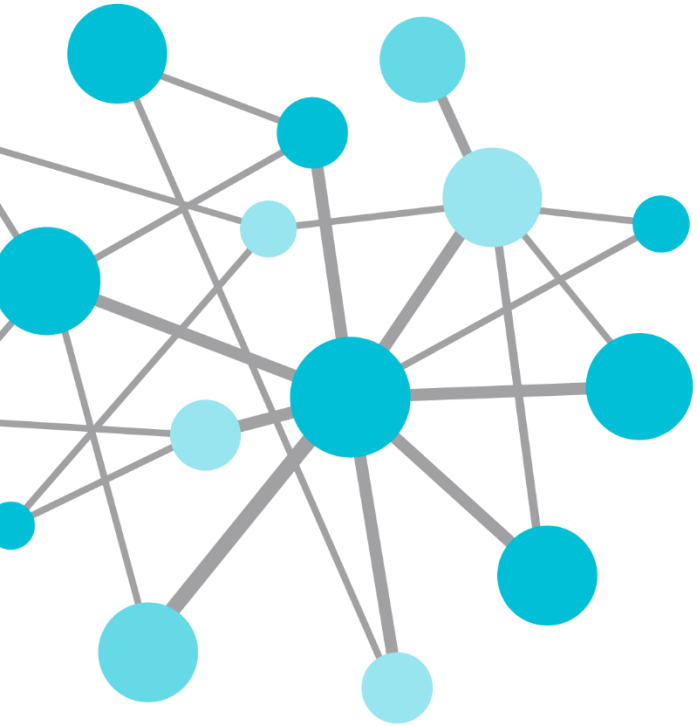


Unleash the Power of Big Data

Presented by **Matt Ziegler**

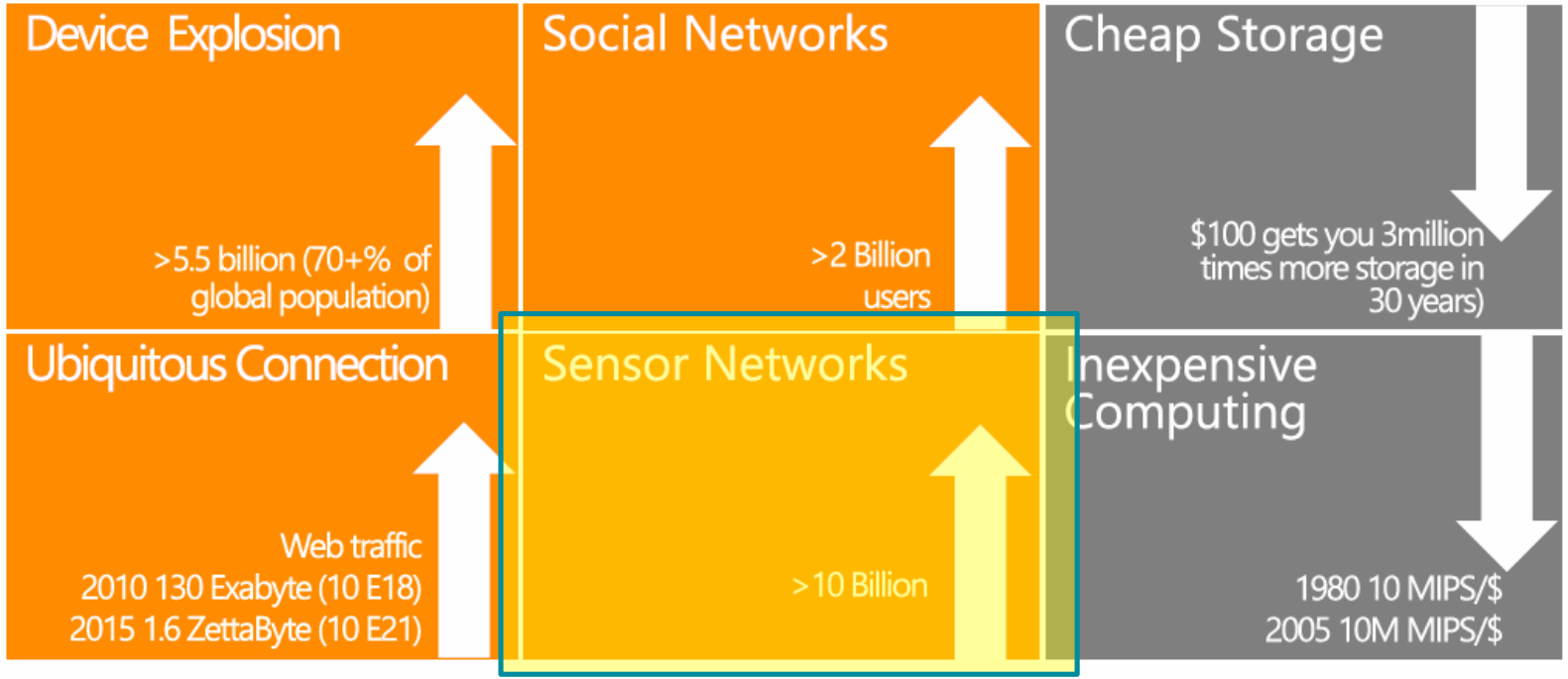
OSIsoft.

