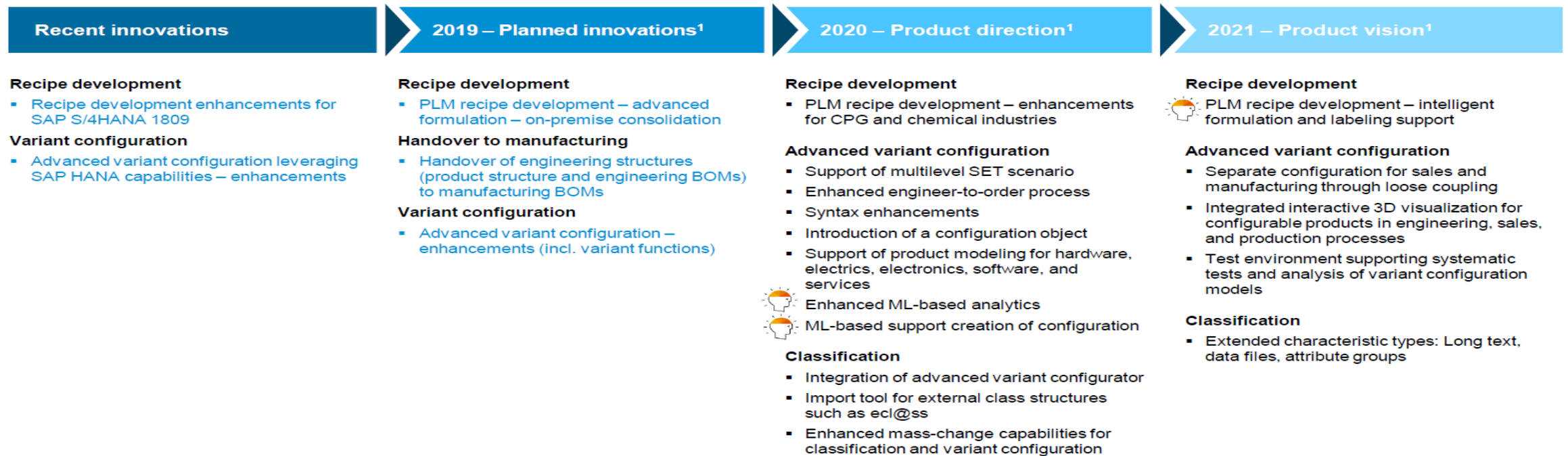
\*This is the current state of planning and may be changed by SAP at any time without notice.



# Roadmaps

## SAP S/4HANA

LoB: R&D/engineering (2/5) – discrete and process industries (2)



1. This is the current state of planning and may be changed by SAP at any time without notice.

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# Presentation Materials

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# Q&A

For questions after this session, contact me at [sschneid@steelcase.com](mailto:sschneid@steelcase.com)

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