PROCESS INDUSTRY PRACTICES

MIMOSA Conference

December 5, 2018

Who is Michael Poehl ?

- **Michael Poehl**
  - **PIP Director since April 2013**
  - **28 years with BP / Amoco**
  - **Chemicals and Upstream**
  - **Technical / Operations Early Career**
  - **Vice President Amoco Energy Group North America**
  - **Retired in 2002**
  - **Adjunct Professor at University of Texas Chemical Engineering since 2002**

* **Paw Paw (Best Job Ever)**

Agenda

- P I P Overview
- Metadata
- P I P Metadata FT
- Questions

PIP PROCESS INDUSTRY PRACTICES

Agenda

- **P I P Overview**

PIP PROCESS INDUSTRY PRACTICES

PIP Vision

- ***Owner, engineering, and construction companies*** within the process industries seek active membership in PIP to establish Practices through the ***direct exchange of knowledge*** as a means to achieve superior results.

PROCESS INDUSTRY PRACTICES

P I P Staff Recommendations

- Purpose:
- **Empower economic progress and capital efficiency by translating applied research into industry best practices.**

- Vision:
- **Global recognition for developing industry Practices through the direct exchange of knowledge by owner, engineering, and construction companies seeking to serve and advance society.**

- Mission:
- **Collaborate to produce a library of engineering Practices encompassing globally relevant guidance and technical criteria within a program that provides opportunity for professional education and leadership development.**

Why Companies use P I P

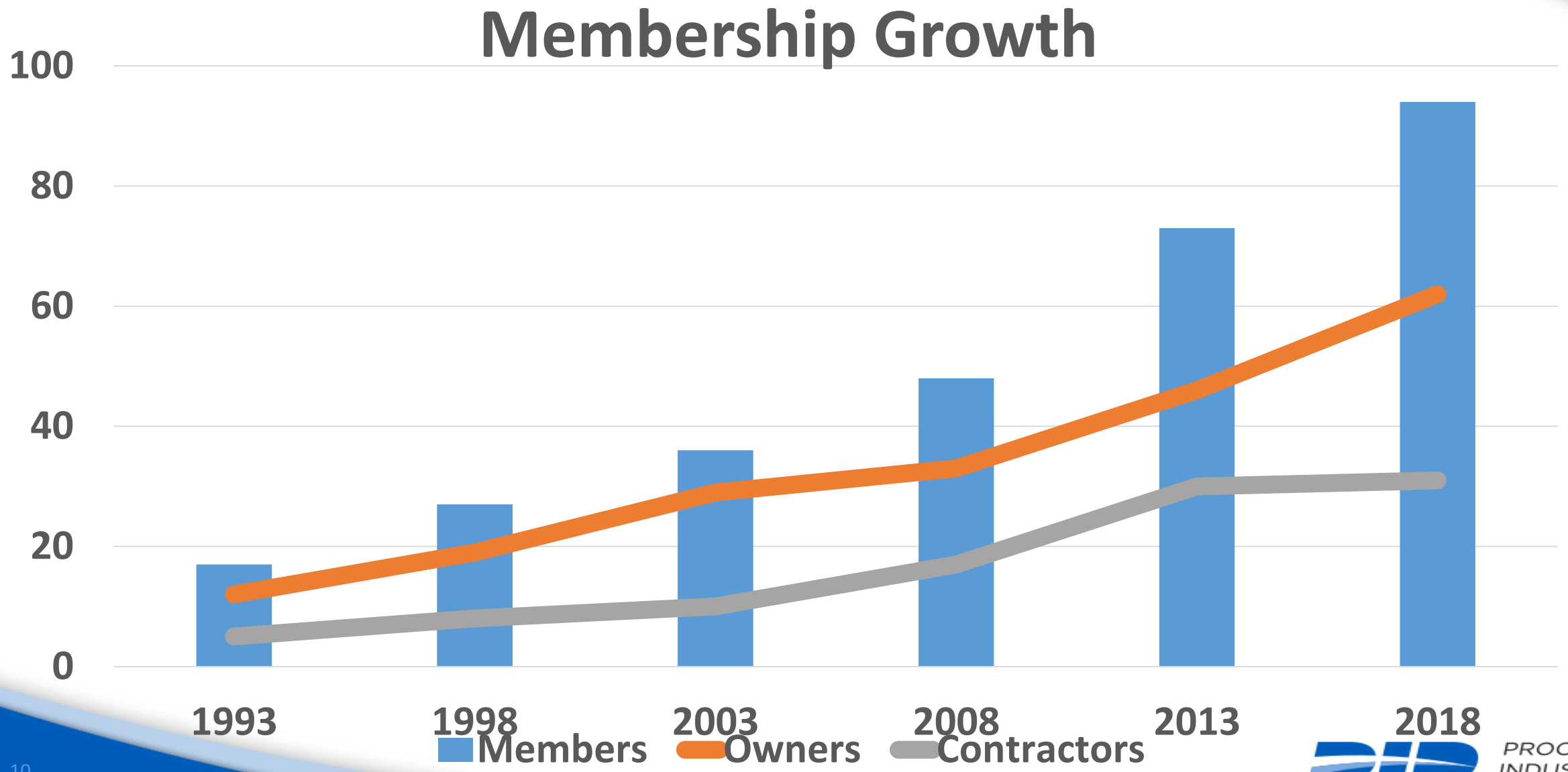
- Member Companies have the opportunity to adopt the Process Industry Practices
- Reduce Plant Operating and Installation Costs
- Standardize Non-Proprietary Processes


BEST PRACTICE
BEST COST

Active Members

PROCESS INDUSTRY PRACTICES

Active Membership Growth



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PIP Volunteers

- **Approximately 650 Active Volunteers**
  - Subject Matter Experts
    - Function Team Members (350+)
    - Discipline Contacts
  - Management
    - Steering Team Representatives (100+)
    - Team Sponsors
    - Committee Leaders
  - Young Professionals
    - Development Opportunities

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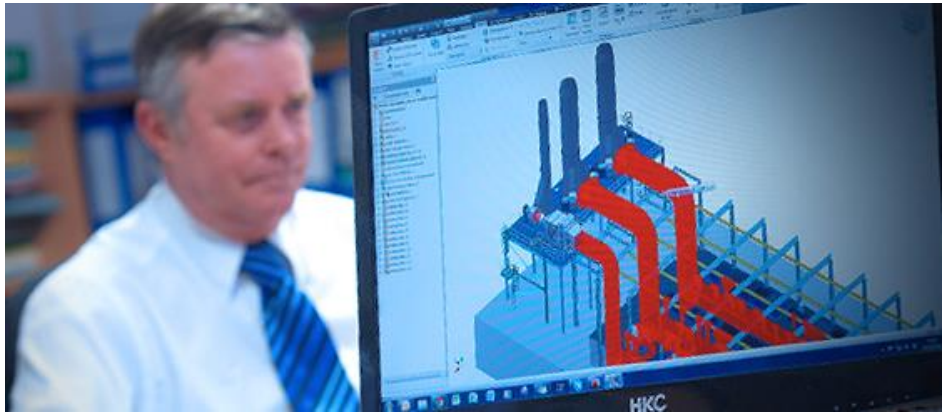
PIP Non-active Member Companies

BAE Systems
Bahrain Petroleum - BAPCO
Baker Hughes
BEI Engineers
Braskem SA
Brock Group
Bryant Refractory
Carboline Company
CF Industries
Chevron Phillips
City of Montreal
Emerson
Engineering for the Petroleum & Process Industries (ENPPI)
Extraction Oil & Gas
GMB Group
H+M Industrial EPC
HDR
IMTT
Jotun Paints
KMCO
Koppers
Kraton Polymers
Lanier & Associates
Lloyd Engineering
Medallion Operating Company
North West Redwater Partnership
NOVA Chemicals
ONEOK
OXEA
Petroleum of Trinidad & Tobago
Phoenix Park Gas Processors
Praxair
Prime Controls
ROCKWOOL Technical Insulation
Scientific Design Company, Inc.
SGC Energia SGPS
Sherwin-Williams
Stepan Company
Sumitomo Chemical
The University of Texas at Austin - Department of Utilities & Energy Management
The Williams Companies
Valero
Velocys
Wood Group USA, Inc.

PIP Licensees

API
ASME
Autodesk
Aveva
Bentley Systems
BlueBeam
BlueCielo ECM Solutions
Cornell University
De La Salle University
Hexagon
IEEE
IHS
IRA-CIPEN
Kinsmen Group
Lamar University
Lee College
Montana State University - Billings
National Institute of Building Sciences
National Insulation Association
Palomar College
South Central Louisiana Technical College (SCLTC)
St. Paul Technical College
SAI Global
Techstreet (Clarivate)
University of North Dakota
University of Wisconsin – Madison



BENEFITS OF P I P

1 Up-To-Date

Full access to high quality up to date practices.

