



ptc

# LIVEWORX

A NEW ERA IN PRODUCT LIFECYCLE INNOVATION

SESSION ID: CA1155C

## CREO MBD POWERS GE APPLIANCE'S DIGITAL TRANSFORMATION

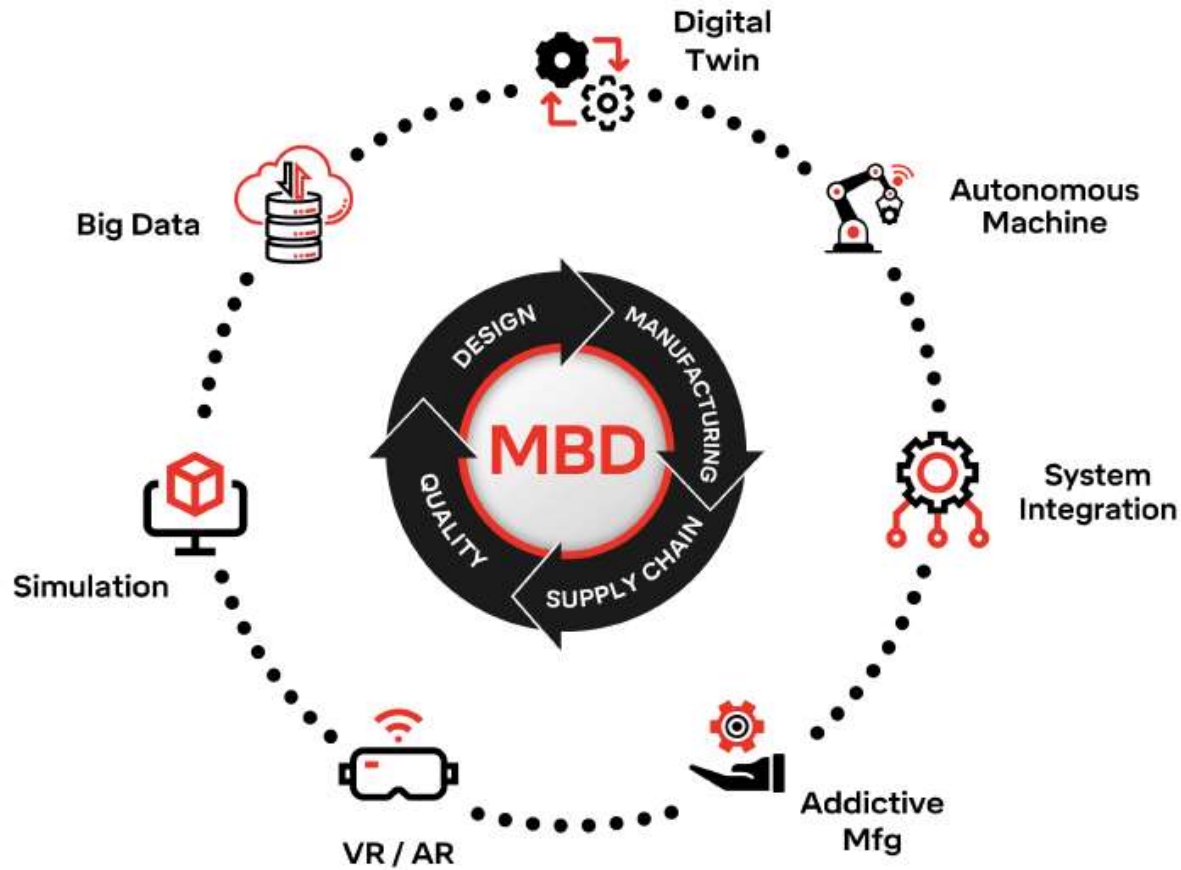
**SPEAKER(s): Trent Stone**

Sr. Design Engineer, GE Appliances

**Daniel Campbell**

VP, Model-Based Definition, Capvidia

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Building MBD Workflows with:





# House of Brands





# Global Headquarters

*Louisville, KY*



**750-Acre** industrial park  
established in 1951



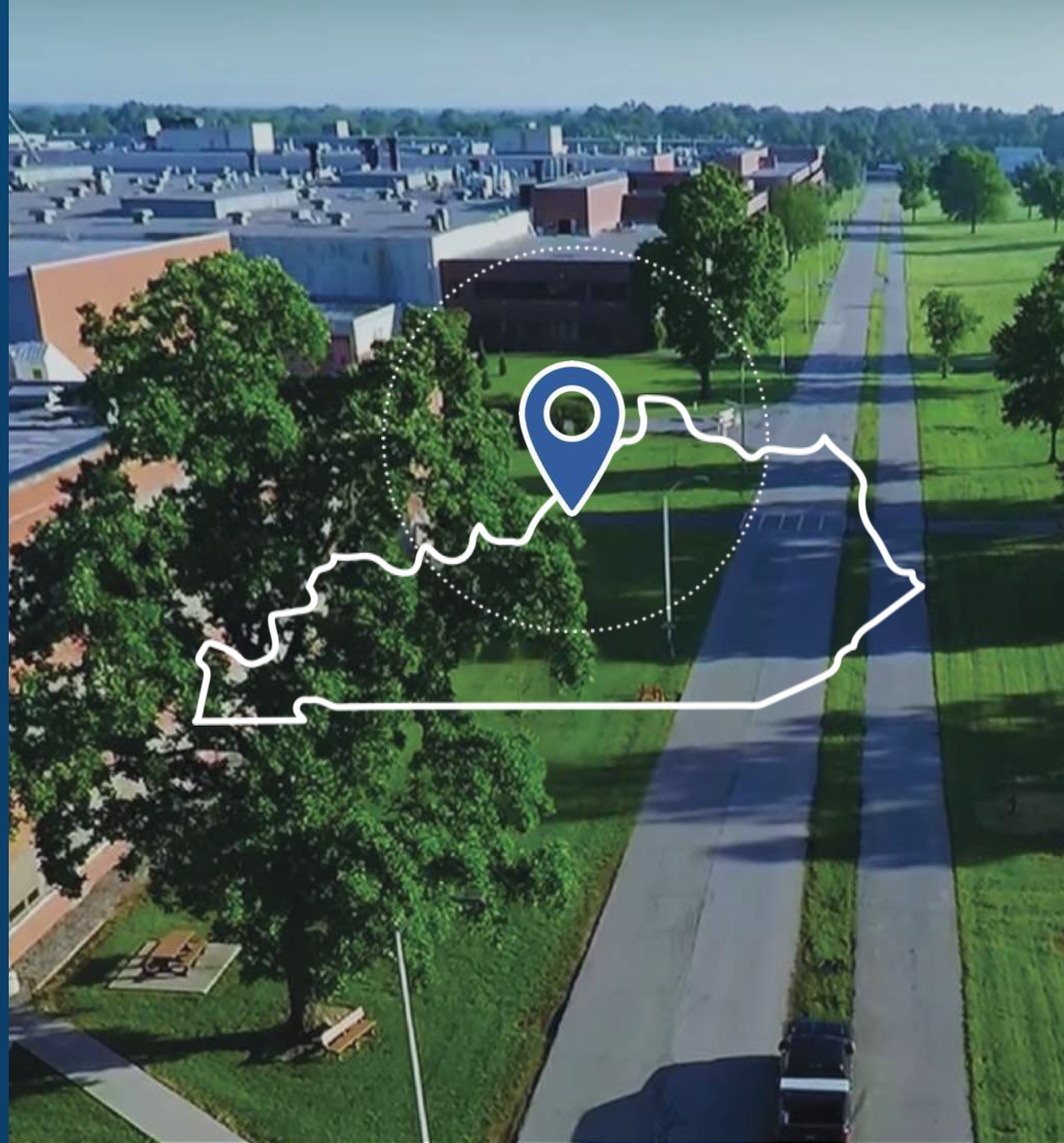
Home to more than **8,500** employees  
including **1,600** design and  
manufacturing engineers



Our **largest manufacturing site** with  
**five** facilities making washers, dryers,  
dishwashers & refrigerators



