QIF 2.0: A New Digital Interoperability Standard for Manufacturing Quality Data

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President, DMSC; Chairman, BOD; QIFPlans Working Group

CAPSULE

- **Manufacturing Quality digital information *incompatibilities* are costly and affects everyone:**
  - **Vendors**
  - **Suppliers**
  - **Users**
  - **Customers**

  And the digital metrology community lacks an enterprise-wide standard solution, . . .
  UNTIL NOW, a superior standards-based digital interoperability has been approved.
- **QIF also enables Manufacturing Quality to Join the Model-Based Enterprise!**

CAPSULE

- **Quality Information Framework (QIF) is a new standard for interoperable manufacturing quality data.**
- **Developed by Metrology Subject Matter Experts and Computer Scientists**
- **The QIF Information Model:**
  - **Scope: developing the digital product verification package with initial emphasis on dimensional metrology; from product design to inspection planning, planning to programming, and inspection execution to results reporting, analysis w/ statistics**
  - **Effects: will be efficient, accurate transfer of self validating manufacturing quality information**
  - **Benefits: improve manufacturing quality; increase product verification velocity; while reducing costs**

QIF™ Quality Information Framework

CAPSULE

- **QIF v1.0 was approved by ANSI on December, 19th 2013**

ANSI Approves New
Quality Information Framework (QIF™) Standard

New QIF™ v2.0 Standard: A Major Breakthrough for the Manufacturing Quality

Burleson, Texas, USA – October 31, 2014 — The Dimensional Metrology Standards Consortium (DMSC Inc.) announced today that on October 30th, 2014, the American National Standards Institute (ANSI) approved QIF v2.0 as an ANSI standard. This new standard enhances the previous ANSI Standard, QIF v1.0 containing quality planning and measurement results, by providing a complete and accurate 3D product definition with semantic geometric and dimensional tolerances, definitions for measurement resources, template for measurement rules, and statistical functionality. All of this to satisfy the digital interoperability needs for a wide variety of use cases including feature-based dimensional metrology, quality measurement planning, first article inspection, and discrete quality measurement.

- **QIF v2.0:**
  - **Public Demonstration at IMTS Show, September, 2014**
  - ***ANSI Approves new QIF v2.0 on October, 30th 2014***

QIF™
Quality Information Framework

The QIF Standard

- **ANSI/QIF 2014 (QIF v2.0)**
- **Dimensional Metrology Standards Consortium (DMSC)**
- *Quality Information Framework (QIF) — An Integrated Model for Manufacturing Quality Information*:
  - ***Part 1**: Overview and Fundamental Principles*
  - ***Part 2**: QIF Library Information Model and XML Schema Files*
  - ***Part 3**: QIF Model Based Definition (MBD) Information Model and XML Schema File*
  - ***Part 4**: QIF Plans Information Model and XML Schema File*
  - ***Part 5**: QIF Resources Information Model and XML Schema File*
  - ***Part 6**: QIF Rules Information Model and XML Schema File*
  - ***Part 7**: QIF Results Information Model and XML Schema File*
  - ***Part 8**: QIF Statistics Information Model and XML Schema File*

CAPSULE

Dimensional Metrology Standards Consortium | **2014**

ANSI Standard
Quality Information Framework (QIF™) Standard

New QIF™ v2.0 Standard: A significant Breakthrough for the Metrology Industry

- **Burleson, Texas, USA – September 3, 2014 – The Dimensional Metrology Standards Consortium, Inc. (DMSC) will hold a special event daily during the IMTS show September 8-13, 2014 at the McCormick Place in Chicago, IL.**

- **A demonstration of QIF (Quality Information Framework) version 2.0 draft standard will be held Tuesday-Friday at the Daily Demonstrations: 10:00 am and 2:00 pm**

- **Join DMSC President Curtis Brown of Honeywell FM&T, Lockheed Martin, NIST, John Deere, Capvidia, PTC, Metrosage, Origin International, IPI Solutions, Mitutoyo America Corporation, Innovalia Metrology, MTConnect Institute, InfinityQS, Kotem Ltd, Renishaw, and PAS Technology, as they demonstrate QIF version 2.0 as published in the September 5th, 2014 ANSI Standards Action publication.**

QIF™ Quality Information Framework

Outline

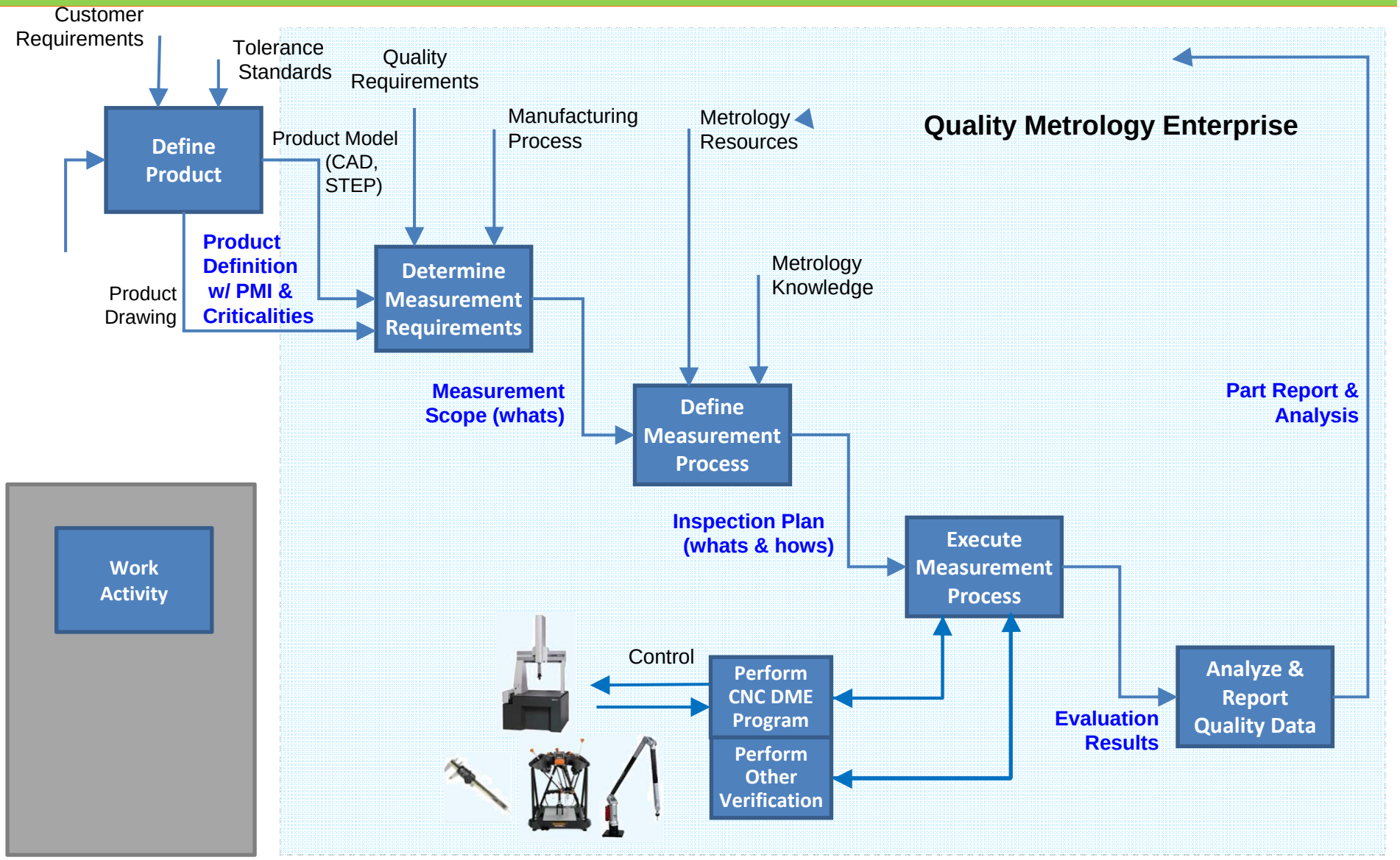
- **Digital Product Verification (DPV)**
- **Digital Interoperability Standards for enabling . . .**

Model Based Enterprise (MBE)

- **Quality Information Framework enables DPV**
  - **Structure of QIF, design principles**
  - **Validation and demos**
  - **Current development status**
- **Dimensional Metrology Standards Consortium**
- **Summary and Request for Involvement**