USERS CONFERENCE 2014

The Power of Data

DECISION READY IN REAL-TIME

Key Trends



Insight

Time Series

Relational

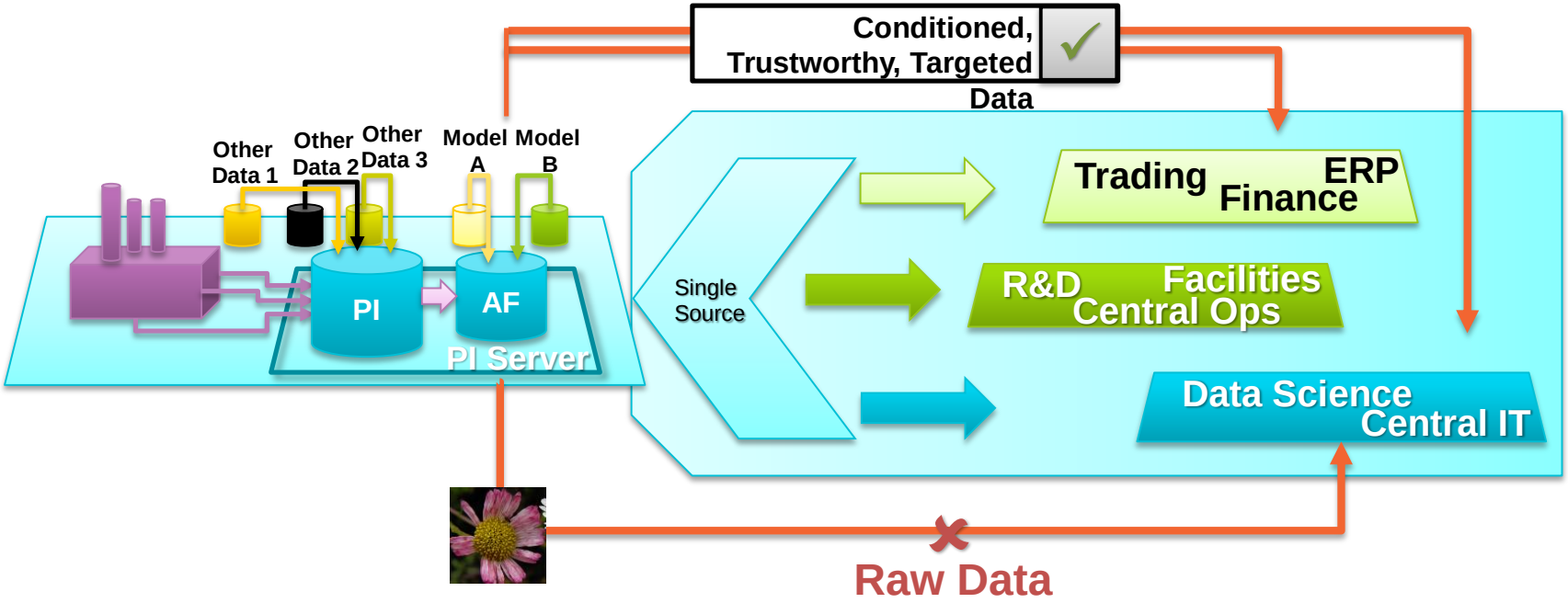
Unstructured

Real-time Data isn’t perfect

The Truth about Real-time Data

- Naturally incomplete
- Doesn’t look like SQL (unevenly spaced, no transactions)
- Subject to errors in measurement
- Varies in fidelity

Decision-Ready Data



Big Data and the PI System

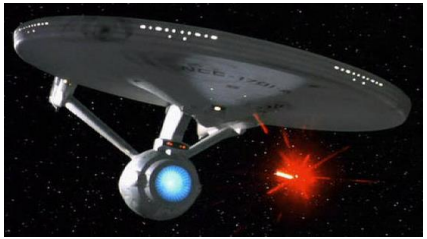
Bring calculations to the data

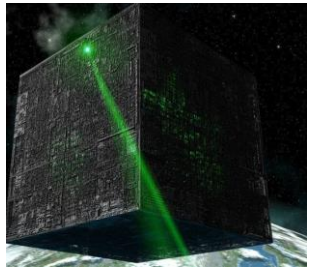
Systems of engagement vs systems of record