BENEFITS OF P I P

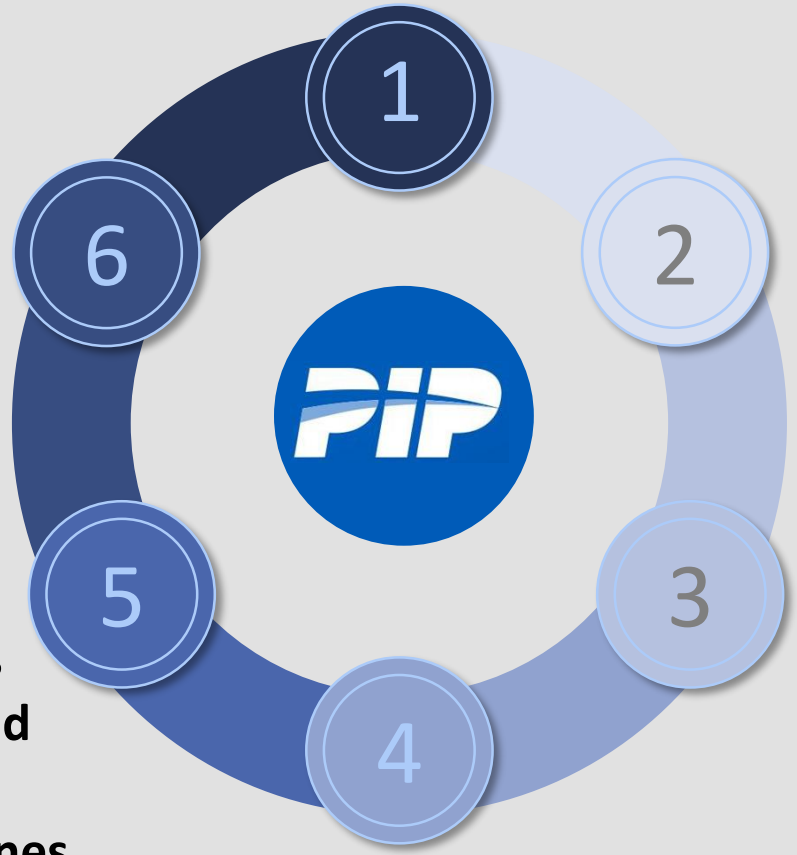
2 **Quality**
Improved delivery of capital projects

BENEFITS OF P I P

3 Cost

Apply industry based standards to lower overall costs.

BENEFITS OF P I P



4 Schedule

Execute projects better, faster, and with industry approved timelines.

BENEFITS OF P I P

5 Sweat Equity

You and your company, get more benefit, with higher participation.

BENEFITS OF P I P

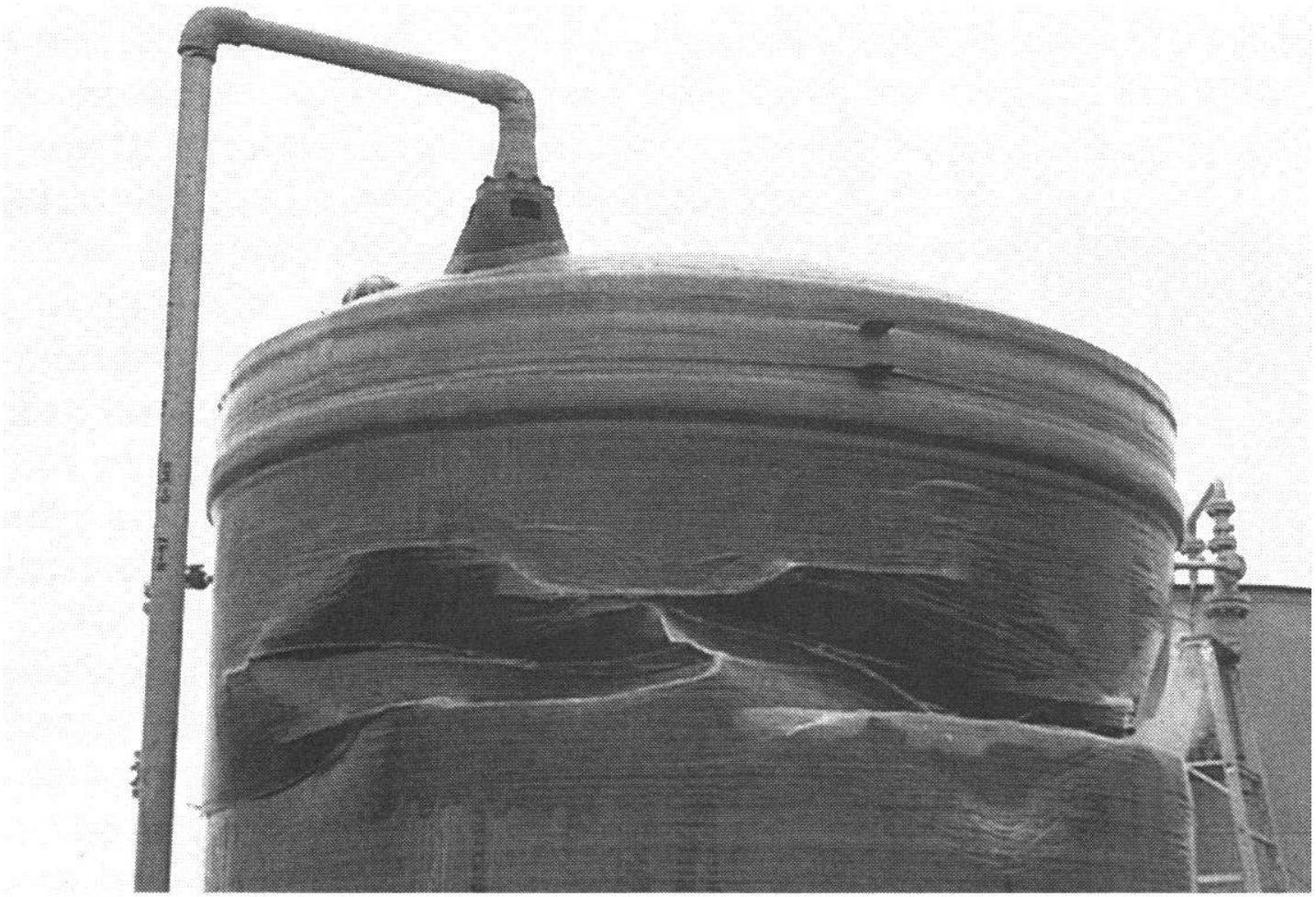
6 Active Membership

Your company can benefit greatly by increasing level of function team participation.

Are There Risks in Your Project ?

PROCESS INDUSTRY PRACTICES

To Avoid Potential Risks



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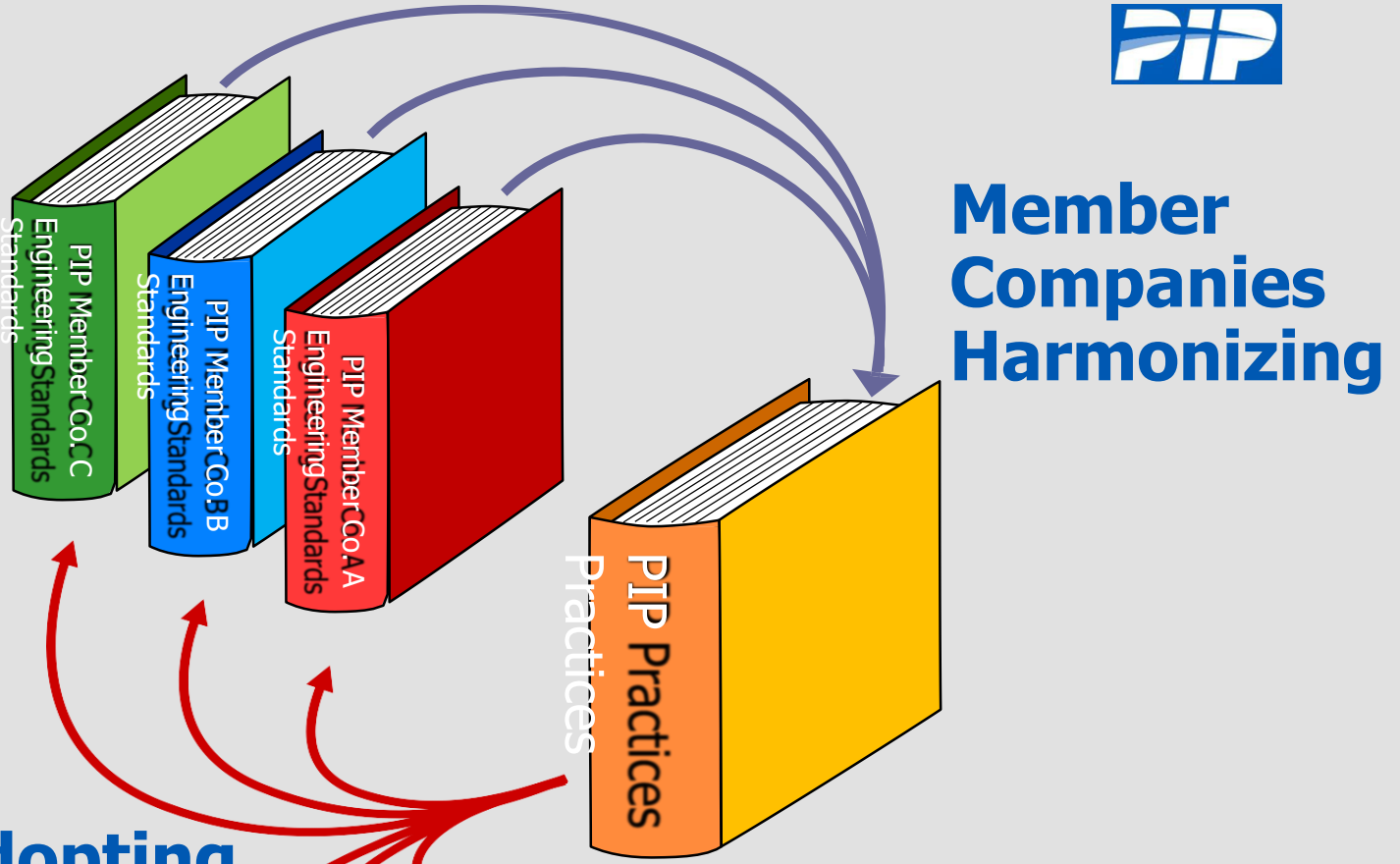
PIP Practices Positioning