Appliance Park is a **city within a  
city** and has its own zip code, 40225





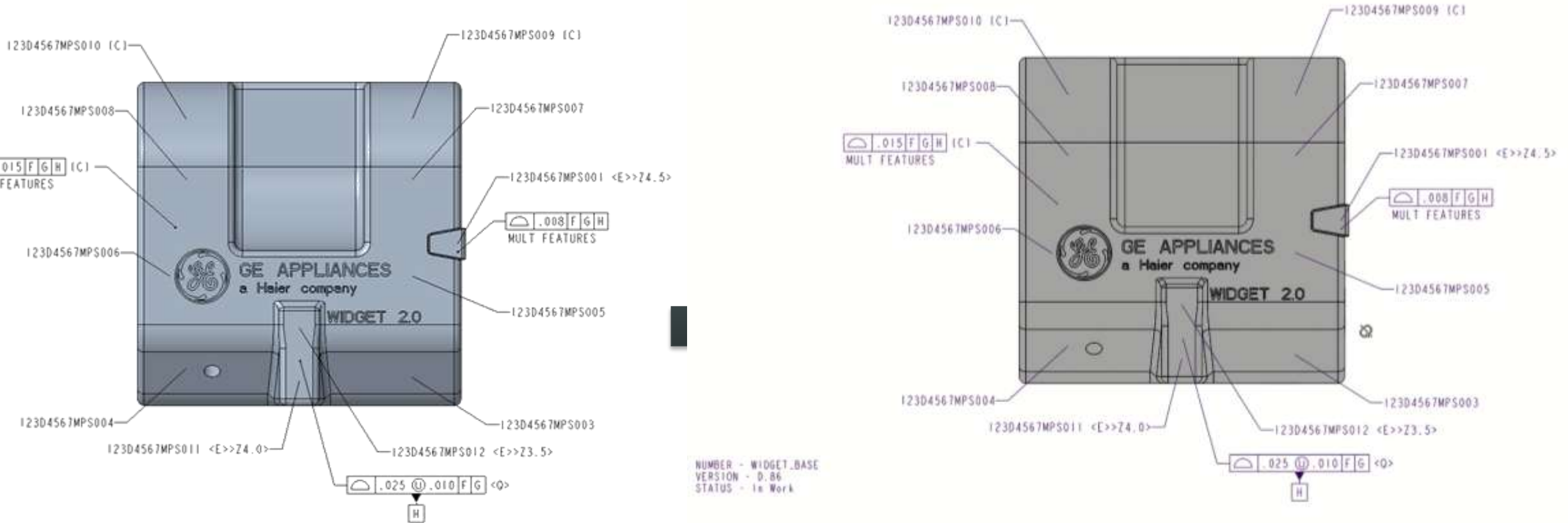
# MODEL-BASED DEFINITION

- What is MBD
- GE Appliances' MBD Journey

# MBD – MODEL-BASED DEFINITION

## Model-Based Definition (MBD): Definitions

- **MBD:** Expressing full product definition through a single model using human and machine-readable practices to express geometry and PMI
- **Machine-Readable Annotations:** Annotations with semantic references that communicate complete function of the annotation



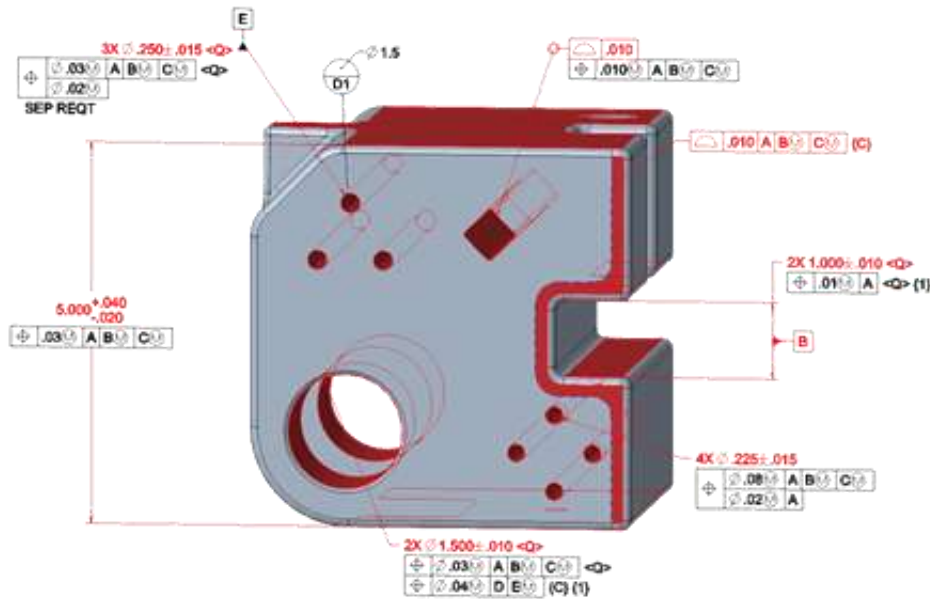


# HUMAN VS MACHINE READABLE



## Understand Your Downstream Audience...

Who (what) needs to read and interpret (consume) PMI?