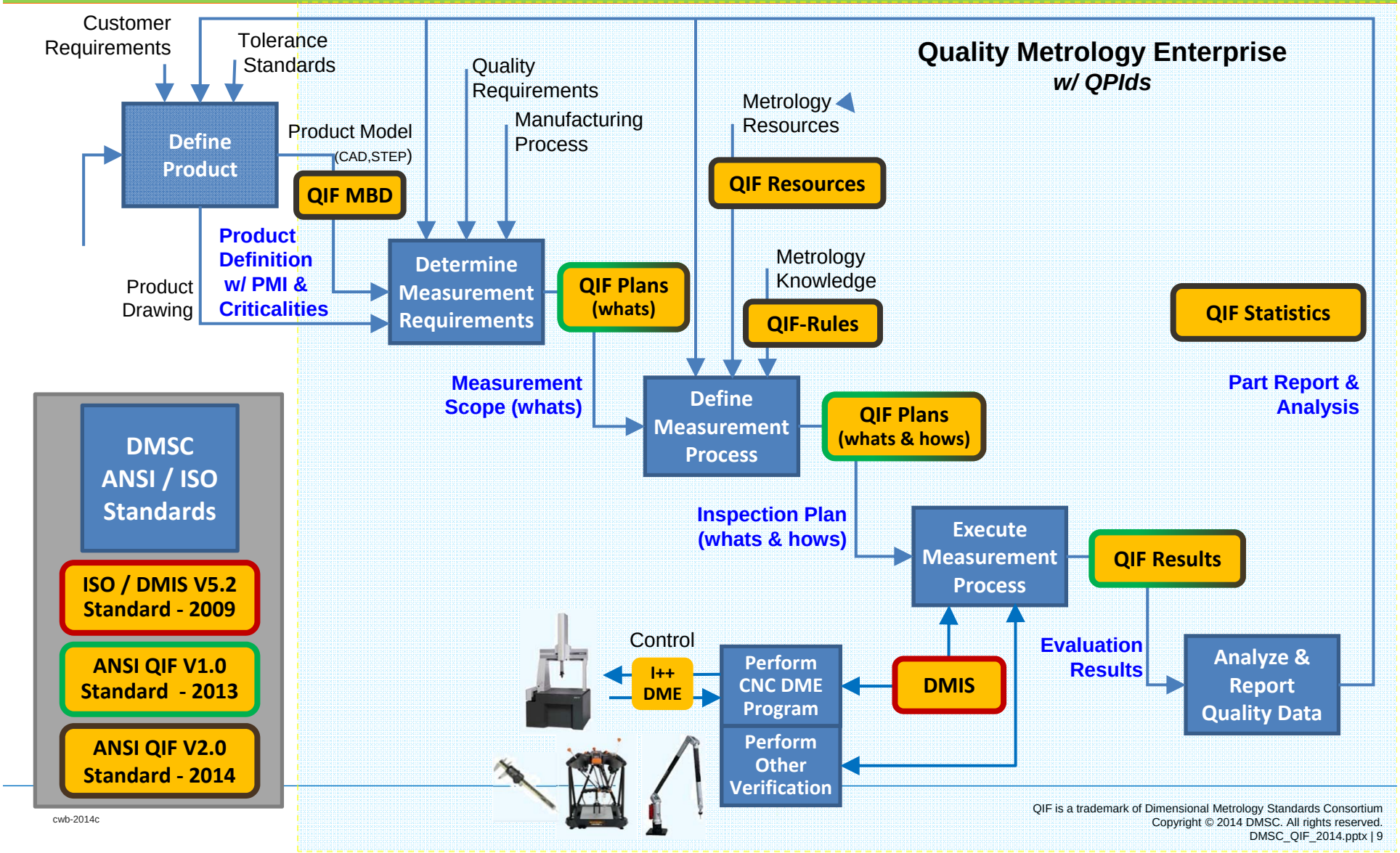
Product Verification Activity Workflow

Dimensional Metrology Standards Consortium | **2014**



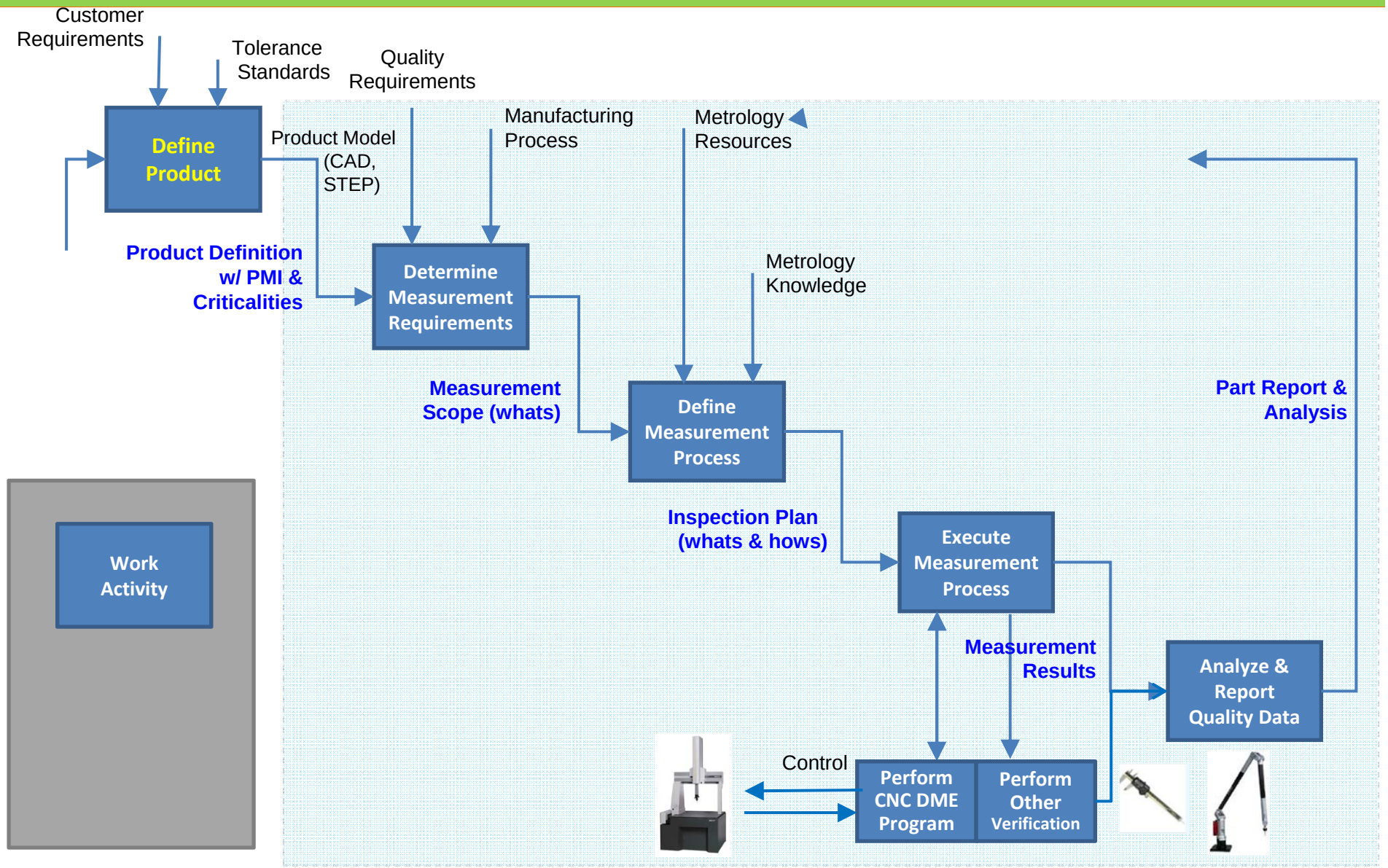
Digital Product Verification Process with QIF

Dimensional Metrology Standards Consortium | **2014**



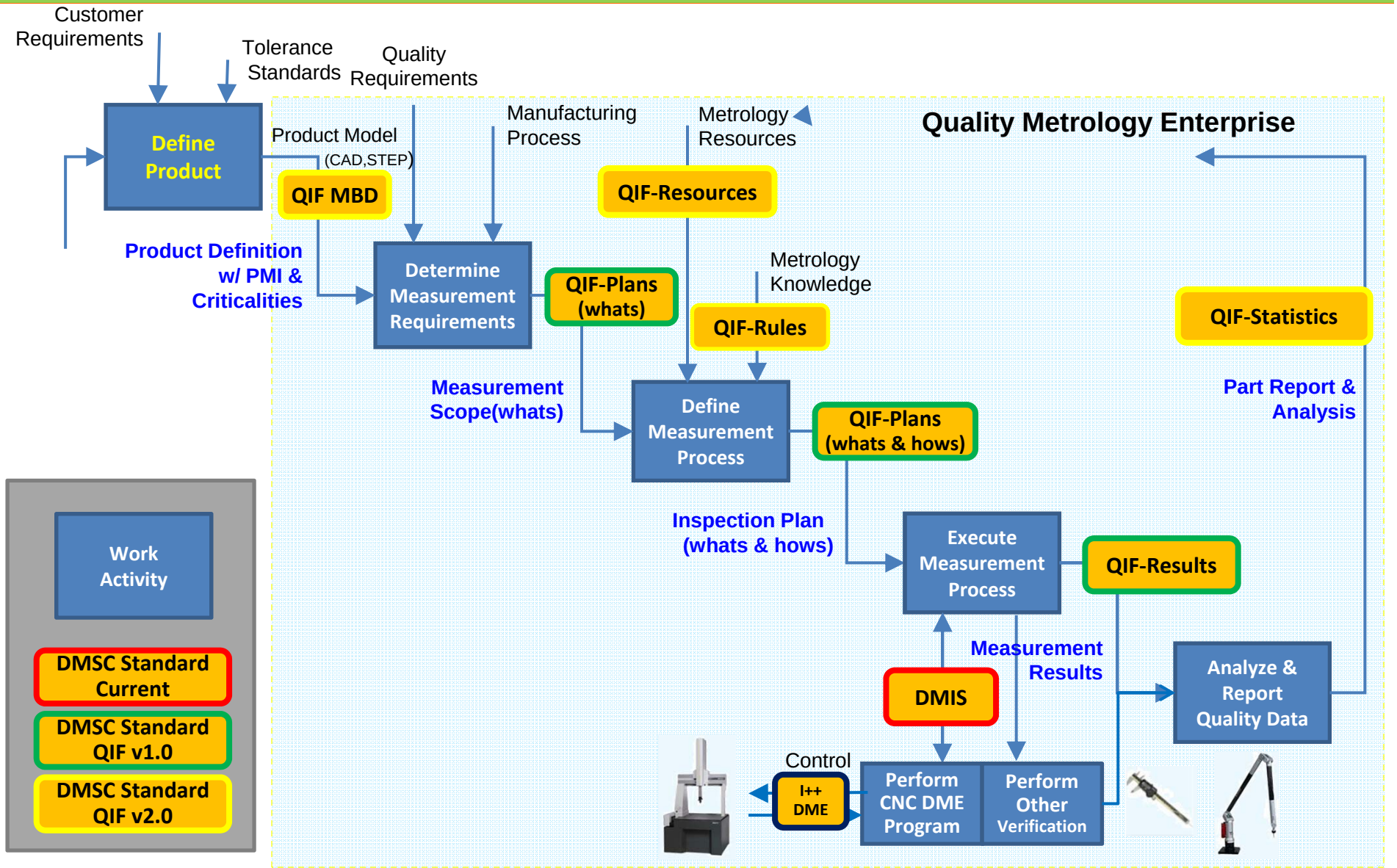
Product Verification Activity Workflow

Dimensional Metrology Standards Consortium | **2014**



QIF v2.0 Digital Product Verification Process

Dimensional Metrology Standards Consortium | **2014**



Digital Product Verification - Issue Statement

- **Metrology Community** is digital and model centric, unfortunately, even with the **successful emergence of CAD**, we have **not realized the benefits** promised by this investment.
- **Two primary needs:**
  1. Full end to end **Digital Metrology Interoperability**
     - *DMSC Response: via QIF Working Groups*
  2. Metrology applications, as well as other downstream applications, need complete, accurate, and cost effective **model-based product definitions** with **smarter semantic PMI**
     - Native CAD w/PMI
     - STEP AP242 w/PMI
     - *DMSC Response: DMSC/Capvidia MOU via QIF CAMBD Working Group*

MBM Critical Requirements

- **Model Based Definition for Metrology / Manufacturing**
  - Complete, Accurate, & Cost Effective Product Definition
  - Common, Domain-Specific Features Manages Complexity
  - Smarter Model Based Semantic PMI (e.g., Product Tolerances)
- **Quality Digital Interoperability Requirements**
  - Measurement Process Planning
    - Measurement Scope (i.e., Bill of Characteristics)
    - Inspection Planning
  - Measurement Results & Process Analysis
    - Dimensional
      - Real-Valued
    - Attribute
  - Supports Standards
    - ASME Y14.5, *Dimensioning and Tolerancing (Similar to ISO TC213 Suite)*
    - ASME Y14.41, *Digital Product Data Definition*
    - ISO/DMSC 22093 DMIS 5.2, *Dimensional Measuring Interface Standard*
    - AS9102a, *Aerospace First Article Inspection Requirement*

Quality Information Framework

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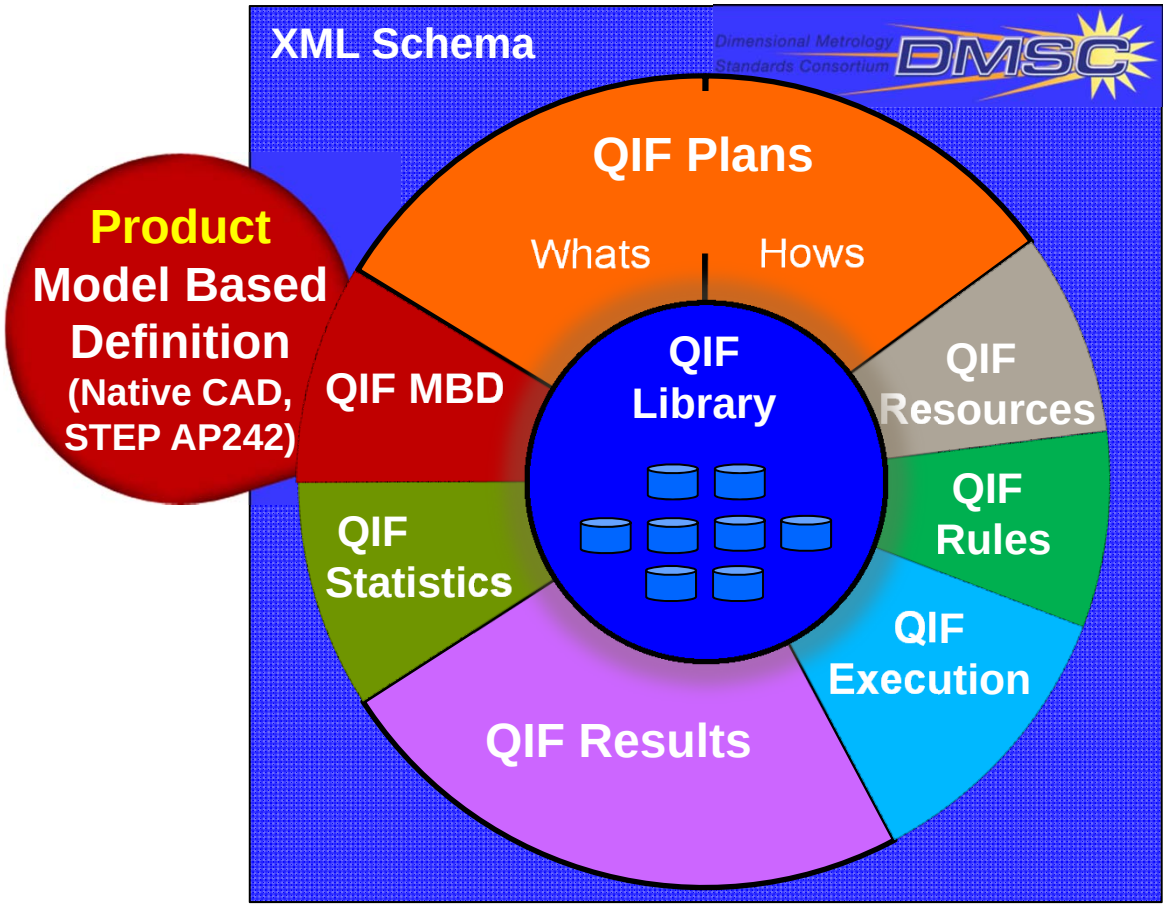
- QIF™ is a standard integrated information model for the **efficient exchange** of data between software and equipment modules for discrete product measurement
  - **Standard:** Open development, free-to-implement, free tools
  - **Integrated:** No overlap, harmonized upstream & downstream
  - **Modern / Affordable:** World Wide Web Consortium's (W3C) XML
  - **Information model:** W3C's XSD
  - **Implementation / data verification:** W3C XSLT
  - **XML Application Data Files:** Conform to QIF data model
  - **Measurement process modules:**
    Plan, Program, Execute, Report/Analyze
- QIF is developed within the Dimensional Metrology Standards Consortium (**DMSC**)