Before PIP

With PIP

PIP Practice Development Process



P I P Engineering Guideline and Criteria

- Practice Development – 6
- Architectural & Civil – 8
- Structural – 4
- Foundations – 5
- Structural Steel – 5
- Coatings/Insulation/Refractory – 6
- Electrical – 7
- Machinery – General – 6
- Pumps- 6
- P&ID – 2
- ASME B31.3 Piping General - 7
- ASME B31.3 Piping Design – 4
- Valves – 8
- ASME B31.4/8 Pipeline Systems – 4
- Hygienic Processes Piping – 2
- Process Controls - General – 9
- Process Analyzers – 5
- Process Control Valves – 6
- Process Measurement – 9
- Vessels – 5
- Heat Exchangers & Tanks - 2

116 Practices on How To Use Practices

PIP PROCESS INDUSTRY PRACTICES

P I P Practice Types

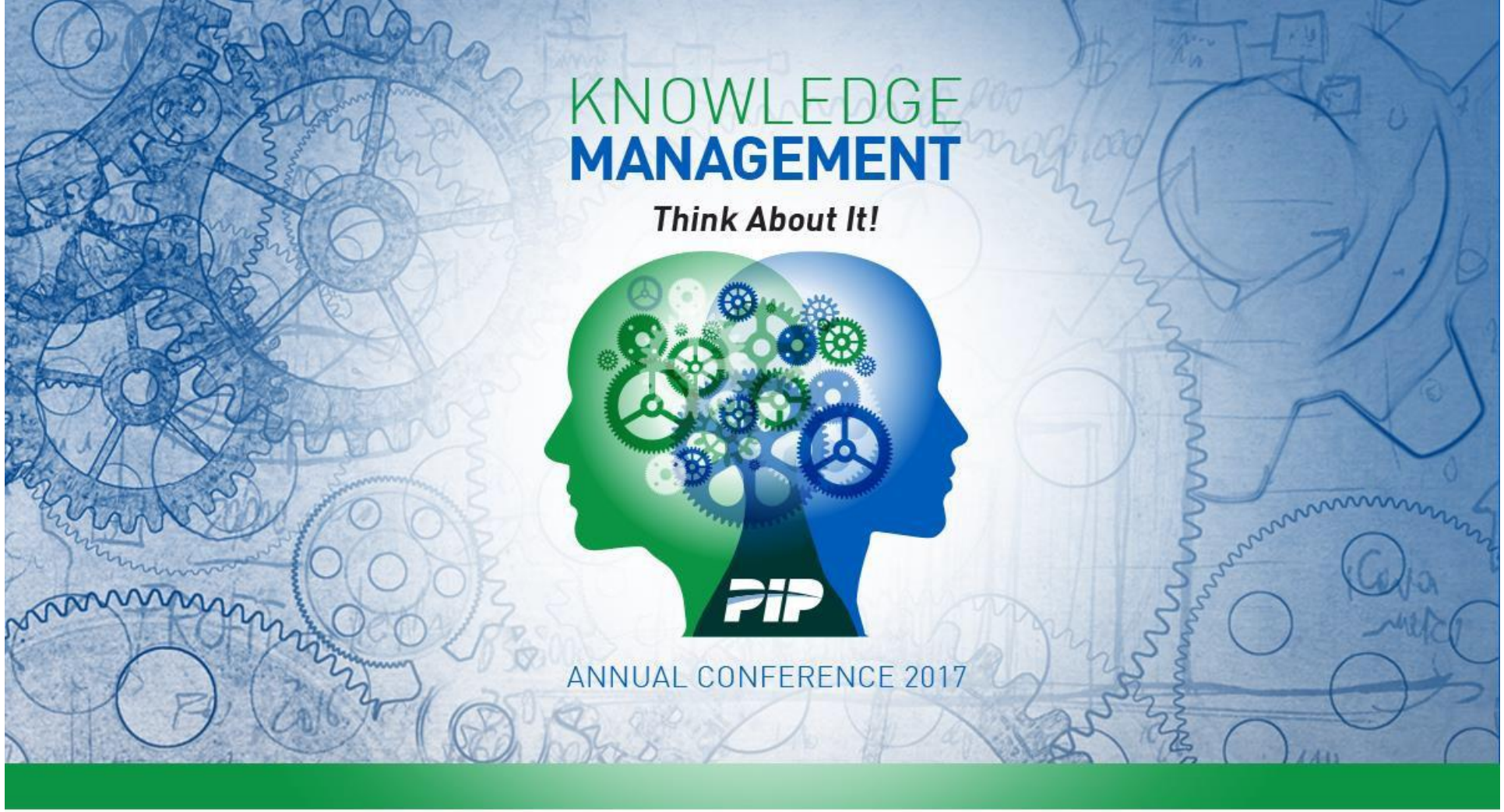
	CODE	TYPE	AUDIENCE
	G	General (Internal Administrative Practices)	Authors and Editors of Practices
+30	C	Criteria (Design Specification)	Engineers
	E	Engineering Guide	Less experienced Engineers
+300	S	Specification (Purchase Order or Subcontract Specification)	Vendors, Fabricators, Manufacturers, Installers, and Constructors
	F	Fabrication Details	Procurers (BoMs), Fabricators (Details), and Inspectors
	I	Installation Details	Installers, Constructors, and Inspectors
	T	Inspection and Testing Requirements	Vendors, Fabricators, Manufacturers, Installers, Constructors, Inspectors, and Start-up Teams
	D	Documentation Requirements	Vendors, Fabricators, and Manufacturers

Agenda

- P I P Overview
- **Metadata**

PIP PROCESS INDUSTRY PRACTICES

Metadata – Preview Teaser ….



Metadata: New Word – Old Concept

Give your Data Purpose

Metadata Everywhere: Even Super Bowl LI

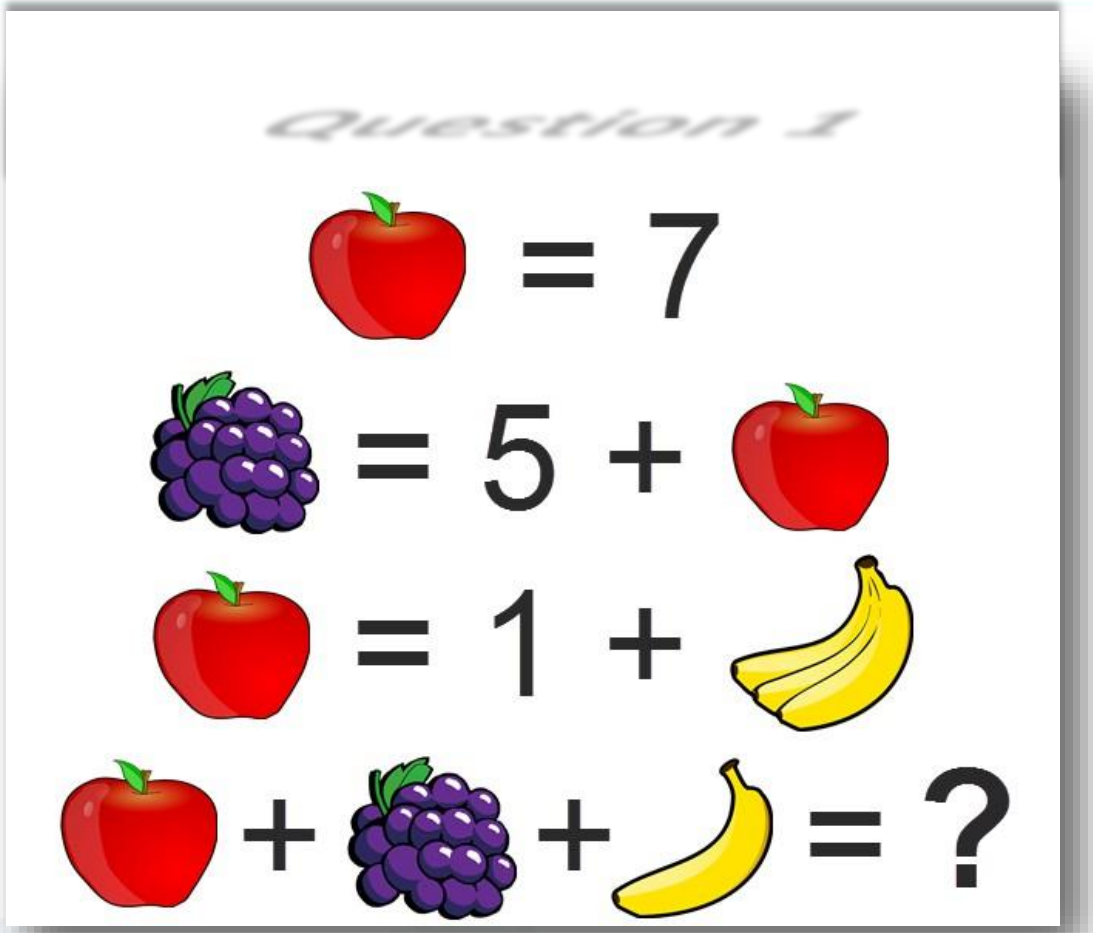
- No team had ever come back from more than a 10 pt. deficit to win the Super Bow
  - Patriots came back from 25 points down…
- 1st Super Bowl to go into Overtime
- 5 Super Bowl Rings for Tom Brady
- Most Pass Attempts (62) & Completes (43)
- Most Yards by a QB (466)
- 1st QB with 3 SB 4th Quarter Comebacks