Engineering, Manufacturing, Marketing, Suppliers

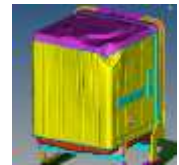


UNLOCK  
Your Digital Enterprise

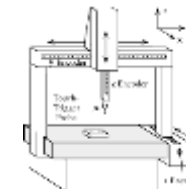
Creo View



CFD



FEA



# GE APPLIANCES TIMELINE

Directive from Leadership  
Feb 2015

Human Readable MBD  
June 2015

QIF Data Export  
Q1 2018

Human/Machine Readable MBD  
Q4 2018

Human Readable 2D

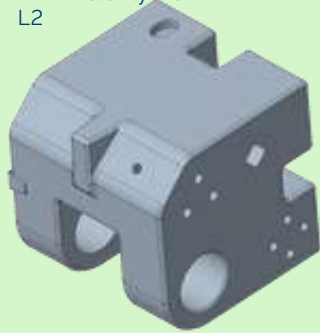
Human Readable 3D

Machine Readable 3D

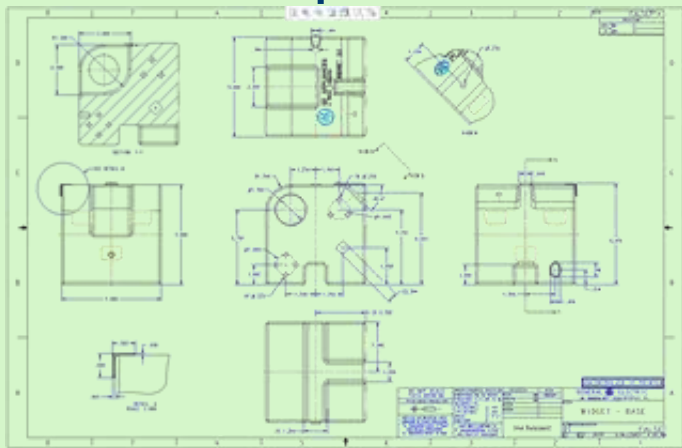
Human Readable 2D