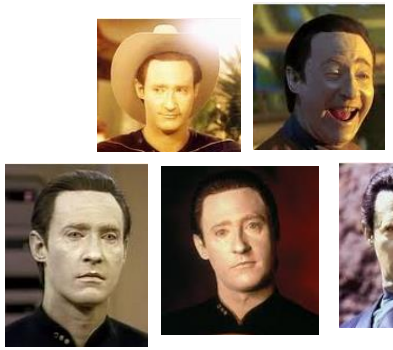
Identify the conversation

Data Warehousing

PI Connectors and Integrators







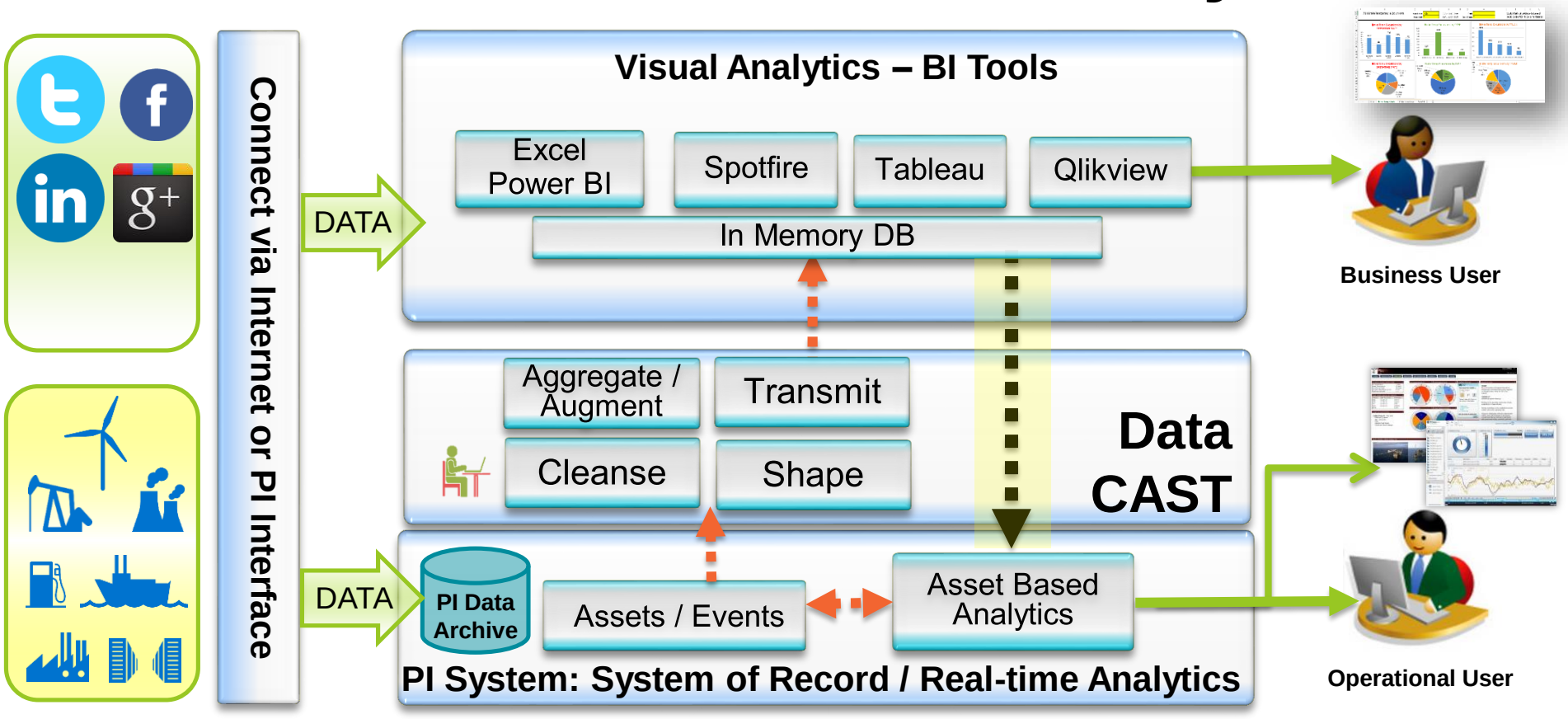
In Context

Auto-configured

w/ Events
w/ Assets

Visual Analytics

PI Infrastructure for Visual Analytics



Enabling the Smart Grid

Conservation Voltage Regulation (CVR)