XML Schema Definition Language Foundation

- XML (Extensible Markup Language)
  - A modern, state of art file format technology
  - Human and machine readable
  - Emphasis on **simplicity, generality, usability**
- XSD (XML Schema Definition)
  - Description of how XML is used (e.g. QIF)
  - Verifies sender & receiver can **communicate**
- XSLT (Extensible Stylesheet Language Transformations)
  - Encodes logical rules enabling **self-validation**
- XML/XSD/XSLT Software tools are
  - Often available free or at a moderate price.
  - Known and used by many
- **Easy to implement, quicker** & **lower cost investment** for application implementers

QIF Metrology 'Life Saver' Architecture

Dimensional Metrology Standards Consortium | **2014**

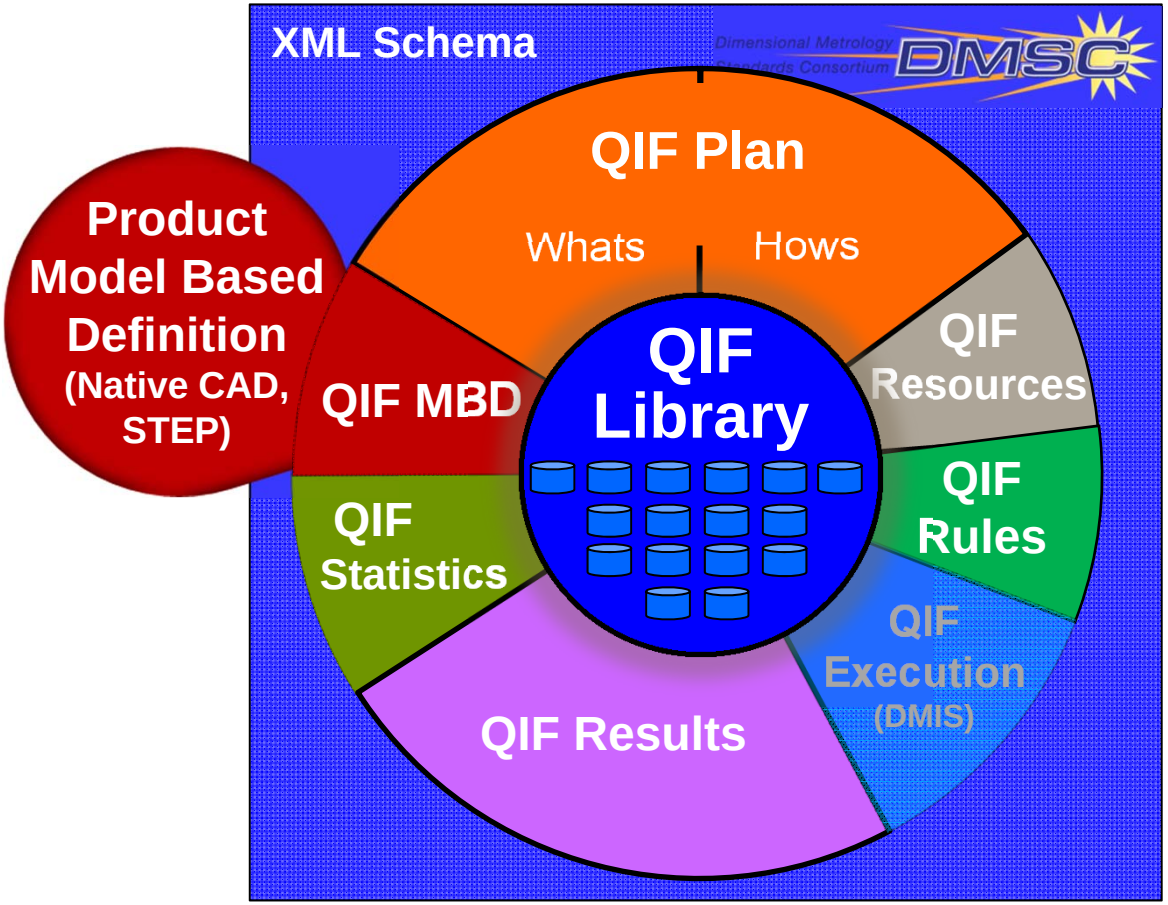


Complete QIF Roadmap

QIF™ Quality Information Framework

QIF v2.0 Metrology 'Life Saver' Architecture

Dimensional Metrology Standards Consortium | **2014**



QIF v2.0

QIF™ Quality Information Framework

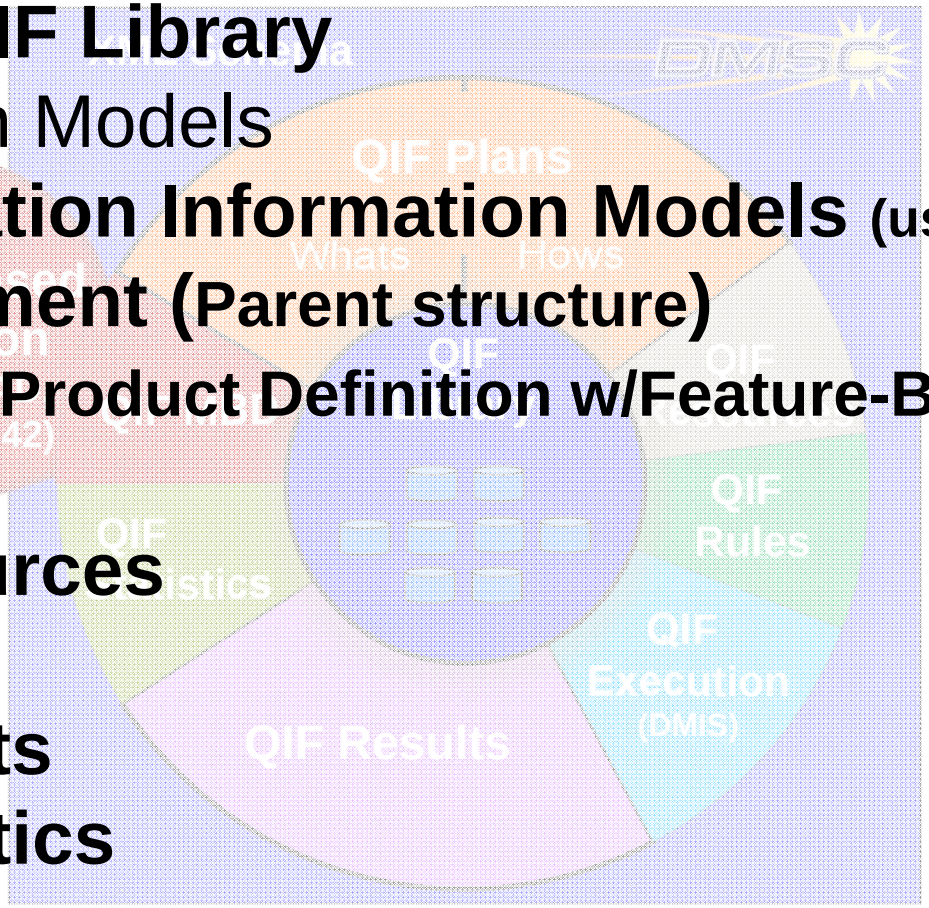
QIF Model Suite

Common QIF Library

Information Models

QIF Application Information Models (use the QIF Library)

- **QIF Document (Parent structure)**
- **QIF MBD (Product Definition w/Feature-Based PMI)**
- **QIF Plans**
- **QIF Resources**
- **QIF Rules**
- **QIF Results**
- **QIF Statistics**



QIF Library

- **Common Data Framework assures Interoperability**
- **XSD Schemas Files for**
  - **Auxiliary**
  - **Characteristics (e.g., Tolerances)**
  - **Expressions**
  - **Feature Types (Metrology/Measurement)**
  - **Generic Expressions**
  - **Geometry**
  - **IntermediatesPMI**
  - **Primitives**
  - **PrimitivesPD**
  - **PrimitivesPMI**
  - **Statistics**
  - **Topology**
  - **Traceability Information**
  - **Units**
  - **Visualization**
- **Supports all QIF Application Models**
- **Benefits**
  - **Avoid Multiple and Conflicting Definitions**
  - **Reuse of common / shared data elements**
  - **Eliminate Point-to-Point Harmonization and Mapping with other specs.**

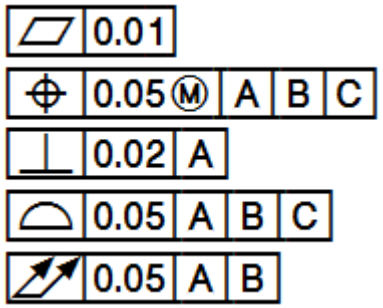
QIF Reduces Complexity w/ Domain Specific Shape Features

QIF Feature	DMIS Equivalent	QIF Feature	DMIS Equivalent
Arc	ARC	OppositePlanes	PARPLN
Circle	CIRCLE	Pattern	PATERN
Compound	COMPOUND	Plane	PLANE
Cone	CONE	Point	POINT
ConicalSegment	CONRADSEGMNT	PointDefinedCurve	GCURVE
ExtrudedCrossSection	*no equivalent*	PointDefinedSurface	GSURF
Cuboid	RCTNGL	ProfileGroup	*no equivalent*
Cylinder	CYLNDR	RunoutGroup	*no equivalent*
CylindricalSegment	CYLRADSEGMNT	Sphere	SPHERE
EdgePoint	EDGEPT	SphericalSegment	SPHRADSEGMNT
Ellipse	ELLIPS	SurfaceOfRevolution	REVSURF
ElongatedCylinder	ELONGCYL	Threaded	*no equivalent*
Generic	OBJECT (possibly)	ToroidalSegment	TORRADSEGMNT
Line	LINE	Torus	TORUS
OppositeLines	CPARLN		

QIF™ Quality Information Framework

Quality's Purpose is to Verify Product's Characteristics (e.g., Tolerances)

- DimensionalCharacteristicBaseType
  - CoordinateCharacteristicBaseType …
  - AngularCharacteristicBaseType … +/-
  - LinearCharacteristicBaseType …
- GeometricCharacteristicBaseType
  - FormCharacteristicBaseType …
  - LocationCharacteristicBaseType …
  - OrientationCharacteristicBaseType …
  - ProfileCharacteristicBaseType …
  - RunoutCharacteristicBaseType …



- UserDefinedAttributeCharacteristicType
- UserDefinedVariableCharacteristicType
- SurfaceTextureCharacteristicType √
- ThreadCharacteristicType

QIF™ Quality Information Framework

QPIds – A Persistent UUID used within the QIF

QIF Persistent Identifier (QPId)

- **Important Mechanism that helps facilitate full lifecycle MBE**
- **Universally Unique Identifier (UUID) (aka GUID within Microsoft)**
  - **ISO/IEC 9834-8**
  - **550e8400-e29b-41d4-a716-446655440000**
  - **3.4 x10^{38} possible UUIDs**
- **Chances of generating two that are the same within the universe are practically nil.**
- **Many software development libraries generate UUIDs**
- **Allows information to be combined later without resolving identifier conflicts**
- **QPIds uniquely identify**
  - **QIF Plan**
  - **QIF Result**
  - **QIF Rule Set**
  - **Feature Item**
  - **Characteristic Item**
  - **Product Item**
  - **Resource Item**