Data Set: Model and Drawing

MBE Maturity Matrix L2



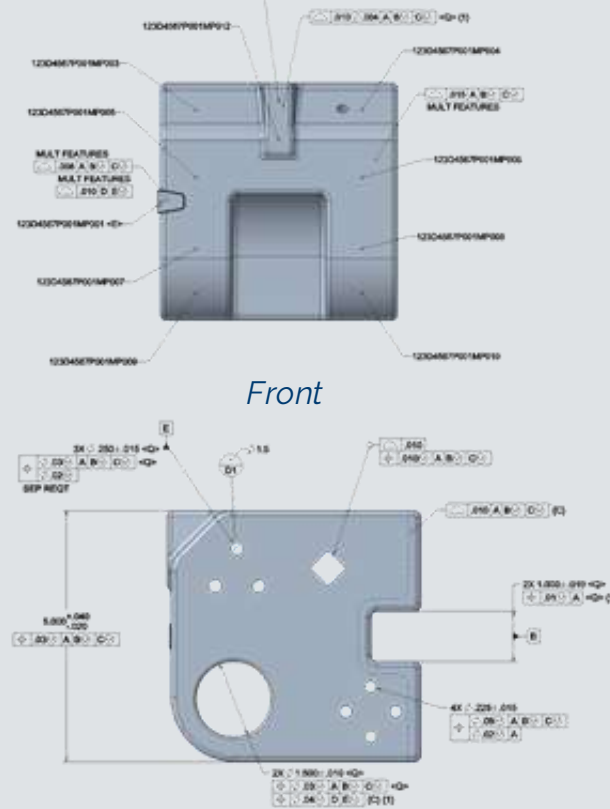
+



Human Readable MBD

Data Set: Annotated Model and No Drawing

MBE Maturity Matrix L3



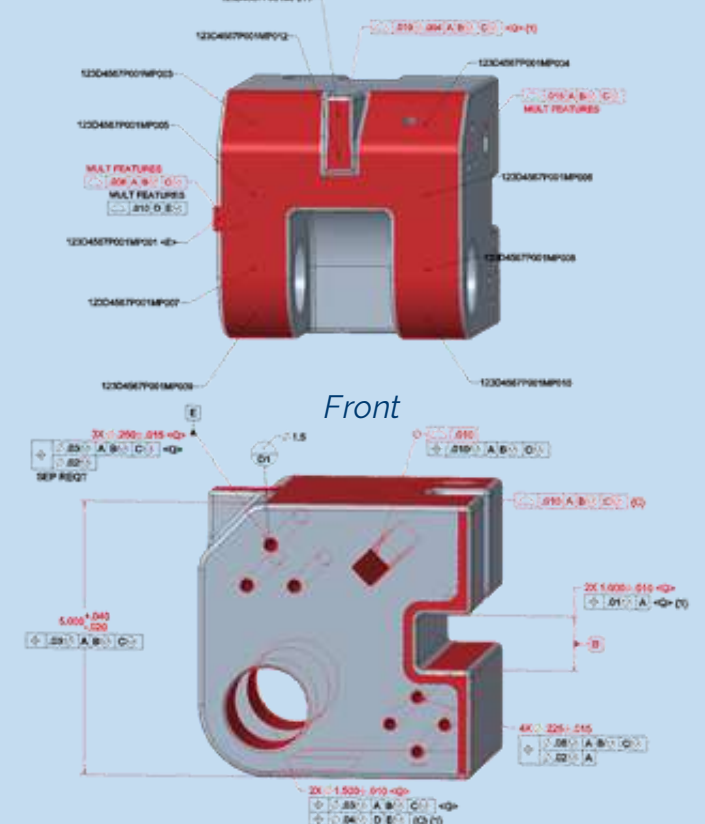
Front

Right

Human/Machine Readable MBD

Data Set: Annotated Model and No Drawing

MBE Maturity Matrix L4/L5



Front

Right





# PEOPLE & PROCESSES: MBD STANDARDS

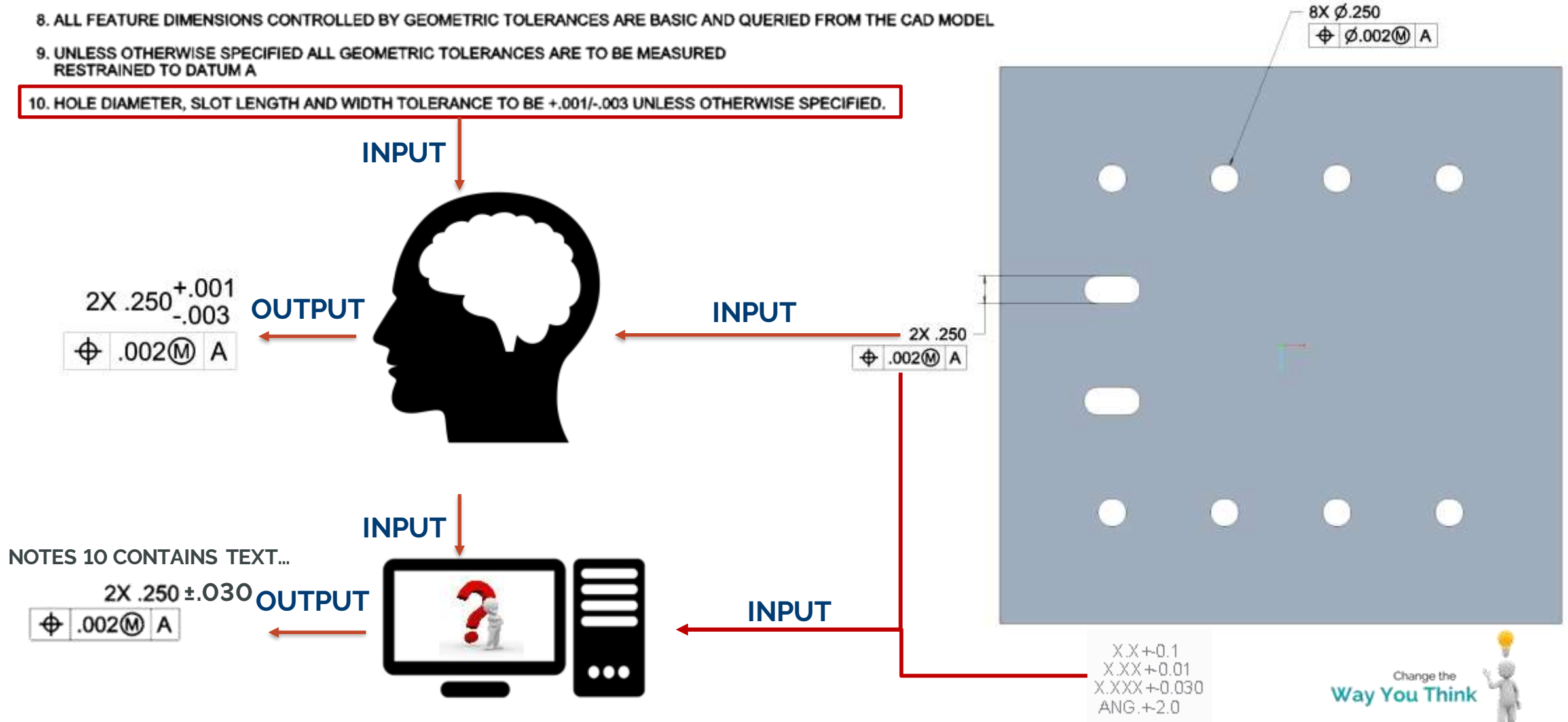
How GE Appliances manages People & Process  
with their MBD implementation