ANSI C-84.1 → 114 – 226V

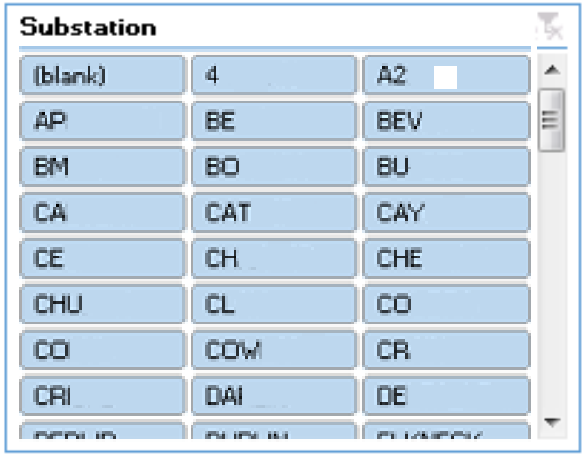
- Utilities operate at the high end of range
- Potential 3% continuous energy savings
- 6,500 MW*Years (56.9 MM MW*hrs)

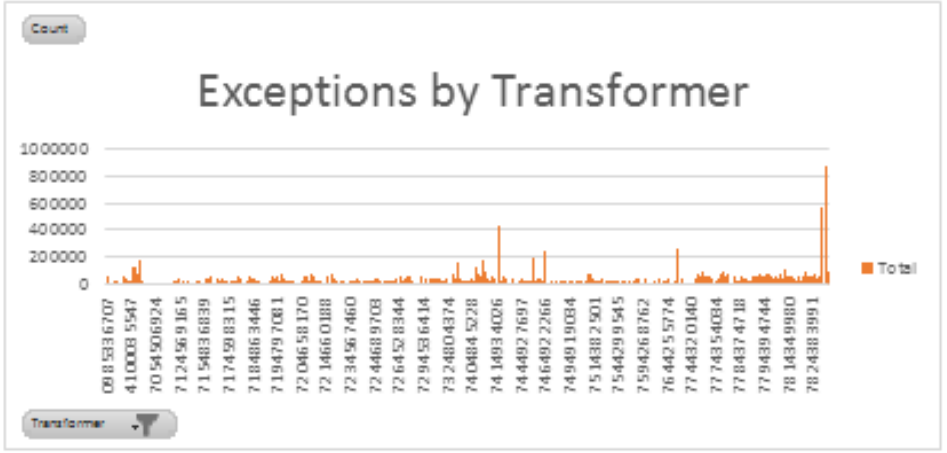
Violation defined as 5 consecutive reads under 115V

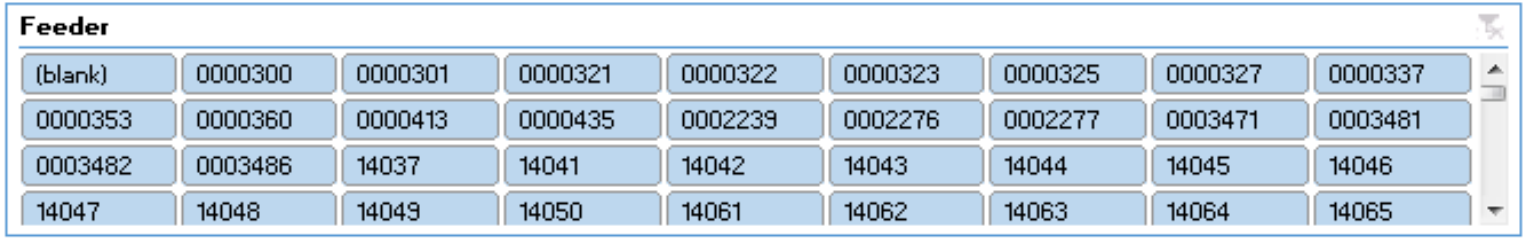
Grand Coulee Dam: #1 US Producer

Direct Visual Analytics

Transformer	Count
0985336707	52279
3945435251	8308
3945935235	4217
3946635311	12848
3946835212	4217
3947235159	17414
3958335267	4381
4020234162	4386
4020334115	2919
4024534242	10006
4025234237	10264
4025734267	12153
4026135386	1388
4028735584	12278
4031635525	8628
4031735581	13155
4035235461	4385
4036034309	18250
4036135113	4265
4036835416	12953
4039235252	4282
4039335116	4385
4040435355	12229