- **Where did all this "data" come from?**
- **How has the data survived from the non-digital age until now?**
- **How is the data calculated to come up with these stats year over year?**
- **What is the probability that these records will ever be broken?**
- **What is the importance of the records that are tracked?**

Question 1

"Data about data"

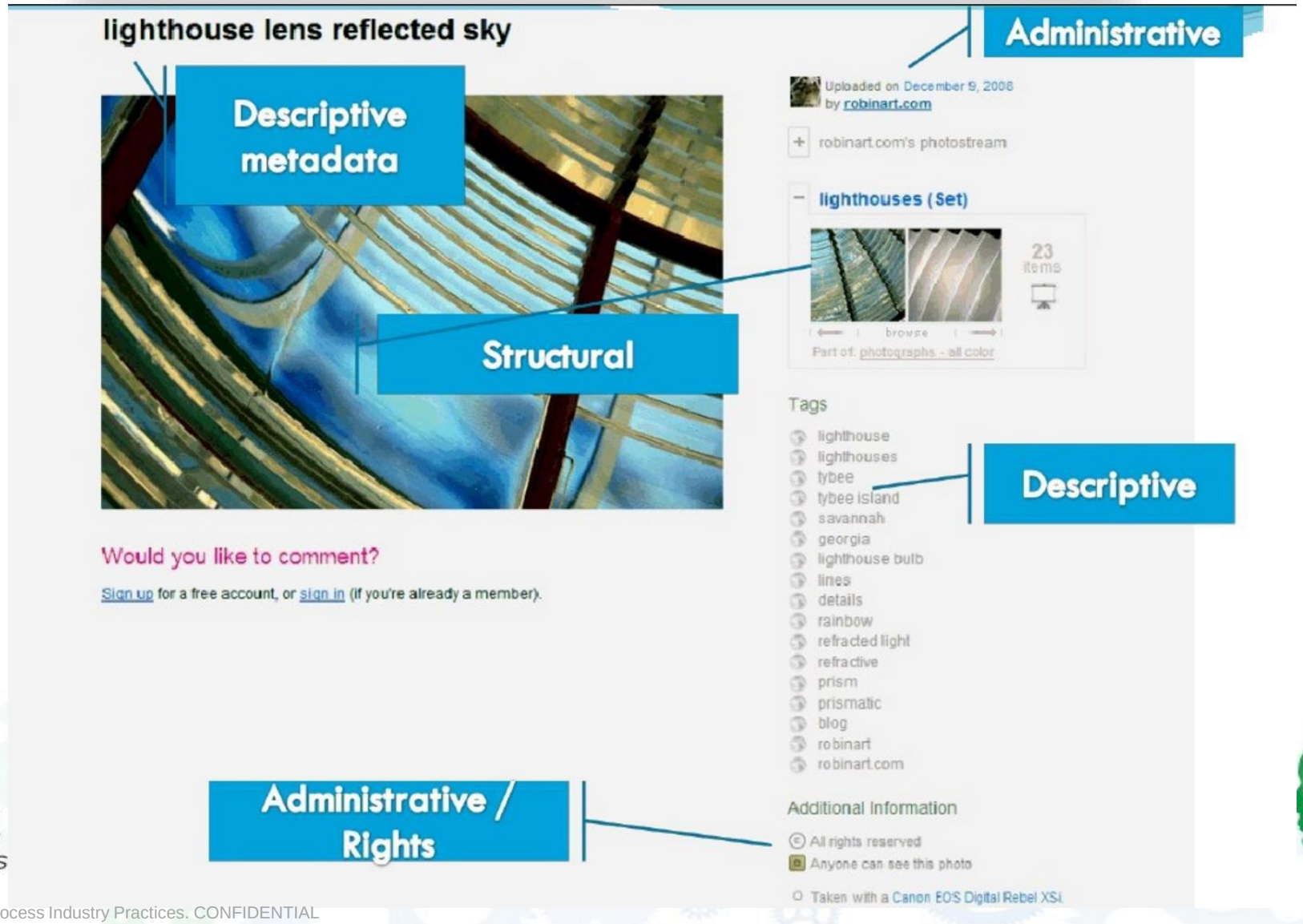
META-DATA



Metadata: Definition

- Metadata is a new word based on an old concept
- The definition literally means “data about data”
- Most important Use: To Locate a Resource
- Alternate Terms: Mapping, Cross-Walking
- Gives your data purpose

Types of Metadata



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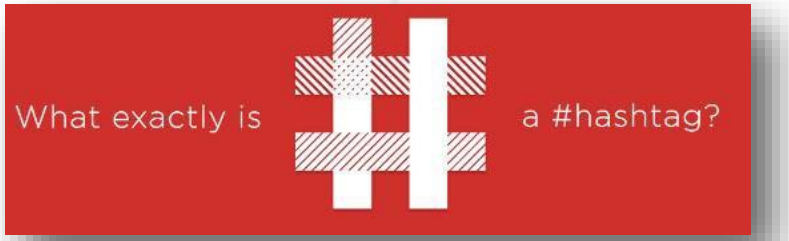
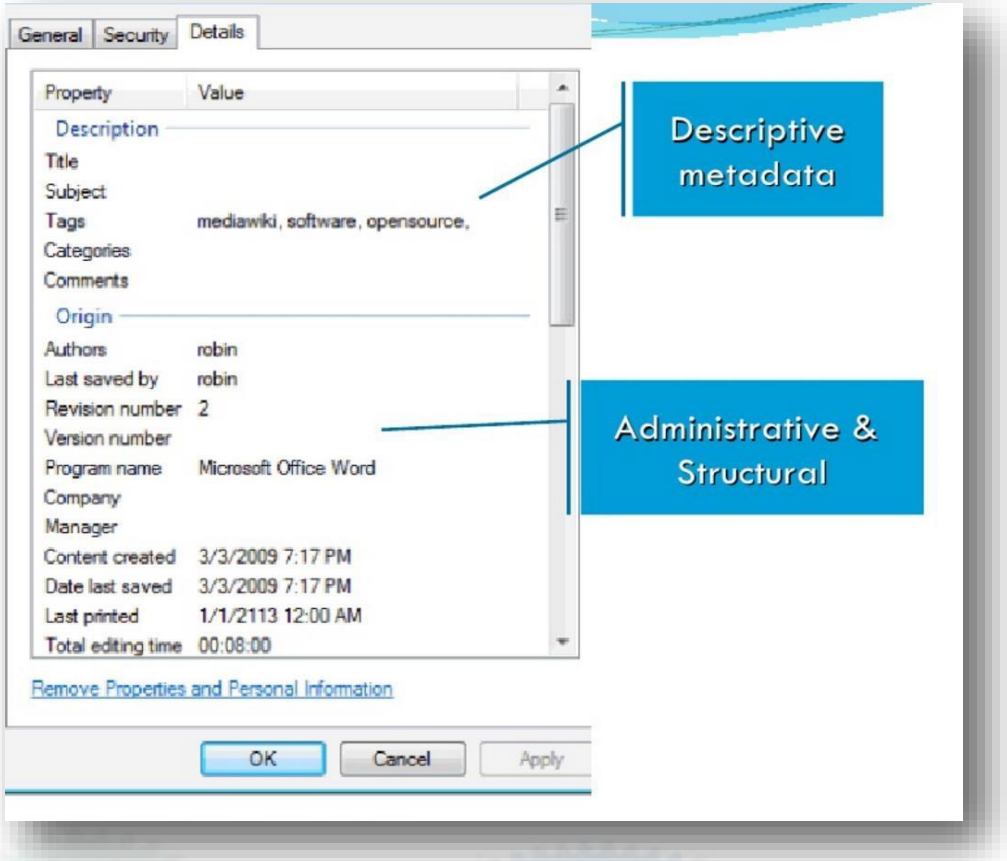
Common uses of Metadata

Ask Your Teenager



- **Locate Resources**
  - Dewey Decimal System
  - **#Haveyoueverusedahashtag**
- **Resource Discovery**
  - Finding resources relevant to one's search
  - Bringing similar resources together
- **Find relevant data to create statistics**
  - Finding a data point in one spec and finding its relative source for analysis in another spec (Cross-Walking)
- **Metadata is key to ensure long data life**
  - Track the lineage of a digital object
  - Document its behavior for future technologies
  - See PIP DMEDC001 for additional details