# MBD STANDARDS: GENERAL NOTES

8. ALL FEATURE DIMENSIONS CONTROLLED BY GEOMETRIC TOLERANCES ARE BASIC AND QUERIED FROM THE CAD MODEL

9. UNLESS OTHERWISE SPECIFIED ALL GEOMETRIC TOLERANCES ARE TO BE MEASURED RESTRAINED TO DATUM A

10. HOLE DIAMETER, SLOT LENGTH AND WIDTH TOLERANCE TO BE  $+0.001/-0.003$  UNLESS OTHERWISE SPECIFIED.



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~~10. HOLE DIAMETER, SLOT LENGTH AND WIDTH TOLERANCE TO BE  $\pm .002$  UNLESS OTHERWISE SPECIFIED.~~

2X  $\begin{matrix} .250^{+.001} \\ -.003 \end{matrix}$   
 $\begin{matrix} \text{Ø} \\ .002 \text{ (M)} \end{matrix}$  A

OUTPUT



INPUT

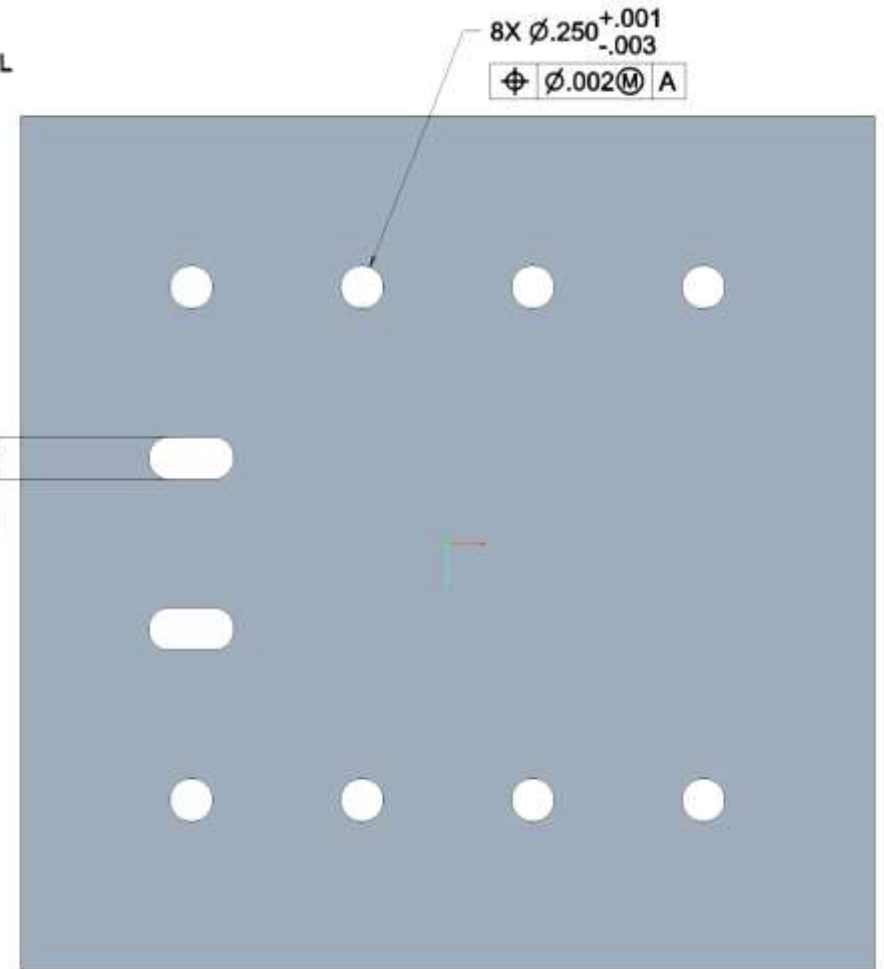
2X  $\begin{matrix} .250^{+.001} \\ -.003 \end{matrix}$   
 $\begin{matrix} \text{Ø} \\ .002 \text{ (M)} \end{matrix}$  A

2X  $\begin{matrix} .250^{+.001} \\ -.003 \end{matrix}$   
 $\begin{matrix} \text{Ø} \\ .002 \text{ (M)} \end{matrix}$  A