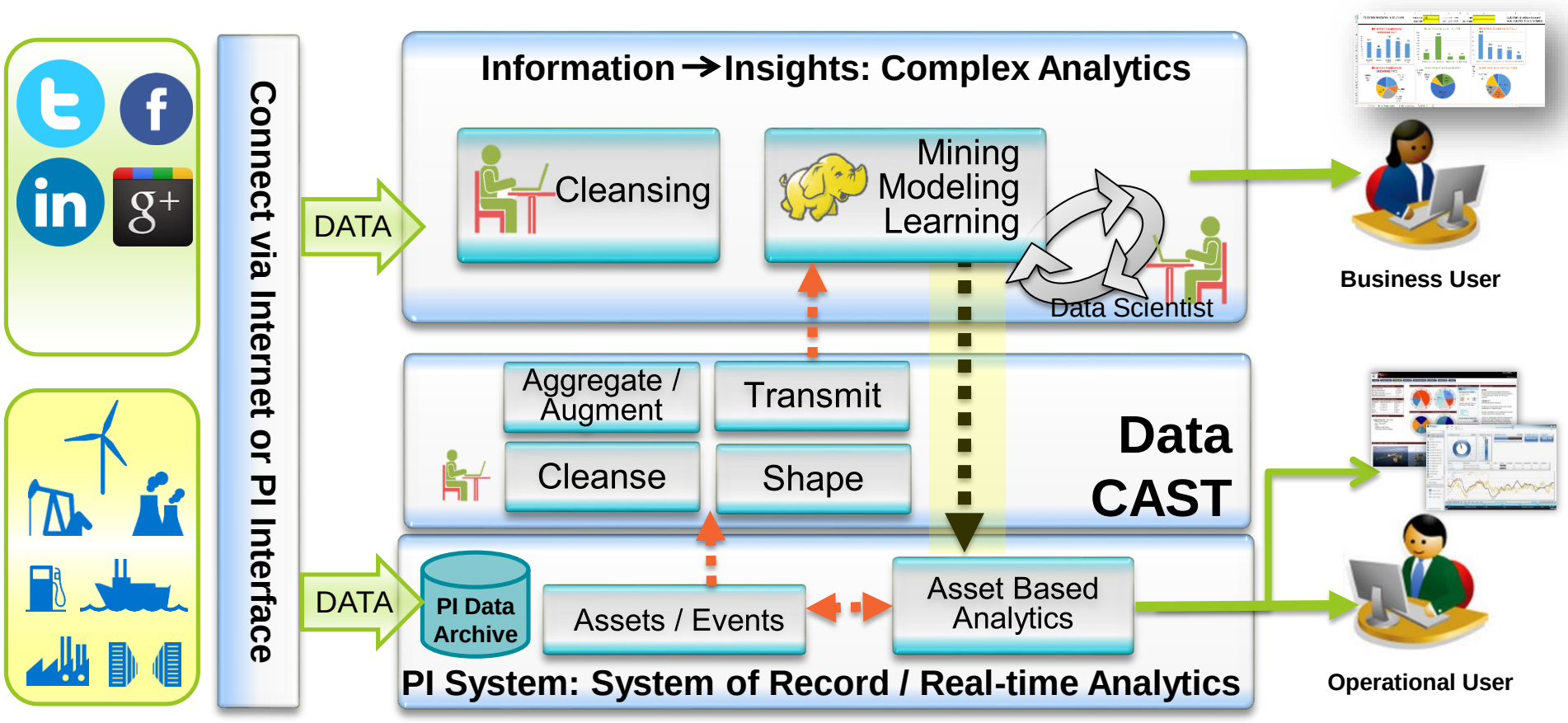






Statistical Analytics

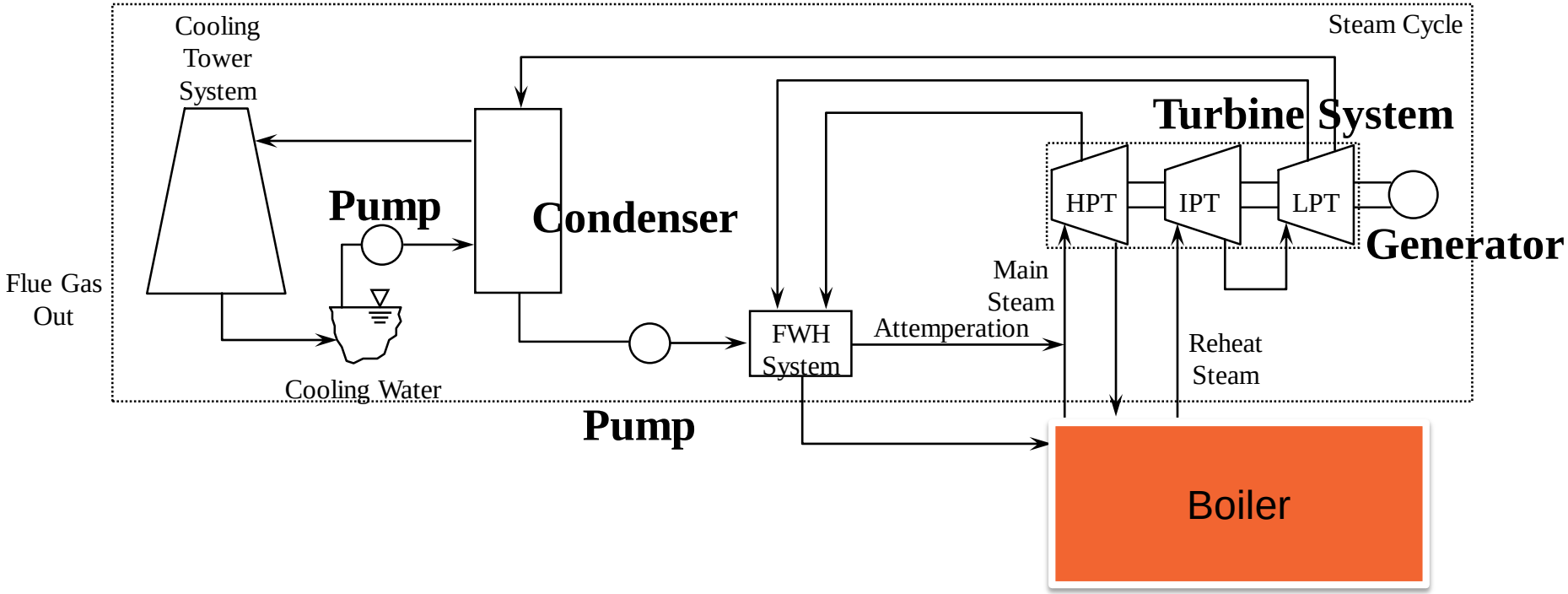
PI Infrastructure for Statistical Analytics



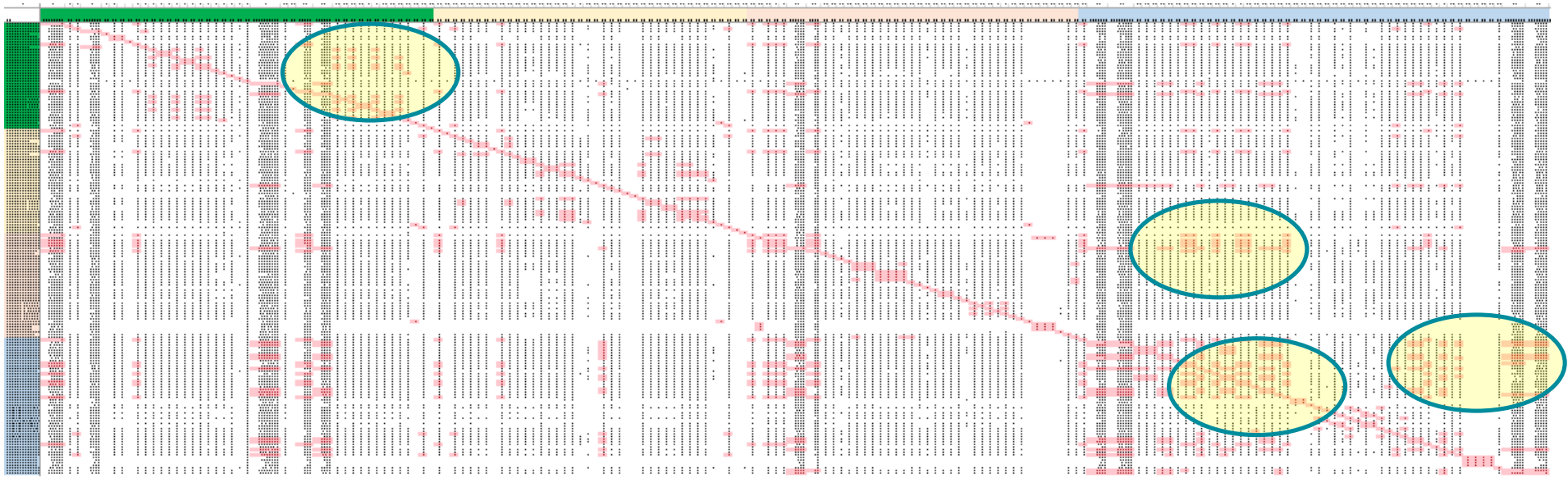
Steam Cycle Statistical Analytics

```
File dependencies to include with job:
[Auto-detected] MapReduce.exe
[Auto-detected] Microsoft.HadoopMapReduce.dll
[Auto-detected] Microsoft.Hadoop.WebClient.dll
14/03/20 22:11:27 INFO streaming.StreamJob: C:\
/bin/hadoop job  -Dmapred.job.tracker=jobtracke
_0038
14/03/20 22:11:27 INFO streaming.StreamJob: Tra
030/jobdetails.jsp?jobid=job_201403100641_0038
14/03/20 22:11:28 map 0%  reduce 0%
14/03/20 22:12:10 map 10%  reduce 0%
14/03/20 22:13:59 map 50%  reduce 0%
14/03/20 22:15:47 map 90%  reduce 0%
14/03/20 22:16:11 map 99%  reduce 0%
14/03/20 22:16:17 map 100%  reduce 0%
14/03/20 22:17:48 map 100%  reduce 17%
14/03/20 22:17:54 map 100%  reduce 33%
14/03/20 22:17:57 map 100%  reduce 67%
14/03/20 22:21:01 map 100%  reduce 90%
14/03/20 22:22:25 map 100%  reduce 100%
14/03/20 22:22:33 Job complete: job_2014031006
14/03/20 22:22:33 Output: asv://energy@blobtes

Job Completed [0] in 701.993 sec.
Reading Results...
Reading Results...Done.
Calculating.......
Calculating.......Done
```