QIF™ Quality Information Framework

Digital Product Verification Process with QIF QPIds

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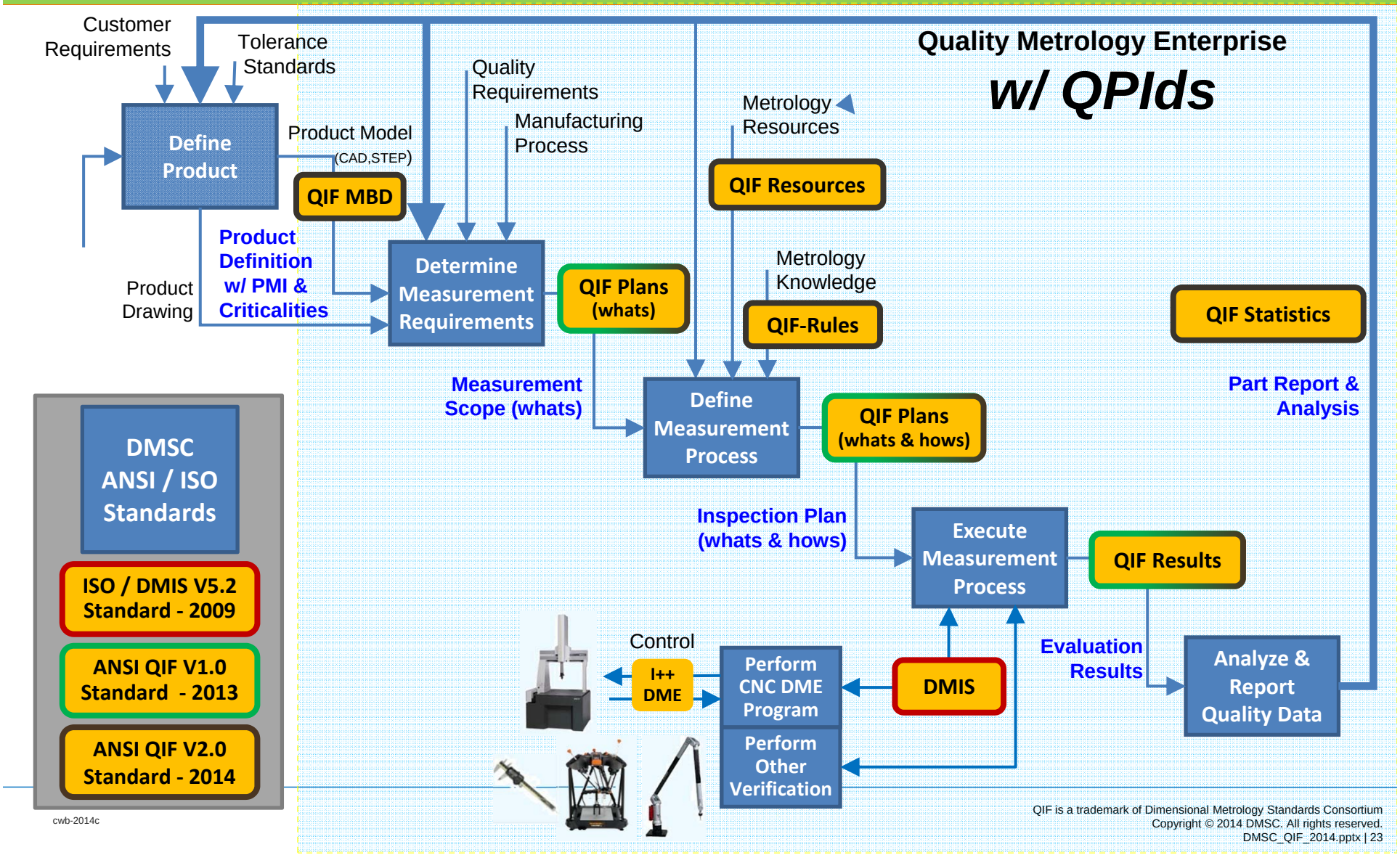
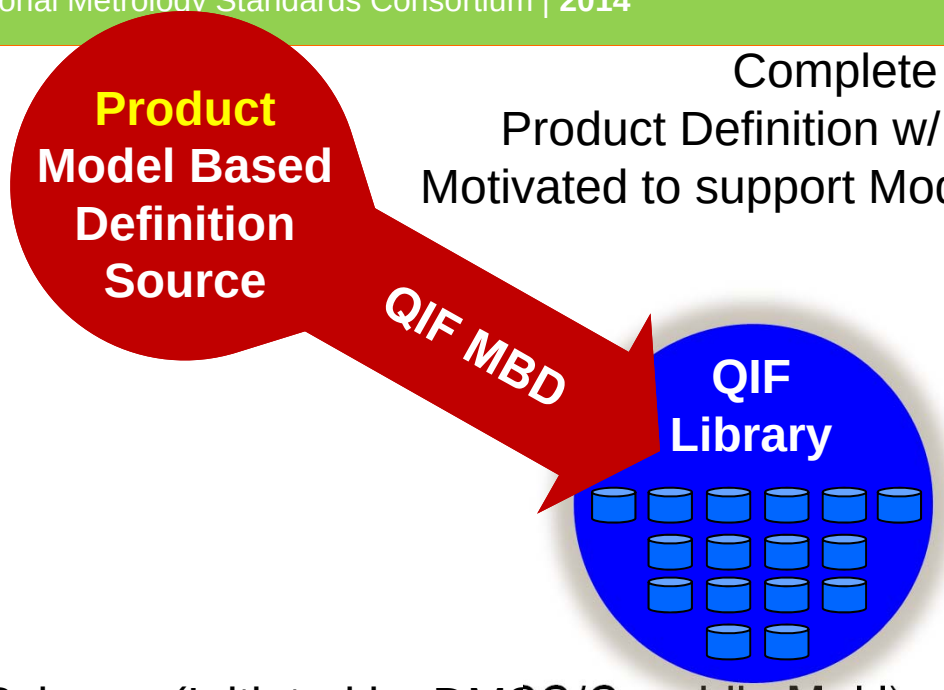
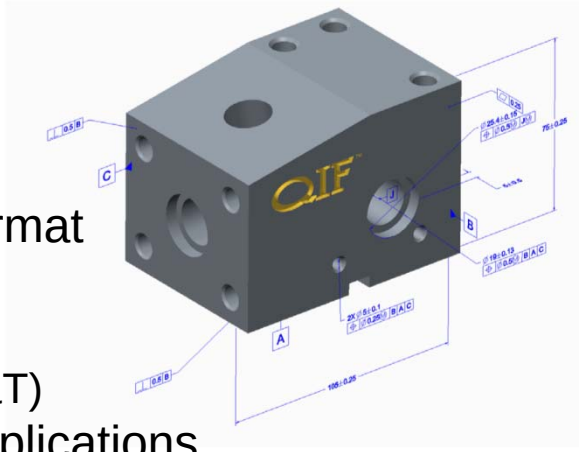


QIF MBD



Complete & Accurate Model Based Definition
Product Definition w/ Product Manufacturing Information
Motivated to support Model Based Metrology/Manufacturing

- QIF Library
- Includes **Feature-Based PMI**
- Native CAD + PMI
- STEP AP242
- INCLUDES PMI!

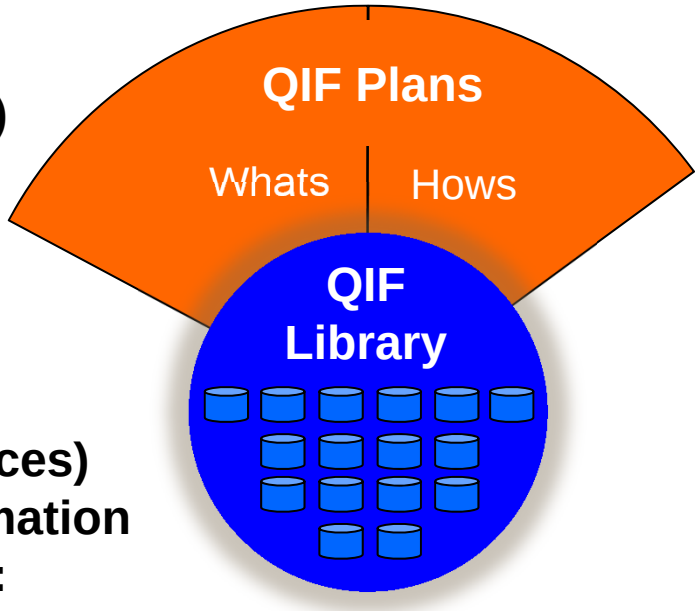


- XML Schema (Initiated by DMSC/Capvidia MoU)
  - Expose the Product Definition w/ PMI in the QIF format
  - Model Based Product Definition
    - Model Based Definition (e.g., Solid Model)
    - Various Conformance Levels of Semantic PMI (GD&T)
  - Easier Use and Implementation for downstream applications
  - Satisfy Native CAD to Model Based Metrology Use Case and more….
  - Satisfy STEP to Model Based Metrology Use Case and more….

QIF™ Quality Information Framework

QIF Plans

Quality Measurement Plans
- **XML Schema File**
- **QPIDs (Universal Unique IDs)**



- **Measurement Features**
  - **Linked with Product**
- **Characteristics (e.g., Tolerances)**
- **Enabler for end-to-end Automation**
- **Standard format for Defining:**
  - **Measurement Scope (i.e., “what” needs to be inspected, BoC)**
  - **Inspection Plan (i.e., “what & how” to be inspected)**
- **Key Characteristic**
  - **Designators (i.e., 2D balloon labeling)**
  - **Criticality Classes**
- **Measuring Action Sequence**
- **Scalable & Extensible**

Measurement Resources & Rules

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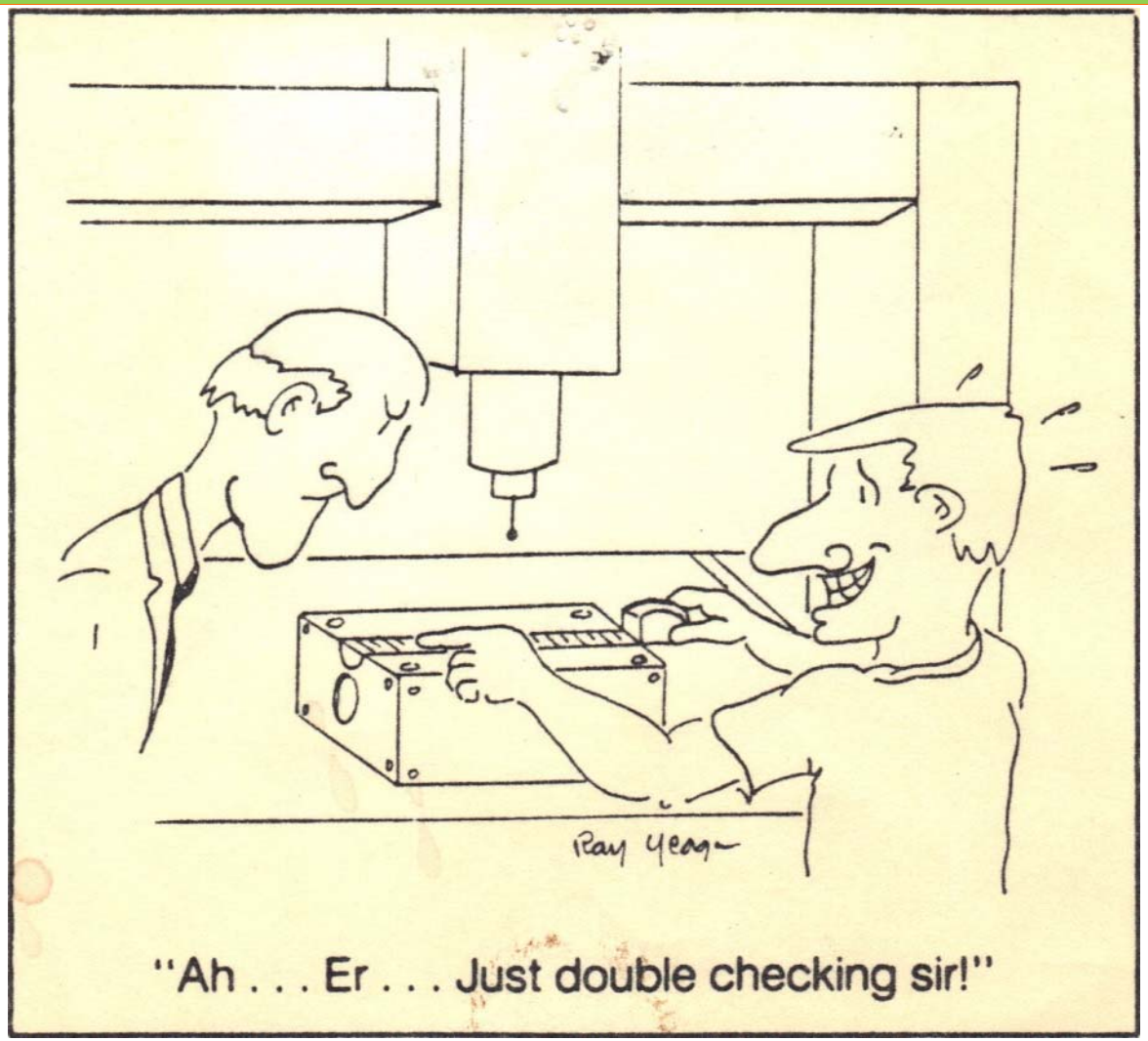
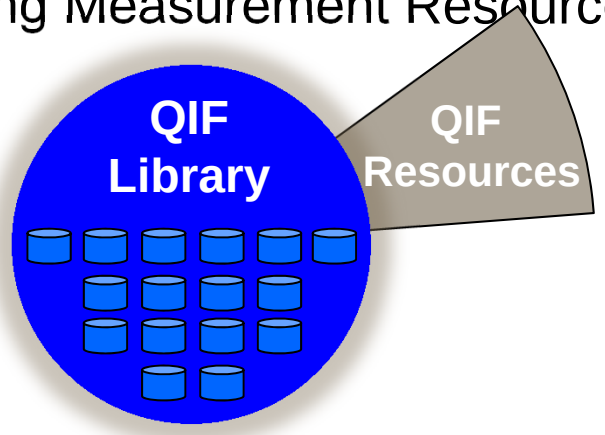