Microsoft and Metadata

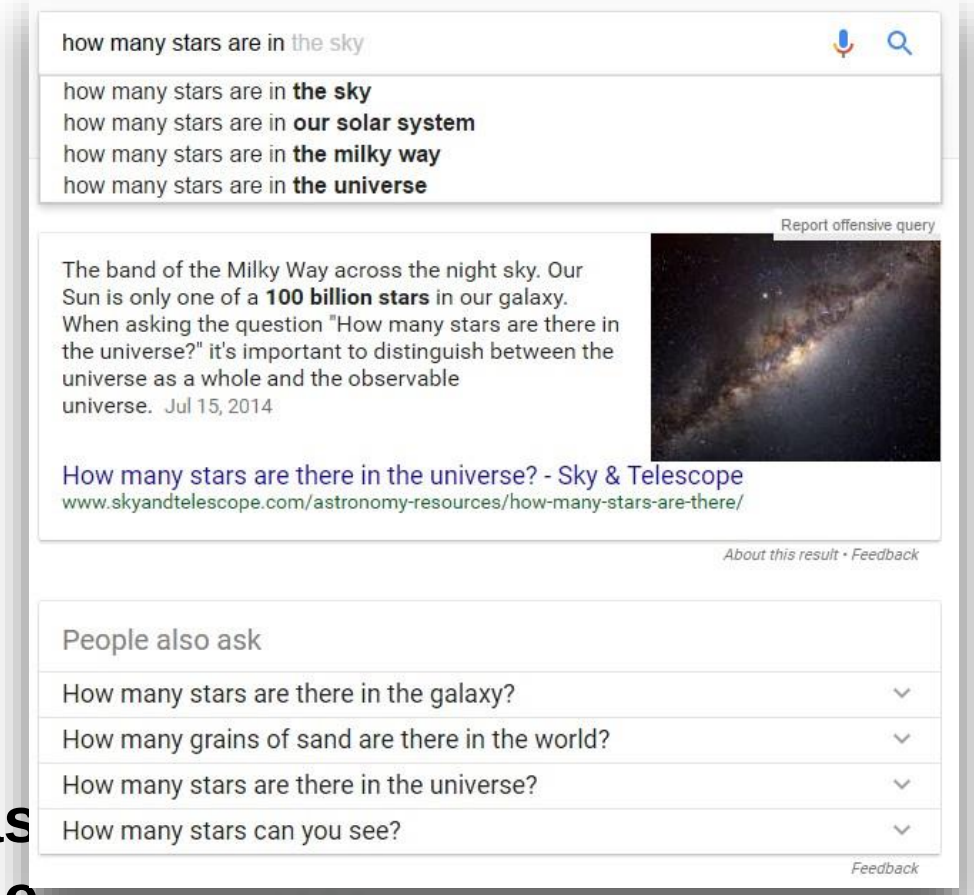


Microsoft has been adding metadata to its documents for years; often based upon which user created the document.

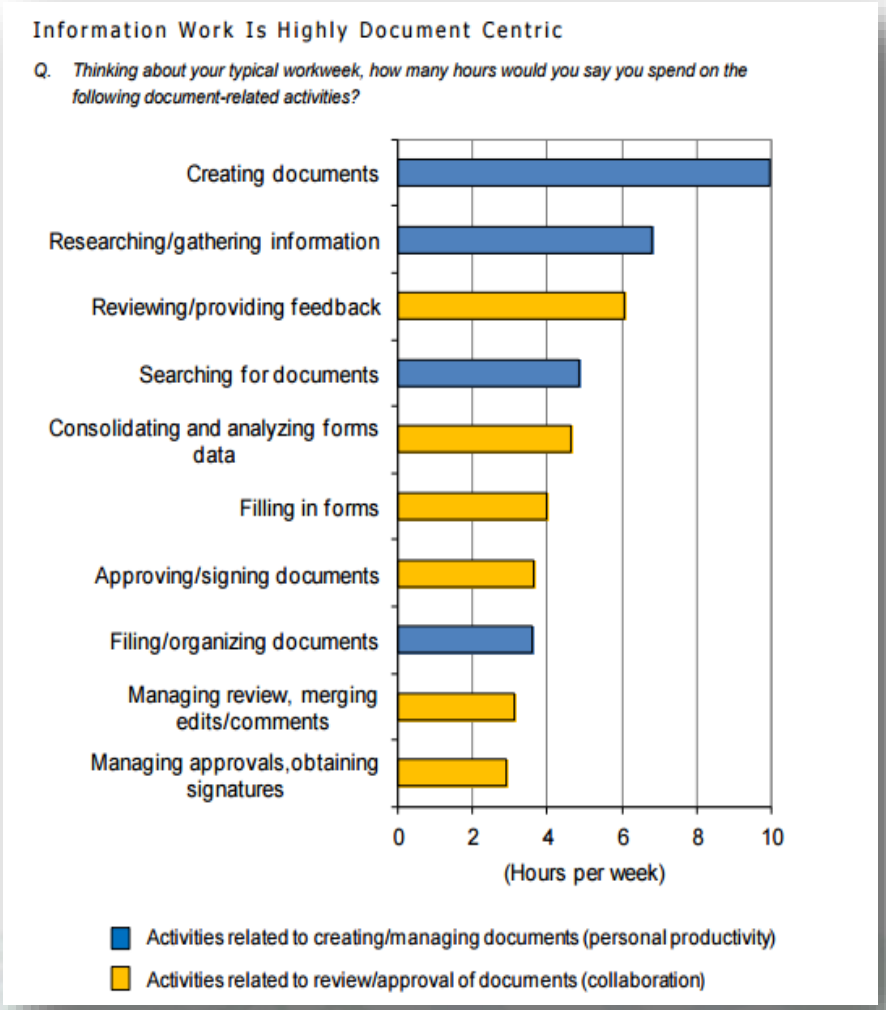
Newer versions allow this information to be changed more easily. PDF Creators also allow the creation and editing of metadata.

How many times per day do you “Google”?

- **Did you know that Google records literally every search item that is typed in the query box?**
- **Google processes over 40,000 search queries every second**
- **3.5 Billion searches per day and 1.2 Trillion searches per year**
- **Every person in this room has contributed to the “World Wide Web” of metadata**



How long does it take to find your information?



- **When you access specs, how long does it take to find what you were looking for?**
- **Does the current technology aide you in your efforts, or does it create obstacles?**
- **Yes, I spent over 1 hour trying to find this type of graph.**

Knowledge Graph – Smarter Searching

About 21,200,000 results (0.77 seconds)

Houston Rockets

43-19, 3rd in Western Conference

Final - Yesterday, 9:30 PM
Staples Center, Los Angeles, California

Houston Rockets (43-19)	122	
Los Angeles Clippers (36-24)	103	

Box Score

All times are in Central Time

Schedule and scores

Top stories

Rockets get hot from 3-point range, overwhelm Clippers

ESPN.com · 7 hours ago

Rockets vs. Clippers: Score, Highlights, Reaction from 2017 Regular Season

Bleacher Report · 8 hours ago

For Mike D'Antoni, Rockets there's no such thing as too many three-pointers

USA Today · 2 hours ago

Houston Rockets

Basketball Team

nba.com/rockets

The Houston Rockets are an American professional basketball team based in Houston, Texas. The Rockets compete in the National Basketball Association, as a member club of the league's Western Conference Southwest Division. Wikipedia

Head coach: Mike D'Antoni
Arena/Stadium: Toyota Center
Mascot: Clutch
Owner: Leslie Alexander
Location: Houston, TX
NBA championships: 1995, 1994

Roster

James Harden Point guard	13
Eric Gordon Shooting guard	10
Nenê Center	42

View 10+ more

Metadata Pitfalls – Think "WebMD Symptoms"

- Too Much Data
- Misleading Results
- Metadata Tagging Errors
- Making Incorrect Data Connections

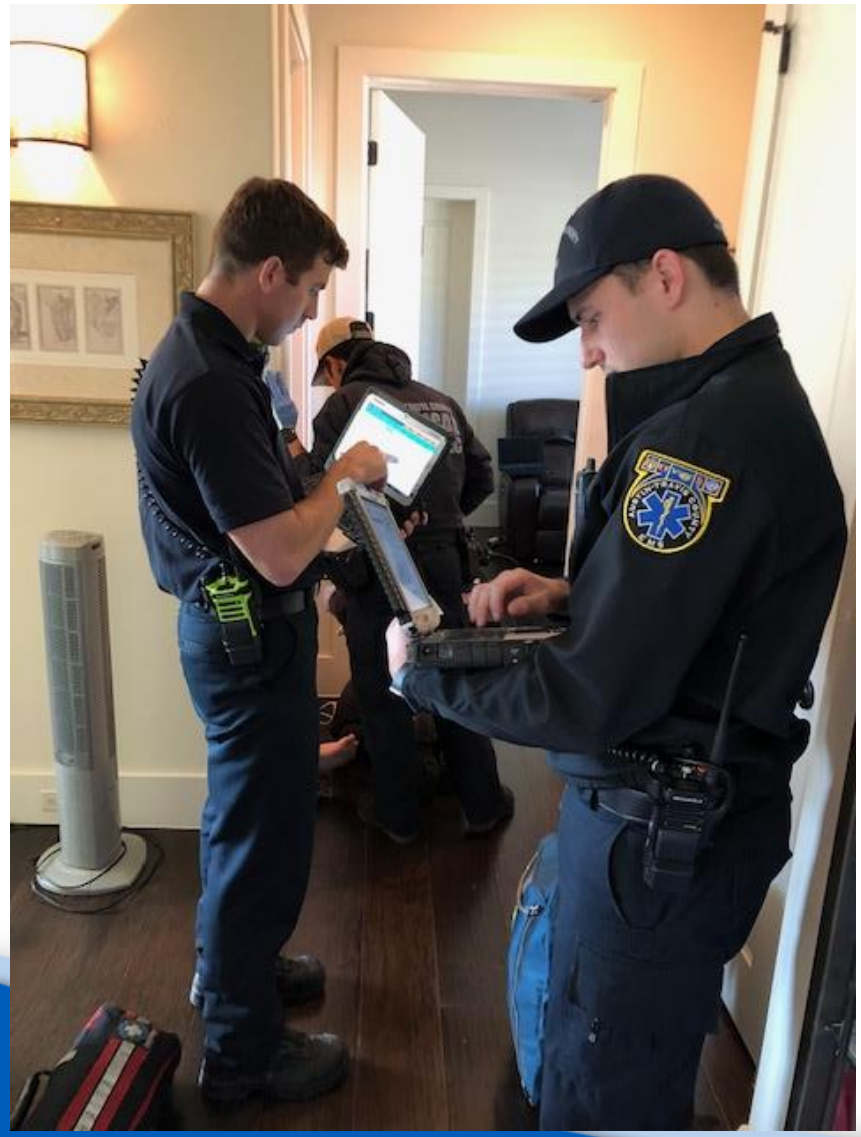
Web MD

(proper noun)

Something that makes a mild cold into a deadly disease that will kill you within the next 24 hours.