Cluster Analysis



Conclusions

R2	GEN GROSS WATTS PRIMARY	N
GEN NET VARS	0.280356162	
GEN MAX STAT AMPS VECTORMETER	0.284610808	
MTG GEN BUS AIR	0.74887239	
MTG H2 GAS TMP LVG COOLERS	0.737921258	
GEN GROSS WATTS PRIMARY	1	
MTG MAIN STEAM PRESS	0.905606472	
MAIN STM ENT'G TURBINE-SOU	0.905188527	
MN STM ENT MTG AHEAD OF 'Y	0.797062644	
MN STM ENT MTG AHEAD OF 'Y	0.797568377	
THROTTLE STEAM TEMP	0.794375313	
MTG MAIN STEAM CHEST PRESSURE	0.90162384	
MTG MAIN STEAM PRESS	0.905607292	
CALCULATED FIRST STAGE STM TEMP	0.696087978	
MTG 1ST STAGE PRESSURE	0.994995909	
MTG 1ST STAGE PRESSURE N	0.998423531	
CRH ENTERING ATTEMP TEMP -	0.899808207	
CRH STEAM TEMP	0.537046771	
CRH LEAVING TURBINE PRESS-	0.998216351	
HRH ENTERING TURB TEMP - N	0.8491605	

- Need Higher Fidelity Data
- Change my model
- Add more data
- Add facets (time of day, temperature, coal quality)

High Pressure Steam does more Work

Call to Action

- Whisper Suite (SAP HANA, HDFS, Power BI, Office 365)
- Power BI at Product Expo
- MVP or Beta registration

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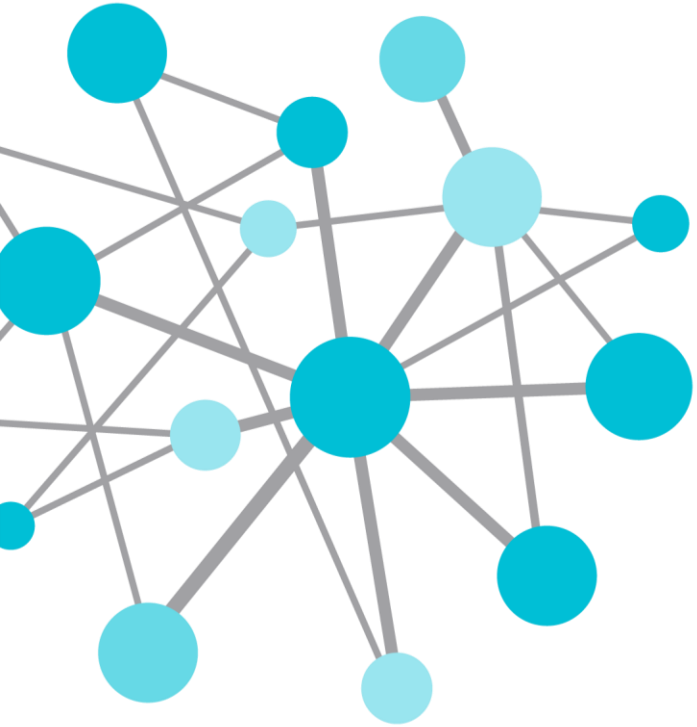
Product Manager