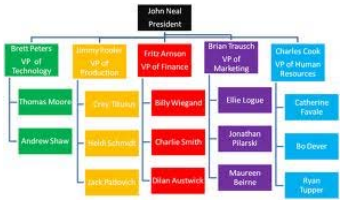
QIF™ Quality Information Framework

QIF Resources

Quality Measurement Resources

- XML Schema
- Supports QIF Plans w/Methods (i.e., hows)
- Standard format for Defining Measurement Resources
  - Measuring Equipment
  - Measure Devices
    - Accuracy
    - Calibration
  - Sensors
  - Rotary Tables
  - Work Centers





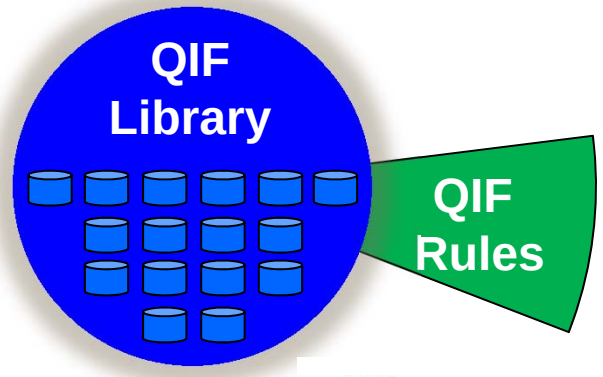
- Define Resources by
  - Company
  - Factory
  - Department
  - Supplier

Quality Information Framework

QIF Rules

Quality Measurement Rules

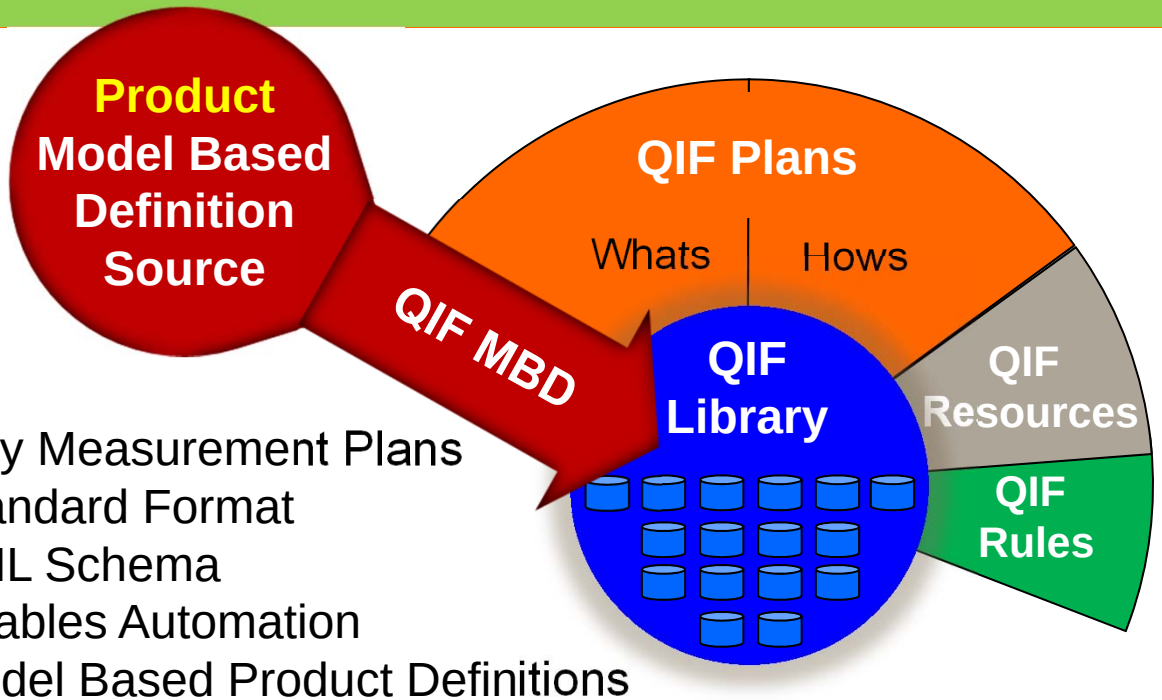
- XML Schema
- Supports QIF Plans w/Methods
- Standard format for Representing Measurement Rules
  - Point Measures
  - Resource Selections
  - Sampling Techniques
  - Algorithm Selection
  - . . .



- Enables Defining Rules by
  - Company
  - Part Family
  - Quality Level

QIF™ Quality Information Framework

Enhanced QIF Plans



Actions / Methods / Rules / Resources

Quality Measurement Plans

- Standard Format
- XML Schema
- Enables Automation
- Model Based Product Definitions
- Features / Characteristics
- Resource-Based
- Rules-Based
  - Applies Rules (by Company, by Part Family)
  - Assigns Resources (by Department, by Supplier)
- Hierarchical Ordered Measuring Sequence
- Dimensional & Non-Dimensional

QIF™ Quality Information Framework

Bill of Characteristics with QIF Plans

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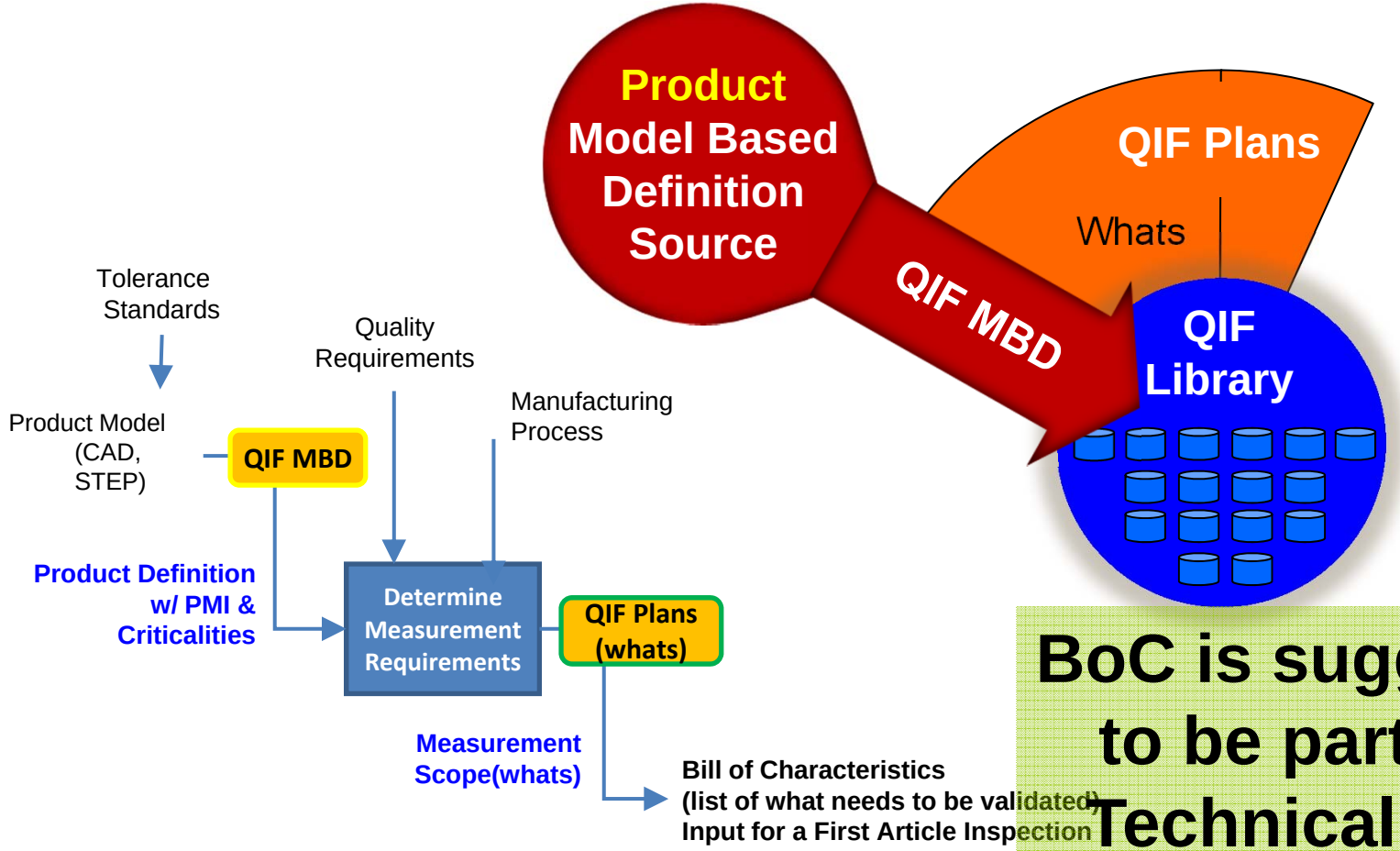

BoC is suggested to be part of a Technical Data Package (TDP)