OUTPUT



INPUT



X.X+0.1  
X.XX+0.01  
X.XXX+0.030  
ANG.+2.0

Change the  
Way You Think





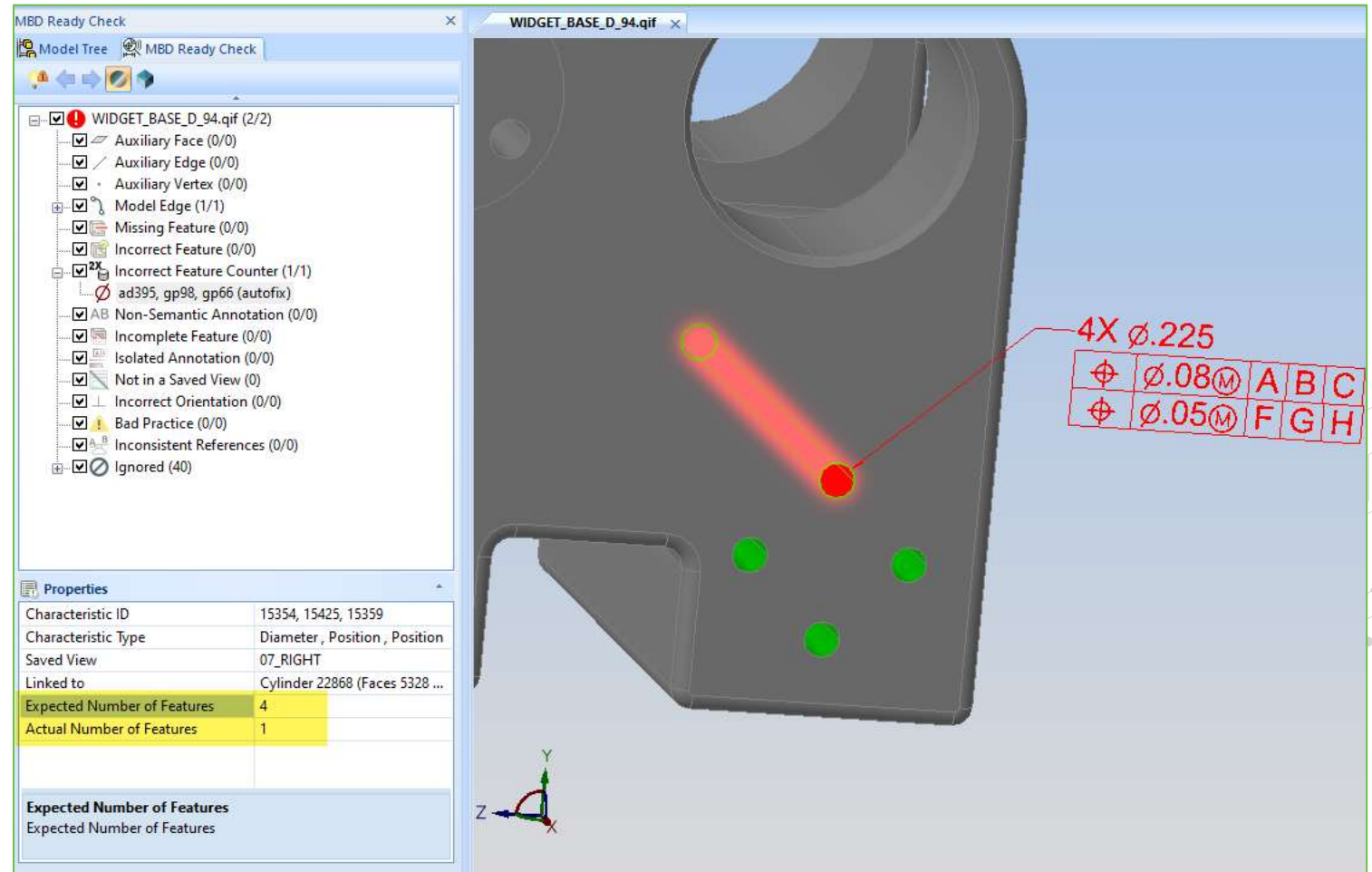
# TOOLS: MBD READY CHECK

Capvidia's MBDVidia has the checking tools to make sure that the right MBD practices are followed and enforced



# TOOLS: MBD READY CHECK

- Detect issues with non-semantic PMI
- Behaves like a spell checker
- Enforces best-practices defined in your MBD Playbook