"I felt fine when I got here for my checkup.
Now that I filled out all your forms, I think I have carpal tunnel."

PIP Director's Report



Michael Poehl

Director

Process Industry Practices

December 5, 2018

PIP PROCESS INDUSTRY PRACTICES

Agenda

- P I P Overview
- Metadata
- **P I P Metadata FT**

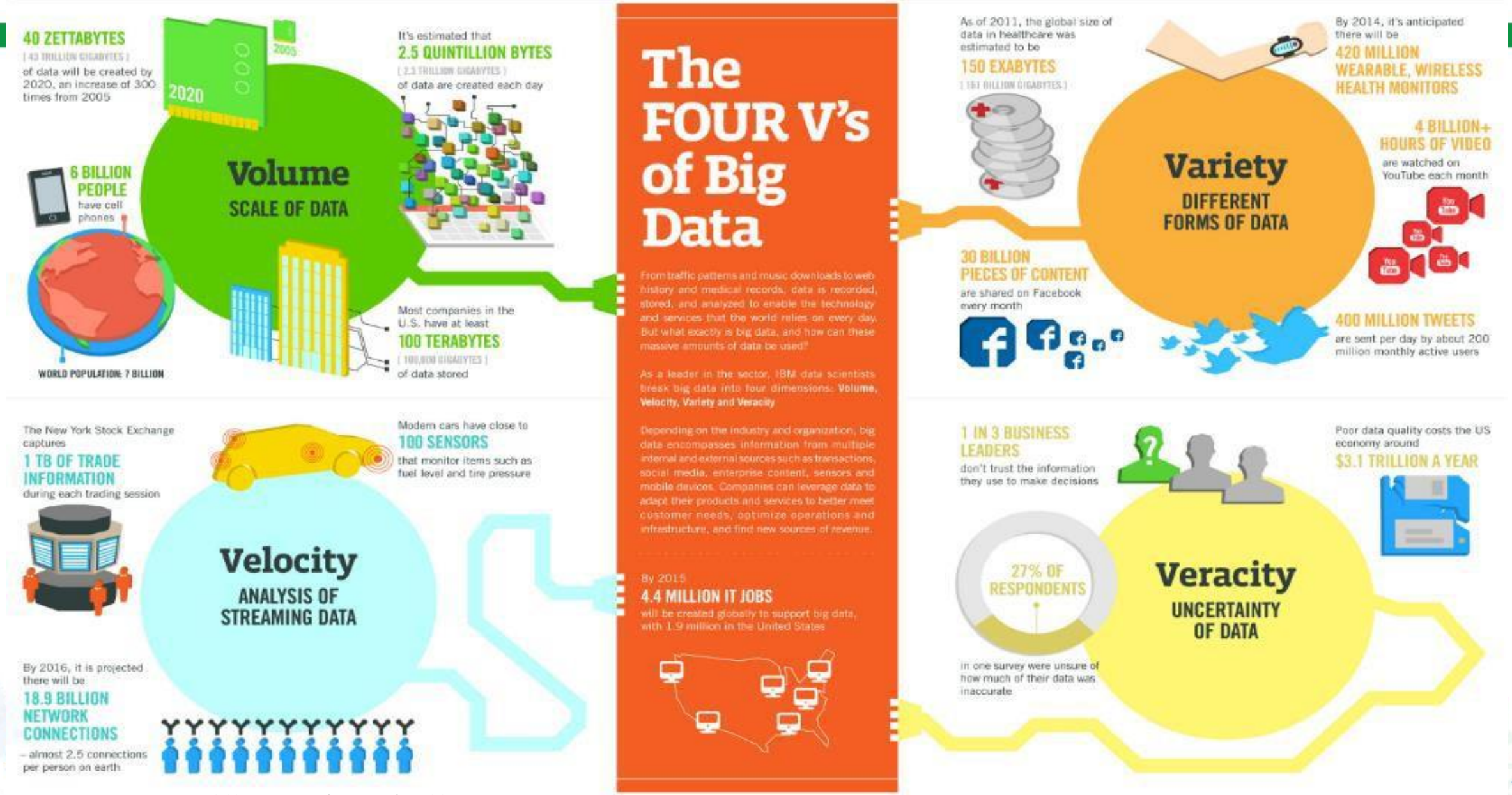
PROCESS INDUSTRY PRACTICES

Think “Google Search” for P I P

- **What if…**
  - You could type in any reference keyword, from any specification
  - You could draw a sound conclusion based on the facts presented
  - You could calculate the money saved by making an engineering decision
  - You could interpret what you searched in seconds

Most popular job by state

Four V's of BIG DATA



Engineering has BIG DATA

Engineering Associations and their "Founded Date"

- ASCE 1852
  - –(oldest national engineering society in the USA)
- ASME 1880
- ASTM 1898
- ANSI 1918
- API 1919
- IEEE 1963
- **Internet 1991**
- **P I P 1992**

So, three engineers are driving down a country road when the car sputters and stops. The first guy, a mechanical engineer says "It's the carborator. I can fix that." The second guy, an electrical engineer says "No, It's just the battery cable. I can fix that." The third guys, a software engineer for microsoft, says "Why don't we just get out, then back in?"

– **We have over 150 years of "data" and "knowledge management" to capture, learn from and preserve for the future.**

PROCESS INDUSTRY PRACTICES

ANNUAL CONFERENCE 2017

PIP Director's Report

Michael Poehl

Director

Process Industry Practices

PIP PROCESS INDUSTRY PRACTICES

PIP Director's Report

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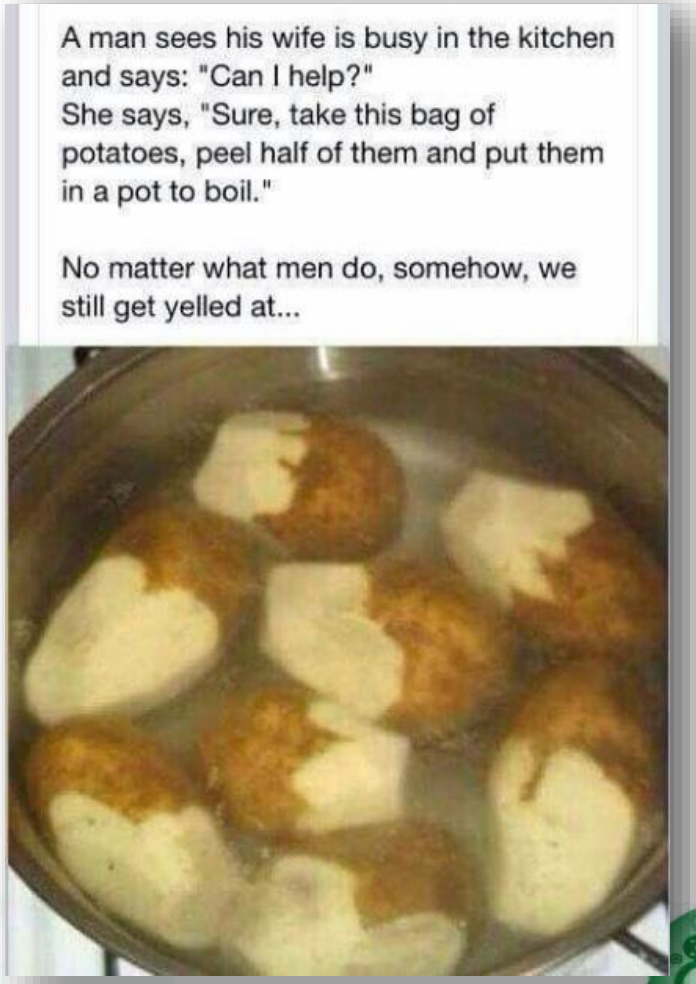
PIP PROCESS INDUSTRY PRACTICES