Example QIF PLAN_BOC_AS1.xml

Inspection Process Planning with QIF Plans

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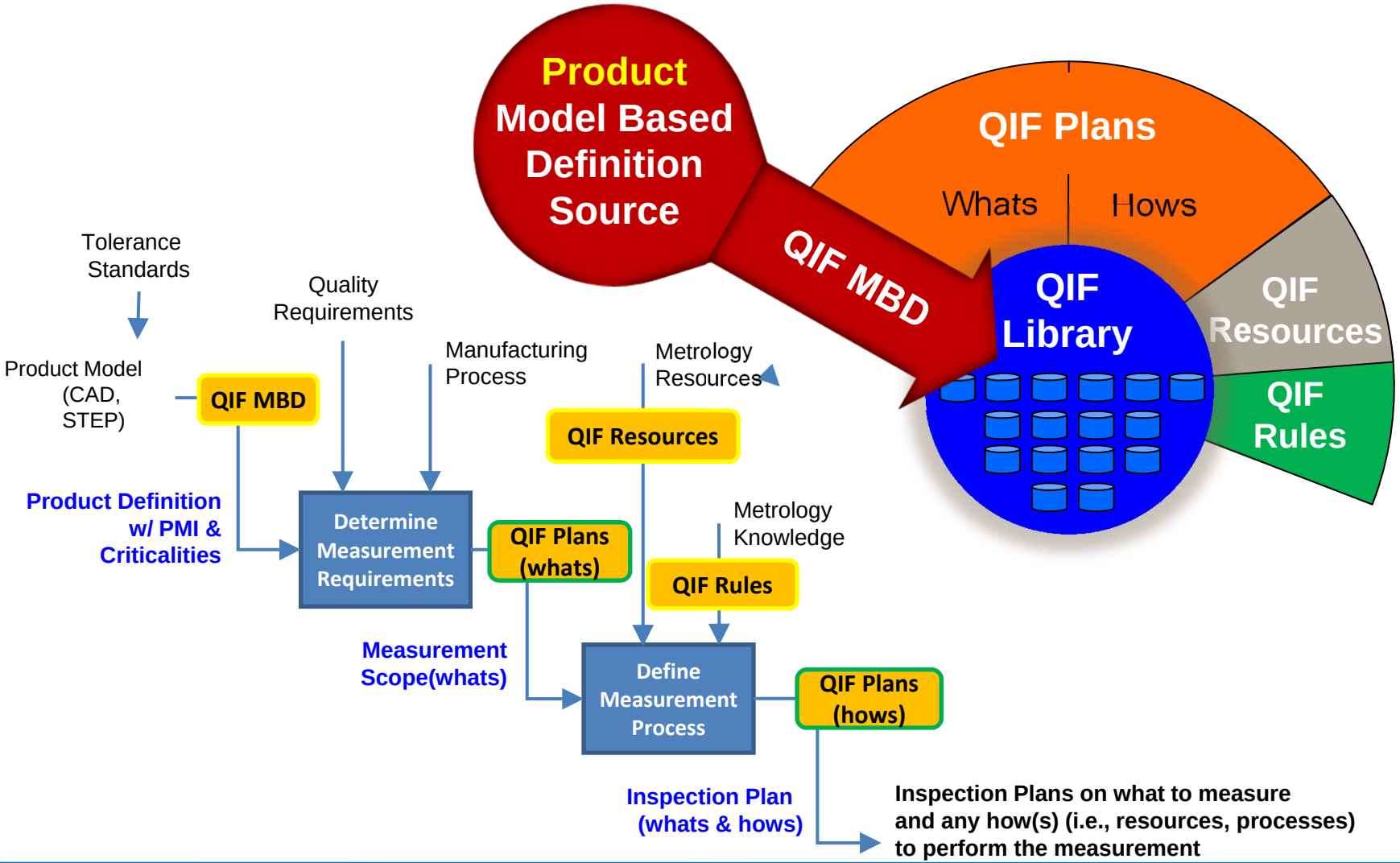
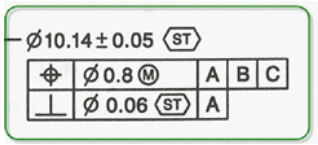


QIF™ Quality Information Framework

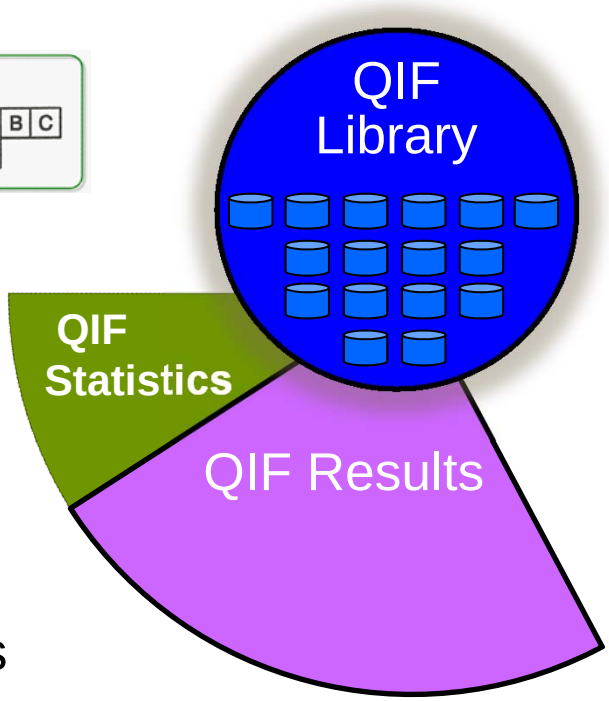
QIF Results and Statistics

QIF Results and Statistics

- Analyzing Single and Multiple Part Inspection
- First Article, Capability, SPC, MSA
- Explicit Statistical Tolerances



- Identify Trends
- Trace Anomalies
- Provide Feedback
- Improve Production
- Assess Performance
- Judge Quality & Efficiency of Processes



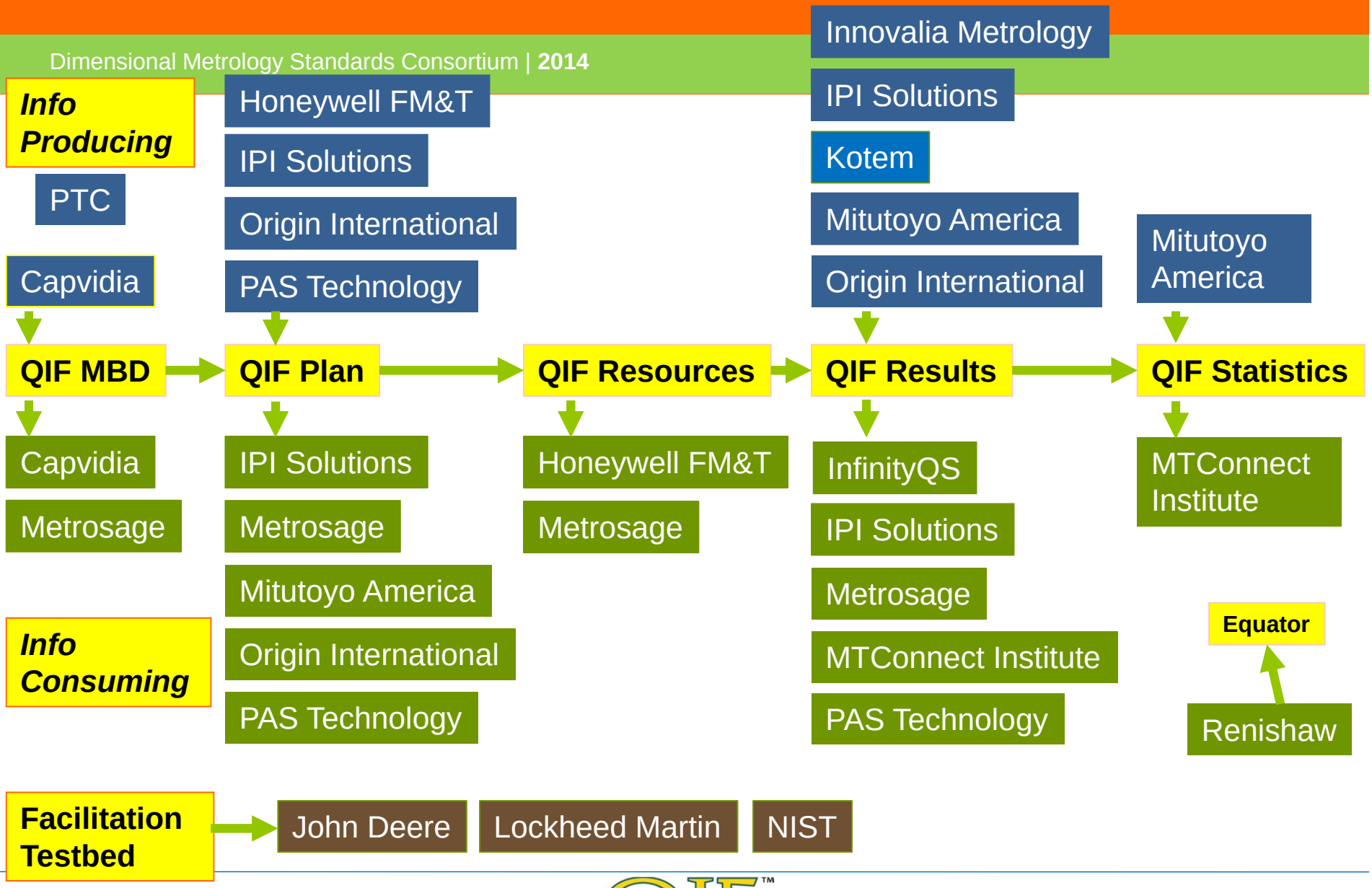
QIF™ Quality Information Framework

Multi-Vendor QIF v2.0 Demostration at IMTS 2014

Dimensional Metrology Standards Consortium | **2014**

QIF INTEROPERABILITY DEMO PARTICIPATING ORGANIZATIONS

Dimensional Metrology Standards Consortium | **2014**



QIF™ Quality Information Framework

QIF Widget – Product Model

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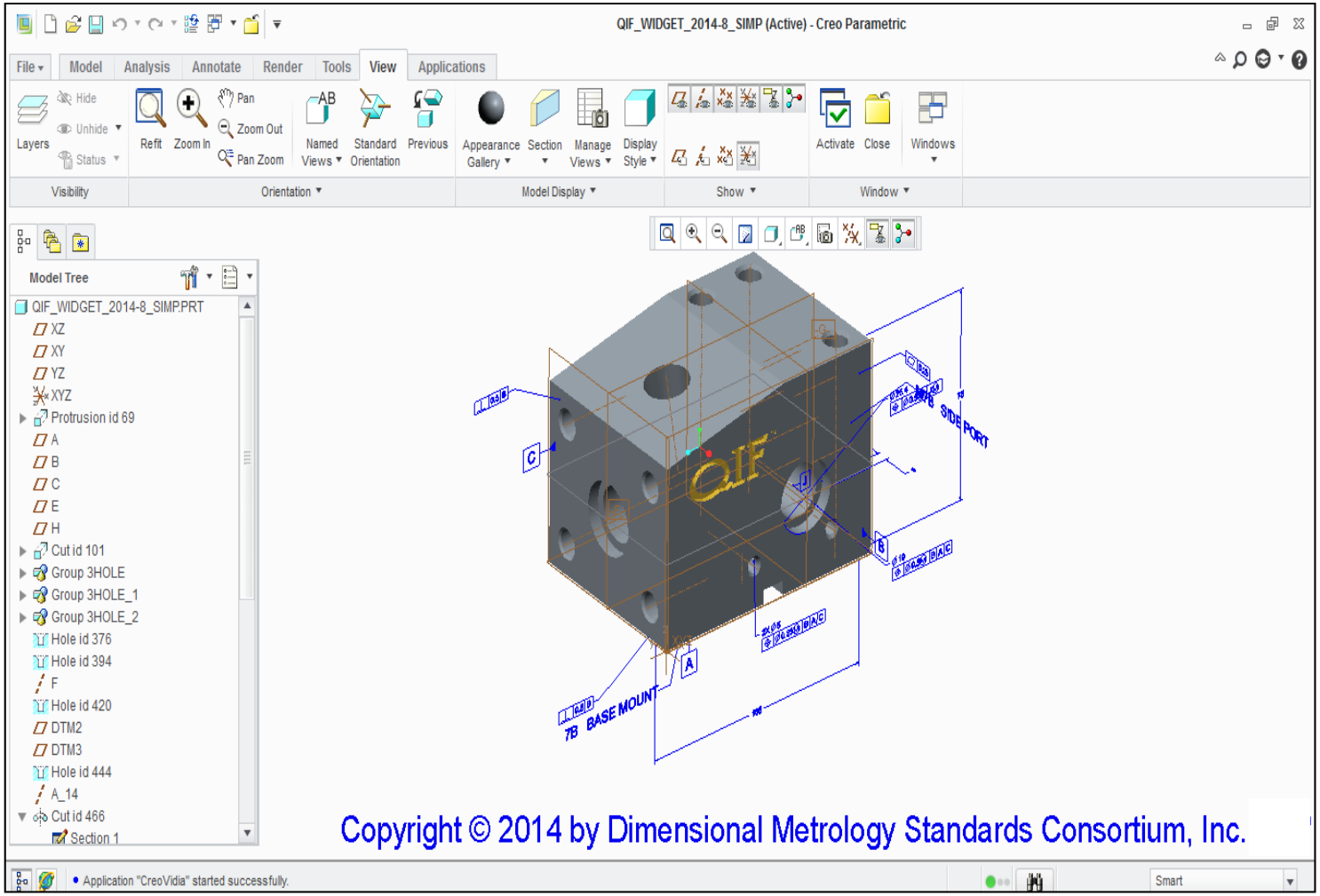
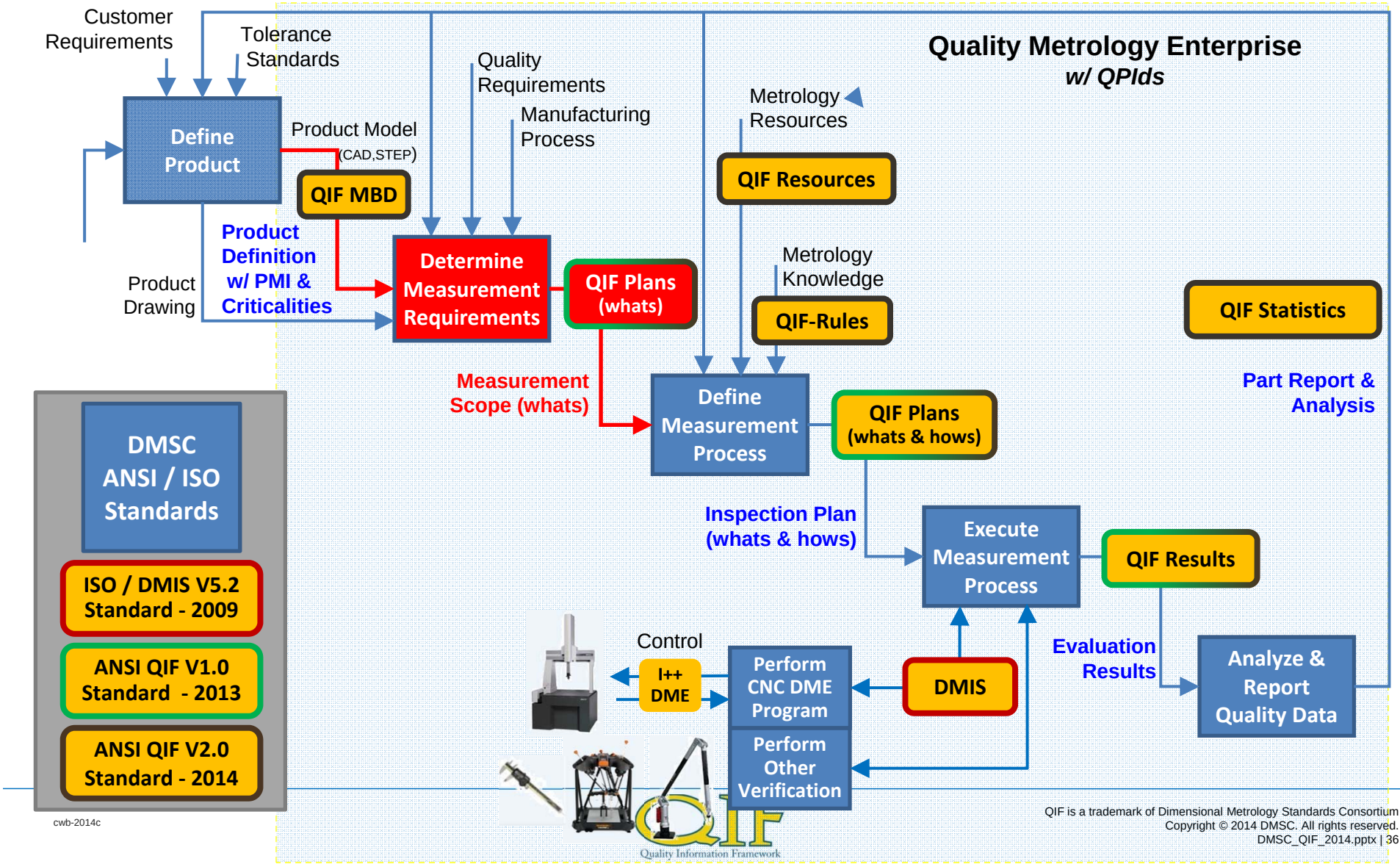