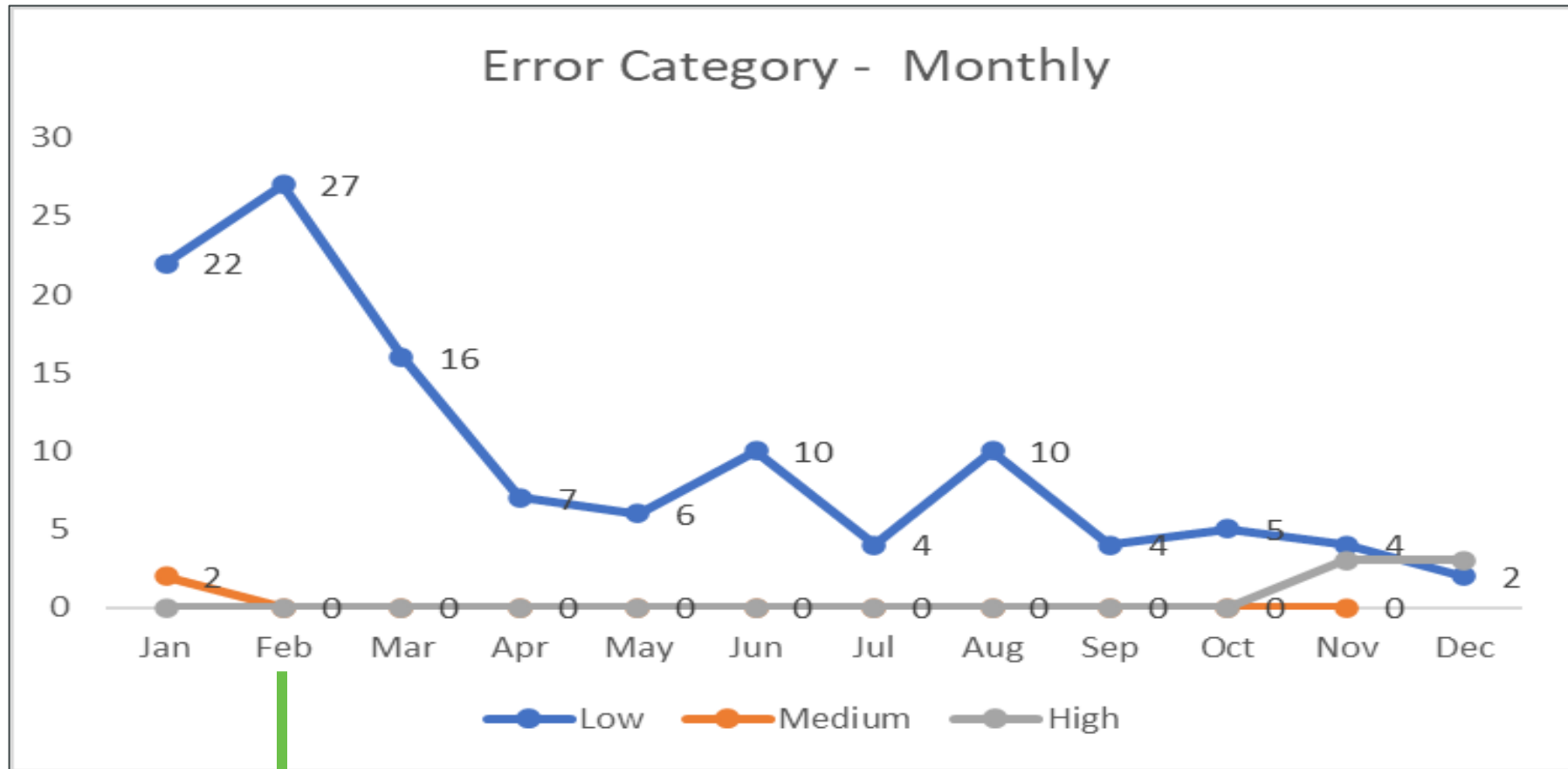




# THE RESULTS

The upshot: GE Appliances is seeing fewer errors and faster PPAP processing time

# METRICS – PPAP REPORT GENERATION ERRORS



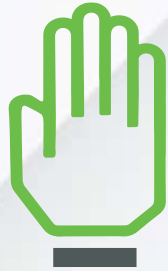
Implemented MBDReady Check Feb 22



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# LESSONS LEARNED

- Develop robust standards and best practices playbook
- Engage with those with experienced in MBD implementations
- This is not an Engineering only activity. Cross functional engagement and buy in is critical to success. This includes your supply base.
- It's a journey – start small with pilot projects to build your playbook
- **DO NOT** convert to MBD just to remove the drawing. Have a plan to make use of the PMI and semantic references to automate your downstream processes.



# QUESTIONS?

Thank you! You can find us at:



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Your feedback provides us with valuable information on how to shape future content strategy for the event!



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# THANK YOU

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