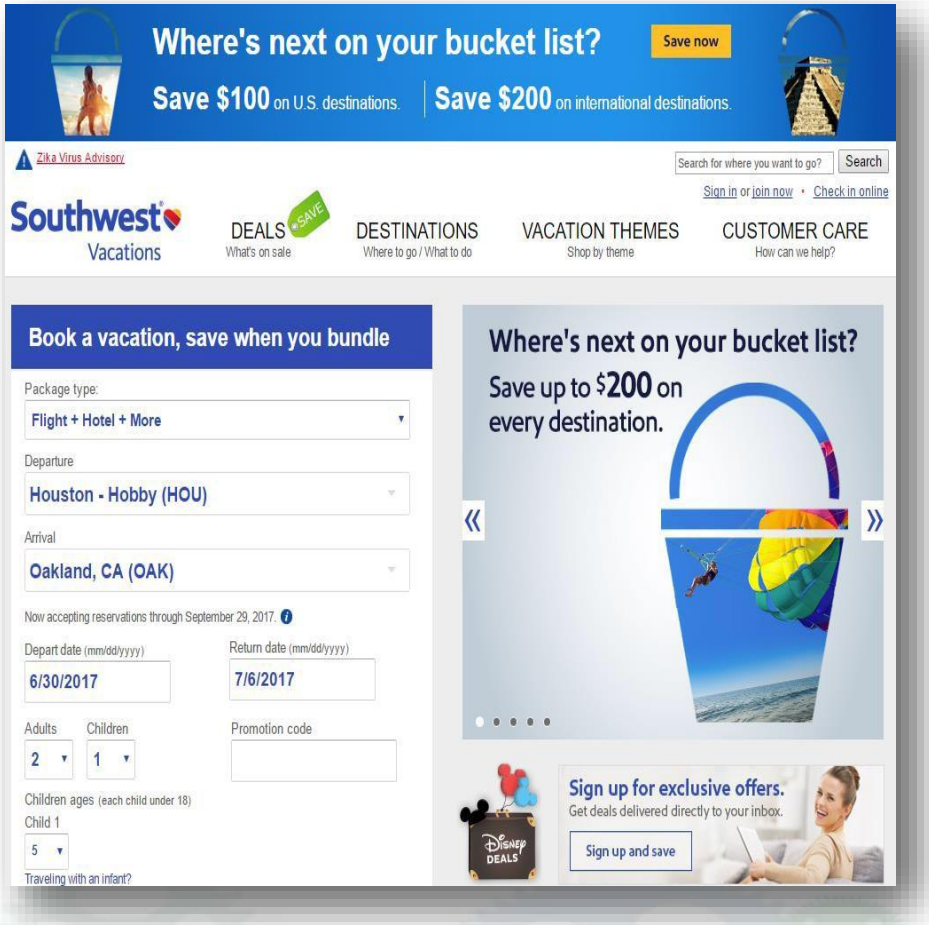
Google – Metadata Wizards!

- **Can anyone guess how many pages make up the “World Wide Web” today…?**

- **Google Knowledge Graph**
  - Crawls the web by following links from page to page.
  - It then sorts the pages by their content and other relevant factors
  - It is then put into “The Index” over 100 Million Gigabytes of storage
  - Over 200 factors are considered before google displays your results
  - You get 100 million results, in roughly fraction of 1 second…

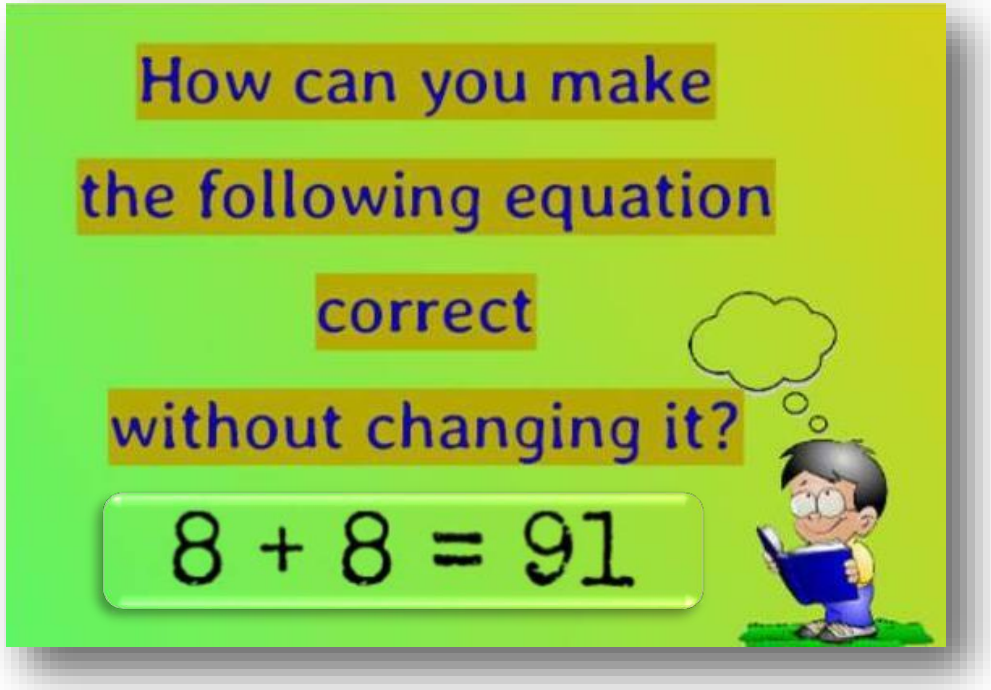


Save money … not metadata



- **Did you know websites collect data about your frequent searches and will actually display "increased" pricing based on your frequent queries?**
- **Make sure your searches for vacations aren't costing you "metadata" related money.**

P I P Metadata
– WHAT'S NEXT?



***Disclaimer*: PIP is not a software developer, but it can help standardize the metadata that software companies use, thus making it possible, and easier for data management and transfer throughout various design systems.**

What does Metadata mean for PIP?

Metadata Function Team

Mission Statement:

Promote awareness and coordinate the discovery, documentation, harmonization, use and reuse of data using best practices.

Long Range Objectives (5-10 years to achieve)

- Develop Metadata communication/transfer beyond PIP

Medium Range Objectives (2-5 years to achieve)

- Develop an Electrical data elements list (similar to DMDIM001) from the Electrical Practices datasheets

Short Range Objectives (<2 years to achieve)

- Develop MDFT Charter document
- Hyperlink the internal PIP References in the Practices (concentrated effort for all Practices; existing and new)
- Develop guidelines for coordinating the assignment of data labels and fields
- Develop an initial PIP "data dictionary"
- Develop a Metadata Management Process
- Develop a Data/Metadata Stewardship Program (See Note)
- Create a Metadata Strategy / Practice
- Adopt / existing industry Metadata Standards
- Identify Appropriate Metadata Tools
- Implement Metadata Management across the PIP organization

PIP SPECS – Knowledge Management

- **Think About It**
  - When was the last time you printed out a spec to read it?
  - When was the last time you referred to a handbook sitting in a shelf vs. looking online?
  - Have you ever wondered where the spec developers got their values from?
  - Have you ever seen a spec refer you to 10 other relevant specs?
  - Have you ever uploaded an old specification (non-digital) and then tried to run a search?

- **If you answered yes to any of these questions, you are yearning for Metadata!**

PROCESS INDUSTRY PRACTICES

P I P METADATA

- **Metadata tags must be added at the native document level**
- **Links must be created before the document converts to PDF**
- **PCCFL001 – with Metadata**

2.1 Process Industry Practices (PIP)

- PIP PCCGN001 - *General Instrument Design Checklist*
- PIP PCCGN002 - *General Instrument Installation Criteria*
- PIP PCIDP100 - *Differential Pressure Installation Details*
- PIP PNF0200 - *Vent/Drain/Instrument Connection Details*

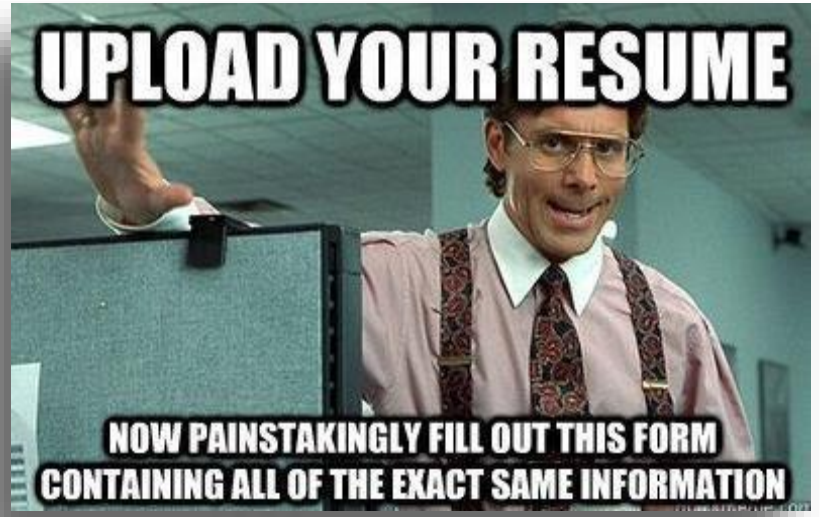
2.2 Industry Codes and Standards

- American Gas Association (AGA)
- American National Standards Institute (ANSI)
  - ANSI-2530/API-14.3/AGA-3/GPA-8185 - *Natural Gas Fluids Measurement - Concentric, Square-Edged Orifice Meters*
    - Part 1 General Equations and Uncertainty Guidelines
    - Part 2 Specification and Installation Requirements
    - Part 3 Natural Gas Applications
    - Part 4 Background, Development, Implementation Procedures and Subroutine Documentation

PROCESS INDUSTRY PRACTICES

PIP and Metadata – Looking Forward ?