QIF™ Quality Information Framework

QIF v2.0 – Honeywell FM&T with FBTol

Dimensional Metrology Standards Consortium | **2014**



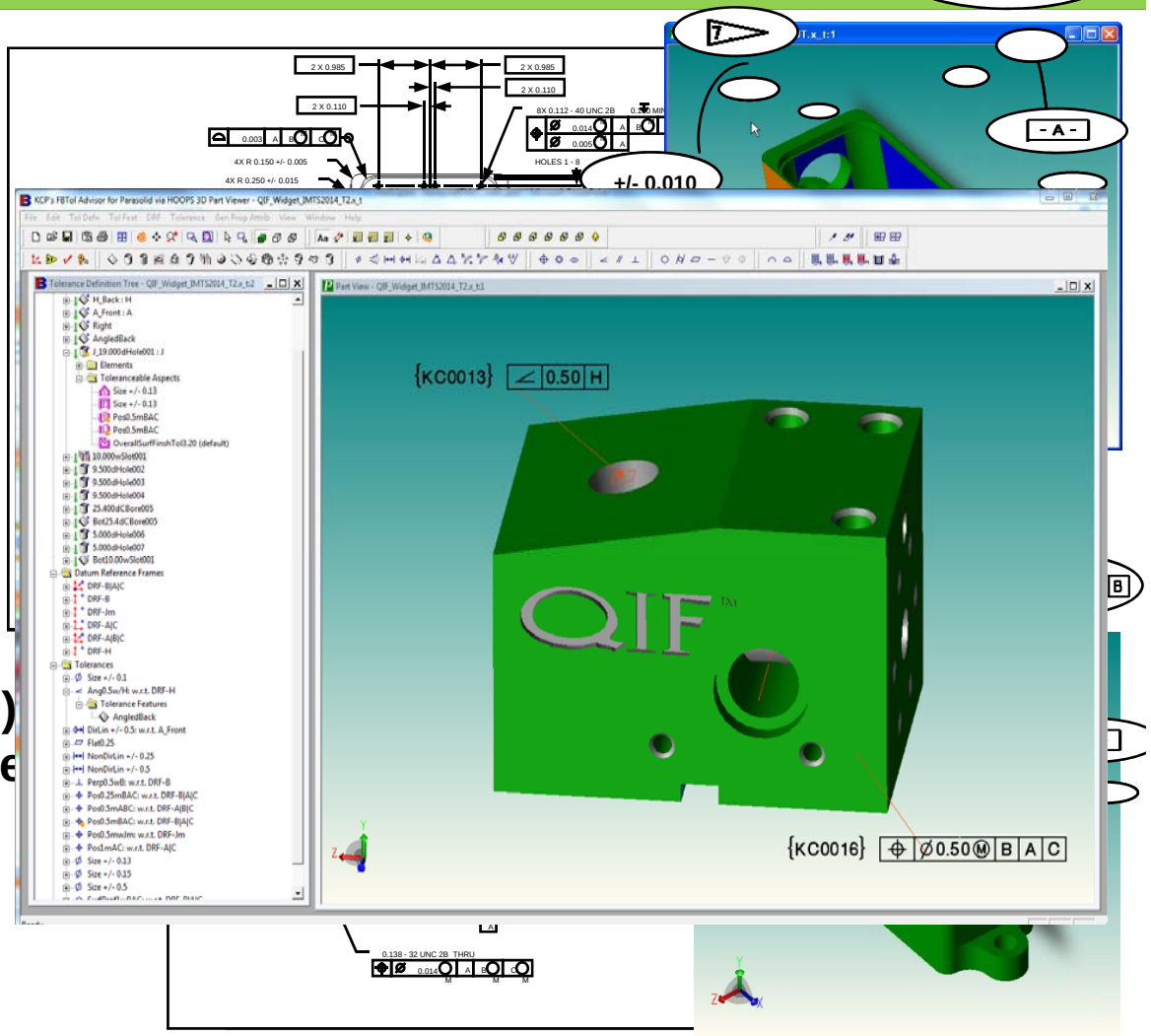
cwb-2014c

Honeywell FM&T's Feature-Based Tolerancing

Dimensional Metrology Standards Consortium | **2014**

Enriches Model Based Definitions with 3D Functional Tolerance Information

- Represents Fully Semantic Tolerances
- Recognizes Tolerance Features Automatically
- Infers Correct Tolerances
- Checks & Grades Part Tolerance Definition (green)
- Provides Downstream Model Based Applications with Explicit Tolerance Data
- Generates Model-Based Quality Plans (BoC) in QIF format



FBTol Demo w/ QIF Widget 101

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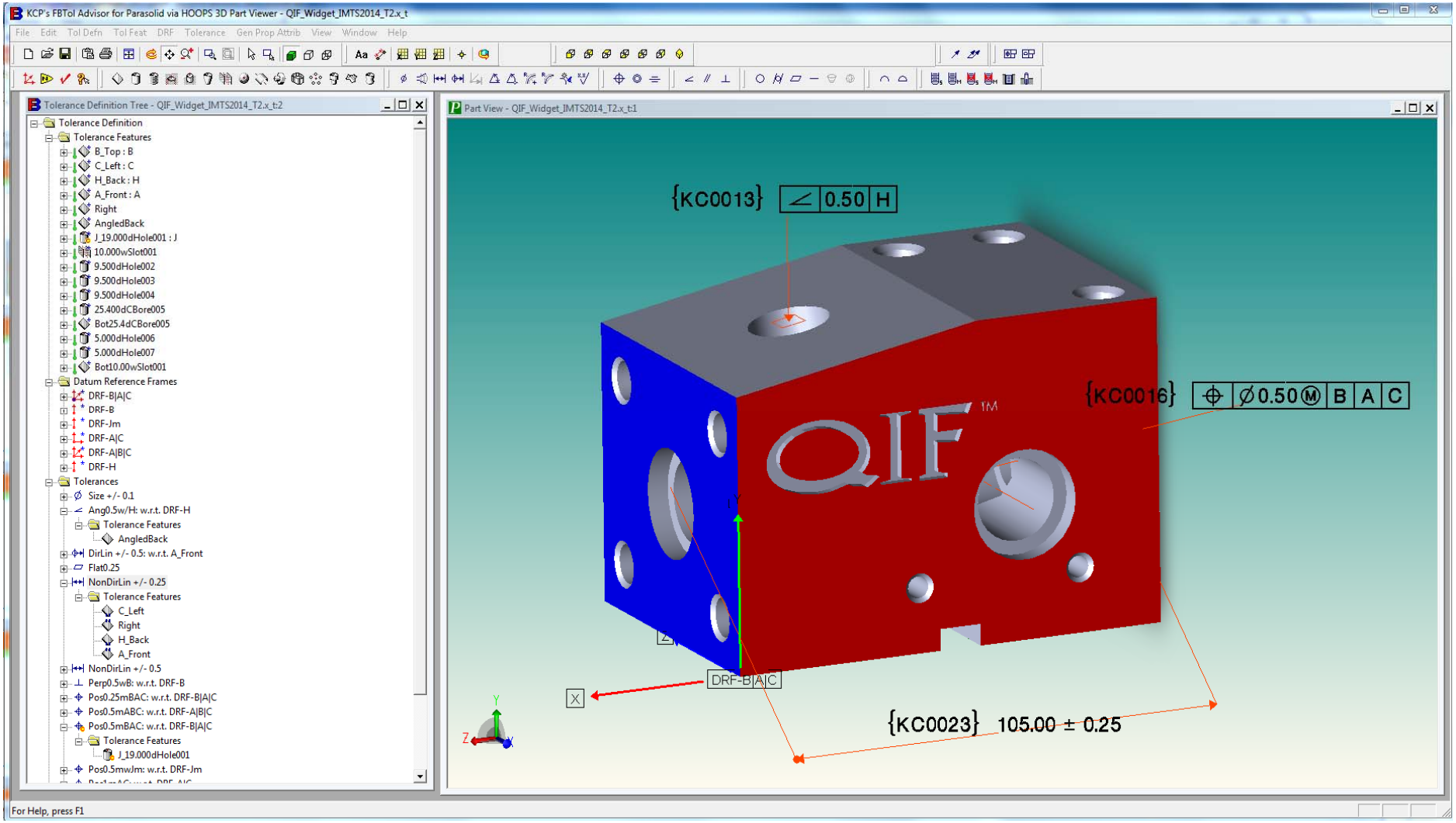

Quality Information Framework

QIF Plan File: Version & Header Information

FBT-QIF_Widget_IMTS2014_T2_QMPlansBoC.**qif**

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    <TimeCreated>2014-09-08T14:23:16</TimeCreated>
  </CurrentVersion>
 </Versions>