OSIsoft, LLC



THANK YOU

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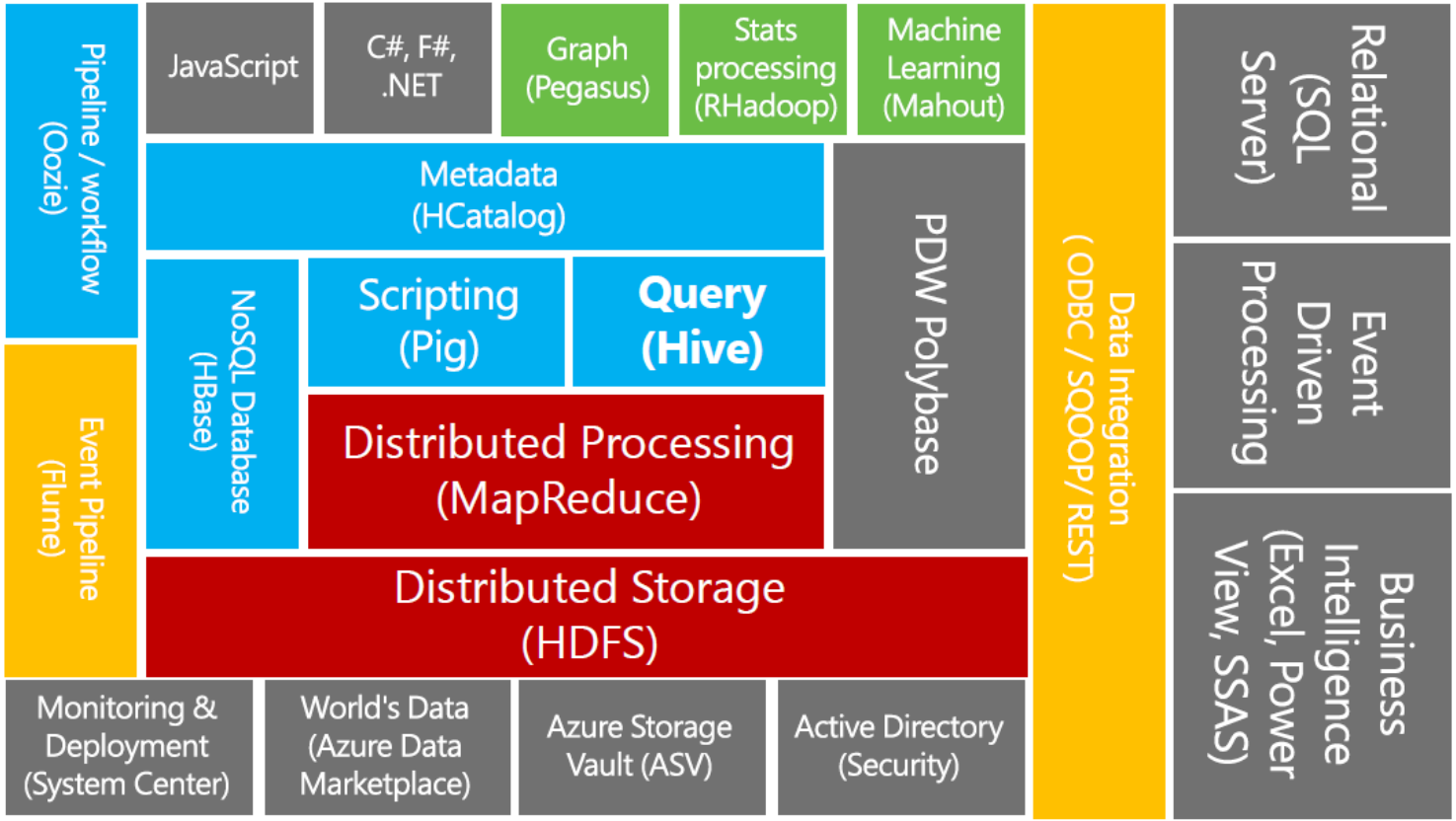

Legend

Red = Core Hadoop

Blue = Data processing

Gray= Microsoft integration points and value adds

Orange = Data Movement

Green = Packages