- Think about specs as packages rather than standalone documents.
- Activate “Metadata” within each spec to provide active references to other specs.
- Create numerical references for young engineers to learn from our experience.
- Start to get a handle on the data that we have & build on our knowledge management.
- Build on the specification database, make it the “GOOGLE” of PIP

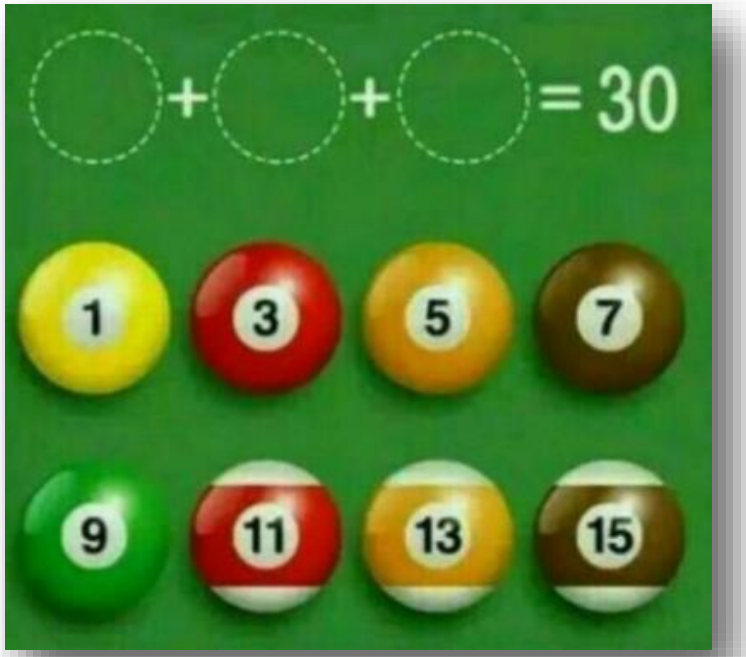


- We don’t need SMART DATA, we need to get SMART about DATA.

P I P SPECS

- **Create Smart Specs**
- **Instead of all entities speaking our own language, start creating a universal language**
- **We have worked for the development of millions of data points, isn't it time we start making our data work for us?**

- **Metadata is our window to the past, our door to the present, and our gateway to the future.**



P I P – W H A T …..

- If it looks like a
- Duck

- If it walks like a
- Duck

- If it sounds like a
- Duck

- It is probably a
- Duck

P I P – NOT D u c k ....

D U c k

D U C k

D UC k

D U C K

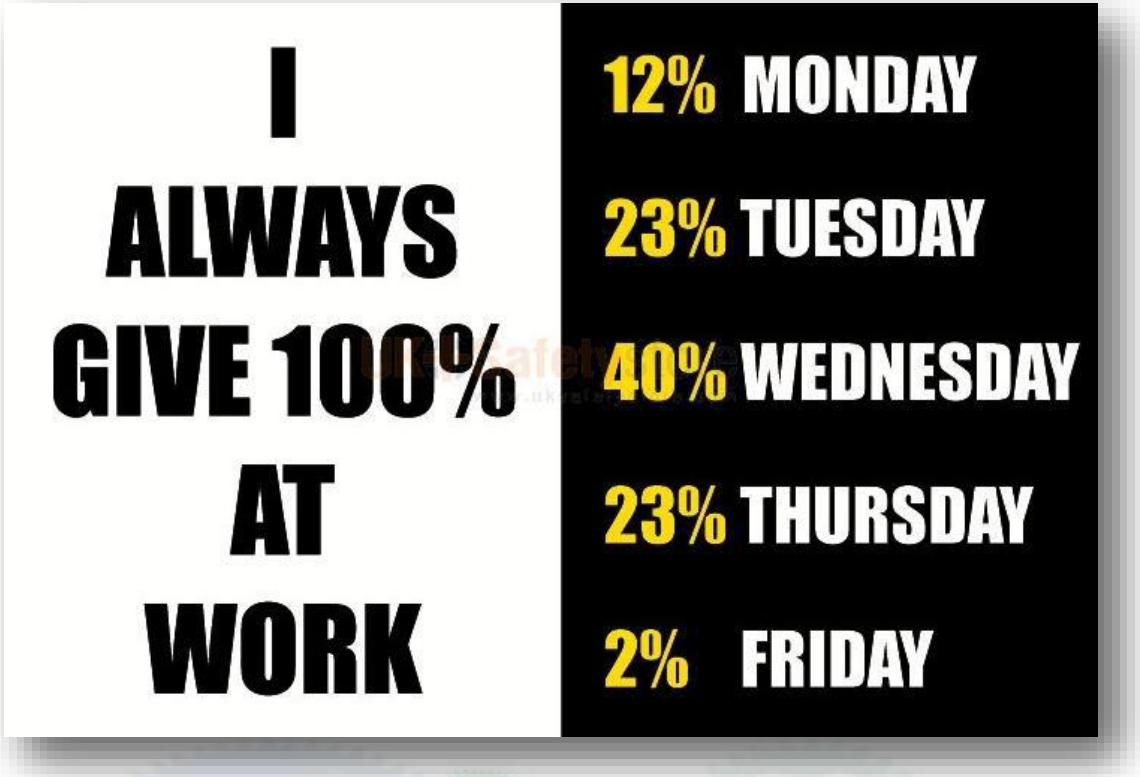
A B E T Philosophy for Chem E

None of us is as smart as ***ALL*** of us !

P I P - Collaboration

- Interoperability
- ISO Connection
- Focus on the WHAT for P I P

And the Answer is…All Figures Lie, Especially %s



Agenda

- P I P Overview
- Metadata
- P I P Metadata FT
- **Questions ?**

PROCESS INDUSTRY PRACTICES

PIP Website:	**http://www.pip.org**
Marjorie Wilcox:	**marketing@pip.org**
Michael Poehl:	**director@pip.org**

PROCESS INDUSTRY PRACTICES

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- P I P Overview
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- **Questions**

PROCESS INDUSTRY PRACTICES

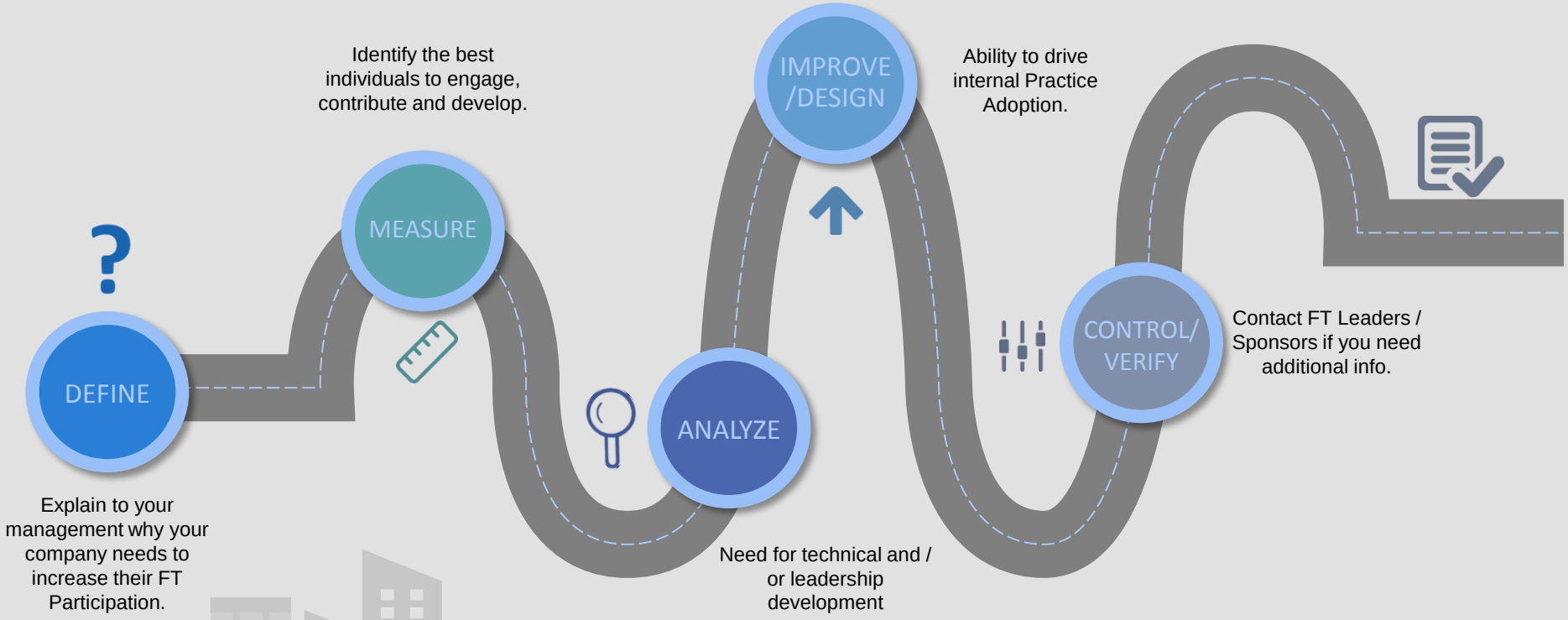
- **Back-Up Slides**

PROCESS INDUSTRY PRACTICES

Piping Database Development

- Hexagon assistance
  - Upgraded PIP SRD instance to new program update (January)
  - Migrated PIP PMS data from Hexagon SRD to PIP SRD instance (Approximately 70 PMS Practices) (April)
  - Continued to provide training via webcons
  - Developing Excel export for use by PIP reviewers
  - Updating the PIP report format with changes required by Piping FT
- PIP Office progress
  - Updated the PIP Excel Piping Components Spreadsheet with data from current PIP Piping Material Specs (128 metallic PMSs)
  - Started working on input of data for one Practice into SRD
  - Proper set up of valve descriptions is difficult in SRD
- PDTT meeting monthly by webcon
  - Helping with SRD/PMS related questions
  - Needs to develop a work process for reviewing the database

PIP ROAD MAP



Provide names and contact information to Lindsay Whelchel– info@pip.org

Managing Complex Change