 <Header>
  <Application>
    <Name>Feature-Based Tolerancing (FBTol) Advisor </Name>
    <Organization>Honeywell FM&T</Organization>
  </Application>
  <Scope>QIF Plan</Scope>
 </Header>
```

QIF Plan File: Datum Definitions


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    <DatumLabel>A</DatumLabel>
    <FeatureNominalIds N="1">
      <Id>39</Id>
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  </DatumDefinition>
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  </DatumDefinition>
  <DatumDefinition id="70">
    <DatumLabel>C</DatumLabel>
    <FeatureNominalIds N="1">
      <Id>35</Id>
    </FeatureNominalIds>
  </DatumDefinition>
</DatumDefinitions>
```

QIF Plan File: Datum Reference Frame


```
<DatumReferenceFrames>
 <DatumReferenceFrame id="69">
    <Datum>
     <SimpleDatum>
      <DatumDefinitionId>41</DatumDefinitionId>
      <MaterialModifier>NONE</MaterialModifier>
      <ReferencedComponent>NOMINAL</ReferencedComponent>
     </SimpleDatum>
     <Precedence>
      <PrecedenceEnum>PRIMARY</PrecedenceEnum>
     </Precedence>
    </Datum>
    <Datum>
     <SimpleDatum>
      <DatumDefinitionId>70</DatumDefinitionId>
      <MaterialModifier>NONE</MaterialModifier>
      <ReferencedComponent>NOMINAL</ReferencedComponent>
     </SimpleDatum>
     <Precedence>
      <PrecedenceEnum>SECONDARY</PrecedenceEnum>
```

QIF Plan File: Product: Printed Drawing / Digital Model


```
<Product>
  <PartSet N="1">
    <Part id="1">
      <Name>QIF Widget IMTS 2014</Name>
      <QPId>f0432de6-c086-4da0-8bd5-7ac0d8720656</QPId>
      <ModelNumber>101</ModelNumber>
      <Description>QIF Widget Minimum Subset for IMTS 2014</Description>
      <Version>1</Version>
      <DefinitionExternal id="5">
        <PrintedDrawing id="3">
          <Name>QIF Widget Subset</Name>
          <Version>101</Version>
          <DrawingNumber>MinSubSet</DrawingNumber>
          <AdditionalChanges>Subset for IMTS 2014</AdditionalChanges>
        </PrintedDrawing>
        <DigitalModel id="4">
          <Name>QIF Widget</Name>
          <File>
            <Name>Parasolid</Name>
          </File>
```

QIF Plan File: Features (Domain Specific for Metrology)


```
<Features>
   <FeatureDefinitions>
    <CylinderFeatureDefinition id="7">
     <InternalExternal>INTERNAL</InternalExternal>
     <Diameter>5</Diameter>
    </CylinderFeatureDefinition>
 </FeatureDefinitions>
<FeatureItems>
    <CylinderFeatureItem id="9">
     <FeatureNominalId>8</FeatureNominalId>
     <FeatureName>5.000dHole006</FeatureName>
     <QPId>34c9b54e-6d22-40cb-b870-3fbebf6d9c3f</QPId>
     <DeterminationMode>
      <Checked>
       <CheckDetails>
        <Measured/>
       </CheckDetails>
      </Checked>
     </DeterminationMode>
    </CylinderFeatureItem>
```

QIF Plan File: Characteristics (e.g., Tolerances)


```
<Characteristics>
 <CharacteristicDefinitions>
    <DiameterCharacteristicDefinition id="10">
     <Tolerance>
      <MaxValue>0.1</MaxValue>
      <MinValue>-0.1</MinValue>
     </Tolerance>
    </DiameterCharacteristicDefinition>
</CharacteristicDefinitions>
<CharacteristicItems>
    <DiameterCharacteristicItem id="12">
     <Name>Sized +/- 0.1</Name>
     <QPId>651aded1-ff04-498a-968e-044147a2506d</QPId>
     <KeyCharacteristic>
      <Designator>KC0019</Designator>
     </KeyCharacteristic>
     <FeatureItemIds N="1">
      <Id>9</Id>
     </FeatureItemIds>
     <CharacteristicNominalId>11</CharacteristicNominalId>
```

QIF Plan File: Measurement Plan


```
<MeasurementPlan>
  <Version>
    <VersionQPId>3a6fcea6-dc0c-4752-a2e9-053ddf00be0f</VersionQPId>
    <TimeCreated>2014-09-08T14:23:16</TimeCreated>
  </Version>
  <UnorderedPlanRoot>
    <Steps>
      <MeasureEvaluateAll/>
    </Steps>
  </UnorderedPlanRoot>
</MeasurementPlan>
```

Honeywell FM&T's Interest in the QIF

- **Quality is a customer requirement**
  It is neither free nor optional;
  However, it can be achieved
    - **Faster**
    - **Better,**
    - **Cheaper**

  with Innovation and Standards-Based Digital Interoperability
- **QIF is a superior standards solutions since:**
    - **XML-Based Implementation**
    - **QIF is cost efficient to implement and use**
    - **QIF is complete but extensible**
    - **QIF verifies data correctness**

The QIF Advantage, XML!

- Standards are in general, paper based documents
- QIF is **fully XML based**
- QIF is described by the **XSD Schema (QIF Library of files)** and in-line documentation
- QIF **data model** is completely and explicitly **expressed by XSD schema**
- QIF XSD schema **eliminates ambiguous implementations** (no flavors as in IGES, STEP, PDF, DMIS, etc.)
- QIF includes (build-in) **data validation mechanisms** (XSD, XSLT)
- QIF is a **"new generation" standard** for MBD/MBE and CAx data interoperability

NIST – Smart Manufacturing Operations Planning and Control Program

Dimensional Metrology Standards Consortium | **2014**

NIST is a member of the DMSC and participates in all aspects of the QIF standard development efforts:

- Maintains the XML schema files
- Prepares data dictionaries
- Leads two subgroups
- Oversees preparation of testing artifacts and provides test files
- Collaborates with industry and establishes test bed to support verification tests and demos
- Researches its integration in the manufacturing enterprise
- Ensures its overall high quality

NIST
National Institute of Standards and Technology
U.S. Department of Commerce

QIF™ Quality Information Framework

- A not-for-profit, cooperative sponsorship organization with **members Large and Small**
- Focused on or relating to **Digital Dimensional Metrology**
- Dedicated to identifying, promoting, fostering, and encouraging the **Development and Interoperability of Standards** that benefit the dimensional metrology community.
- An **ANSI accredited Standards Making organization** with **ISO fast-track** international presence
- Brought you the **DMIS ISO Standard**, the most influential standard in the industry
- Ensure that **metrology standards fill gaps** and do not overlap

Participants

- **DMSC Consortium Members***
  - **Advanced Dimensional Management**
  - **Applied Automation Technologies**
  - **Capvidia**
  - **Deere & Company**
  - **Hexagon Metrology**
  - **Honeywell FM&T**
  - **Kotem**
  - **Lockheed Martin**
  - **Origin International, Inc.**
  - **MBD360 LLC**
  - **MetroSage LLC**
  - **Metrology Integrators**
  - **Mitutoyo America Corp**
  - **Nikon Metrology**
  - **NIST**
  - **PAS Technology**
  - **Renishaw**
  - **Siemens PLM Software**
  - **UNC-Charlotte**
- **Associated Organizations**

Open to all who have a Direct and Material Interest

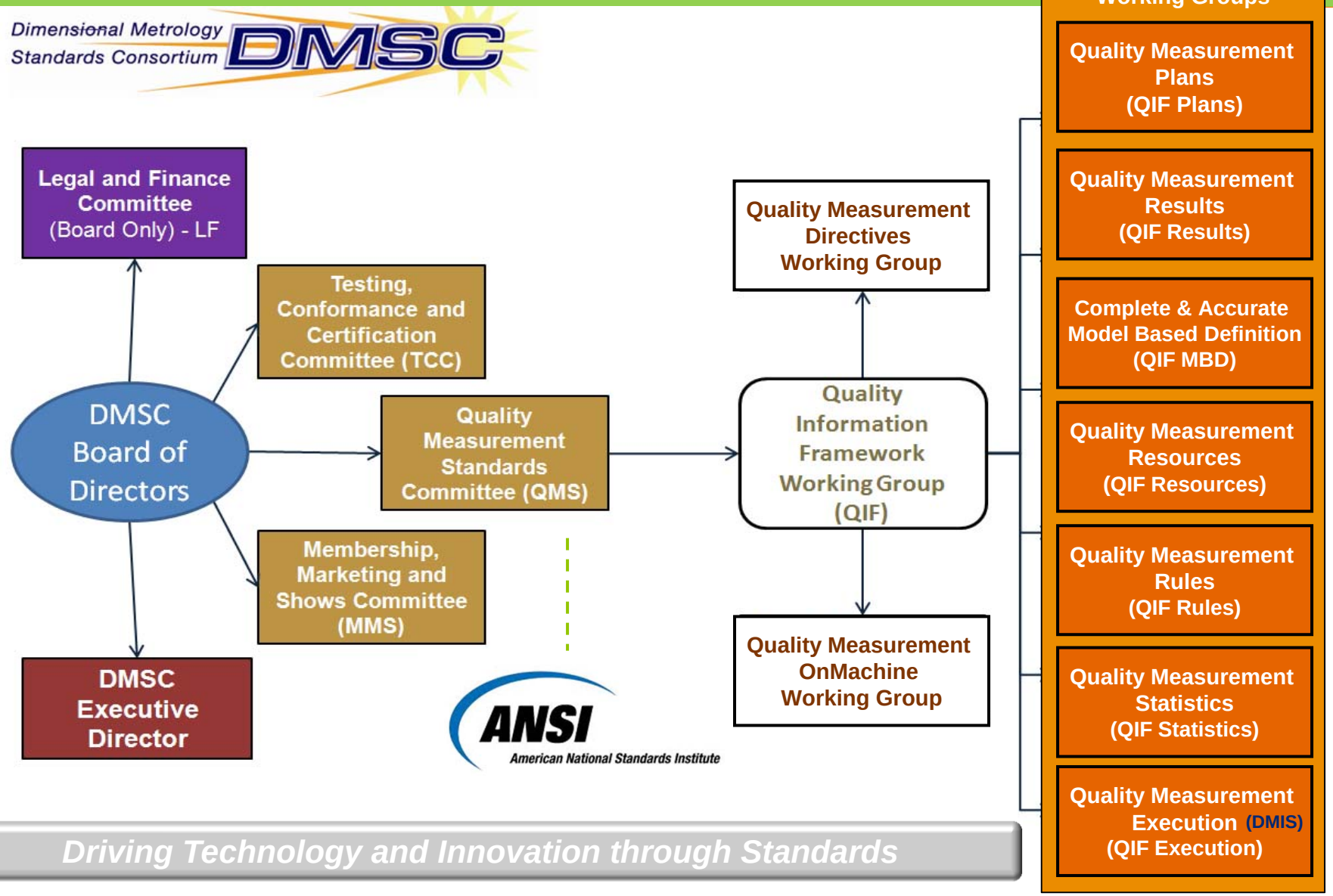
- Rolls Royce
- Pratt Whitney
- GE Aviation
- Boeing
- DISCUS Software
- MTConnect
- Renaissance Services
- Validation Technologies
- IPI Solutions
- Manufacturing Technology Centre

* November, 2014

QIF™ Quality Information Framework

DMSC Organization

Dimensional Metrology Standards Consortium | **2014** **(Updated)**



Driving Technology and Innovation through Standards

We value your Involvement

- ***Encourage***
  - ***Your Favorite Vendor to Investigate the Benefits of QIF***
  - ***Your Metrology Department to Plan for the Use of the QIF***
  - ***Your MBE Strategy Team to Plan for the Use of the QIF***
  - ***Visit the QIF-Related Tables at the MBE Summit***
  - ***Join us, we would value your involvement!***
- **DMSC Membership (www.DMSC-Inc.com)**
  - **bsquier@dmsc-inc.com to Request an Application**
- **QIF Involvement (www.QIFStandards.com)**
  - **One or Many Working Groups**
- **Download ANSI/QIF 2014**

  http://bit.ly/16tKZy3

  or:

  //fmt.kcp.com/kcpfm/kcpfm_short.cgi?box=/.DBxul30__zxBxsub&path=%2F&cmd=list

  Get it from the DMSC/QIF Table

QIF™ Quality Information Framework