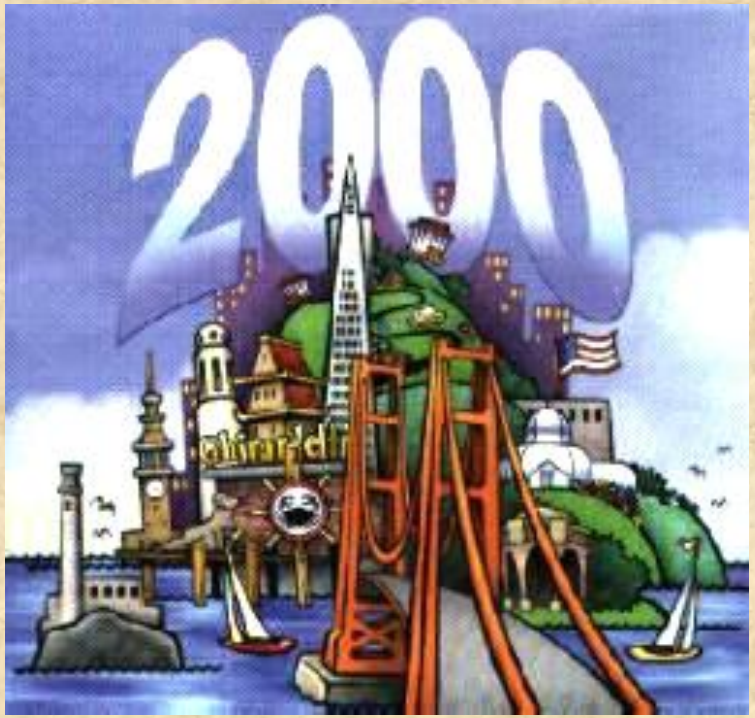
Columbia Gas Transmission

Real Time Data As A Corporate Asset

Presenters:

Steve Browder

John Rodgers

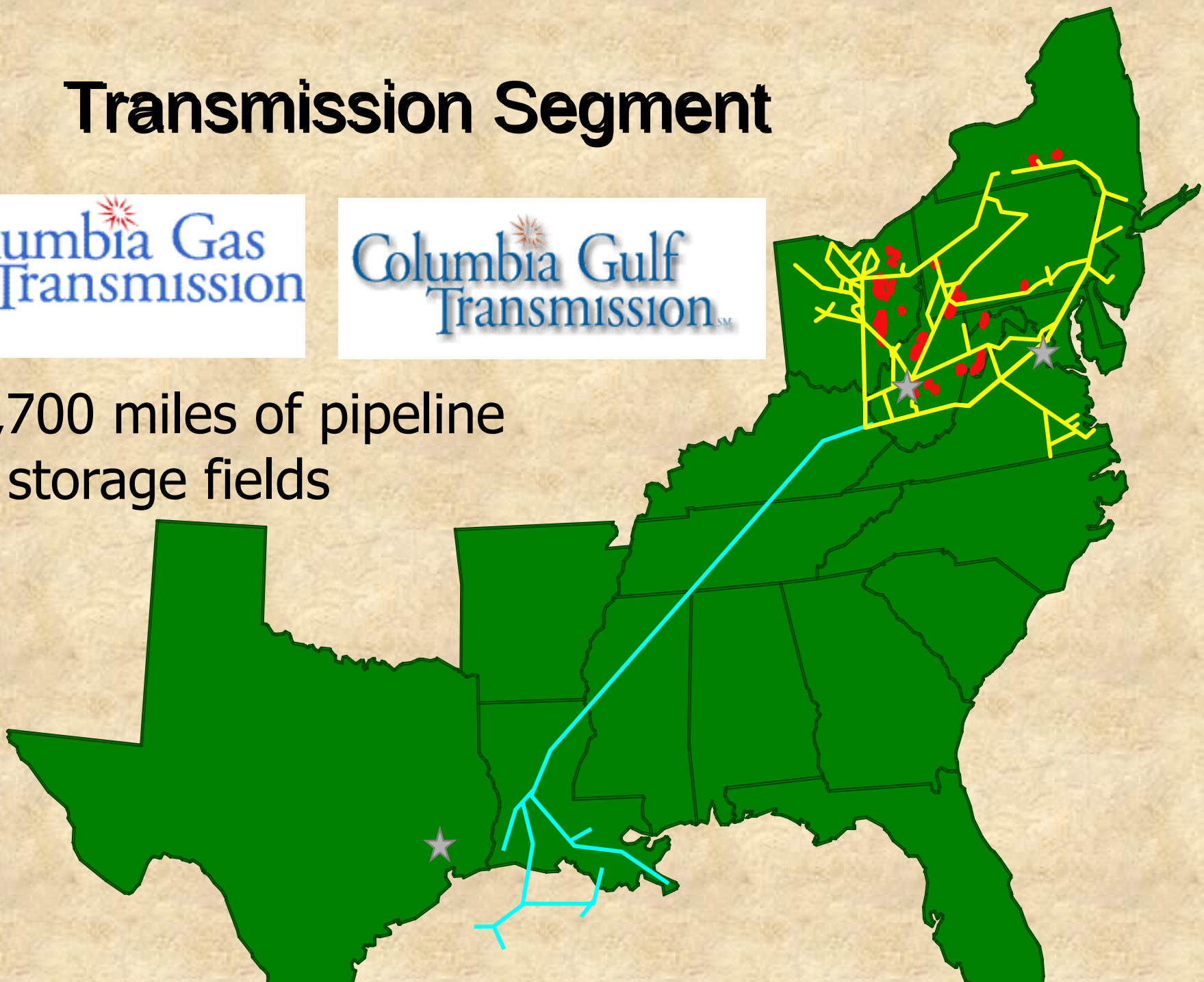


Transmission Segment

Columbia Gas Transmission

Columbia Gulf Transmission℠

16,700 miles of pipeline
44 storage fields



Columbia Gas Transmission

12,500 miles of pipeline

140 compressor stations

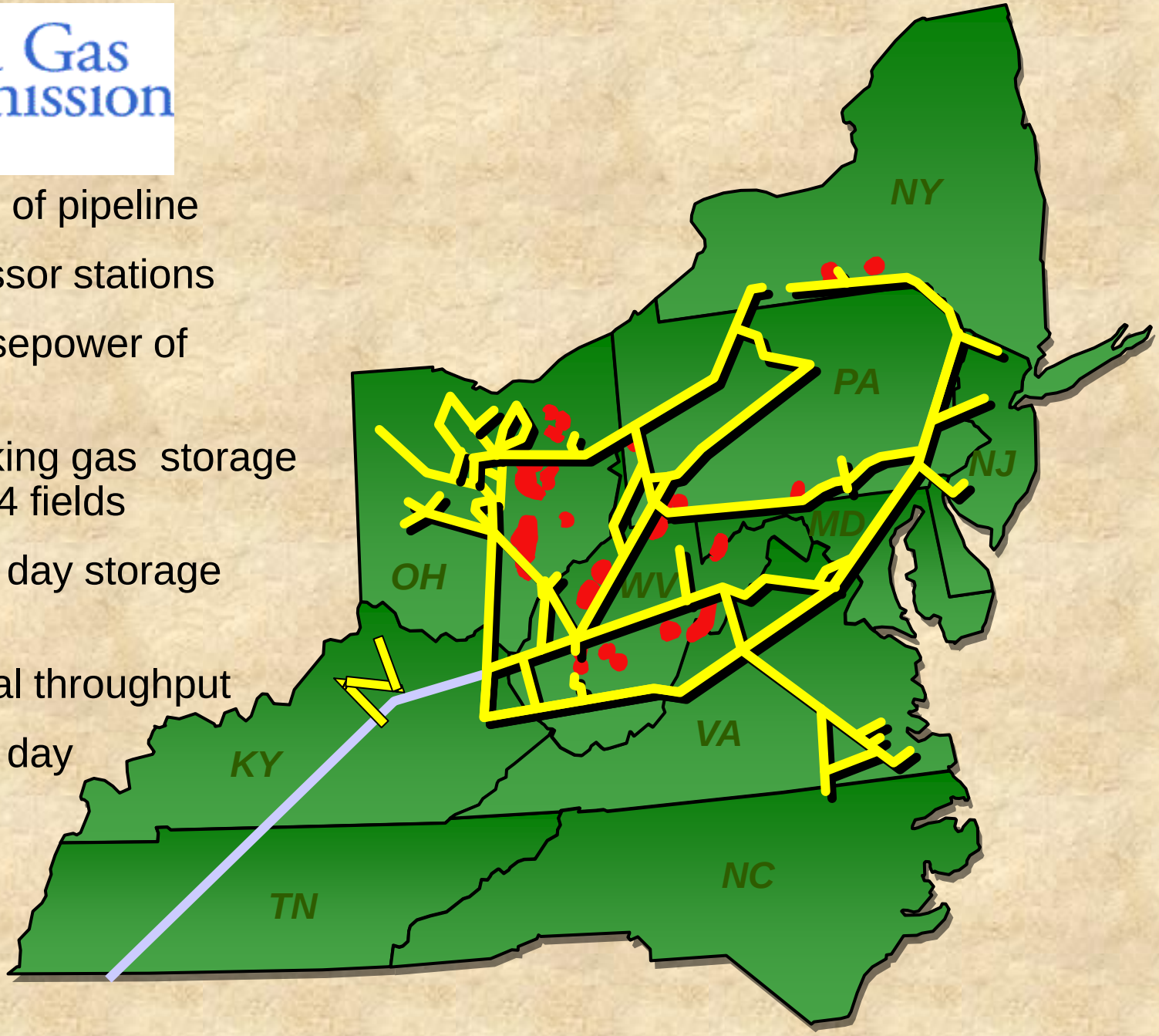
585,000 horsepower of compression

220 Bcf working gas storage capacity in 44 fields

4.5 Bcf peak day storage deliverability

1.2 Tcf annual throughput

7.3 Bcf peak day deliverability



SCADA

Primary Users - Gas Control

Users Location - Charleston, WV

Number of Sites - 500+

Data Granularity - 2 Minutes

Attributes

Valve Position
Line Pressure
Engine Status
etc...

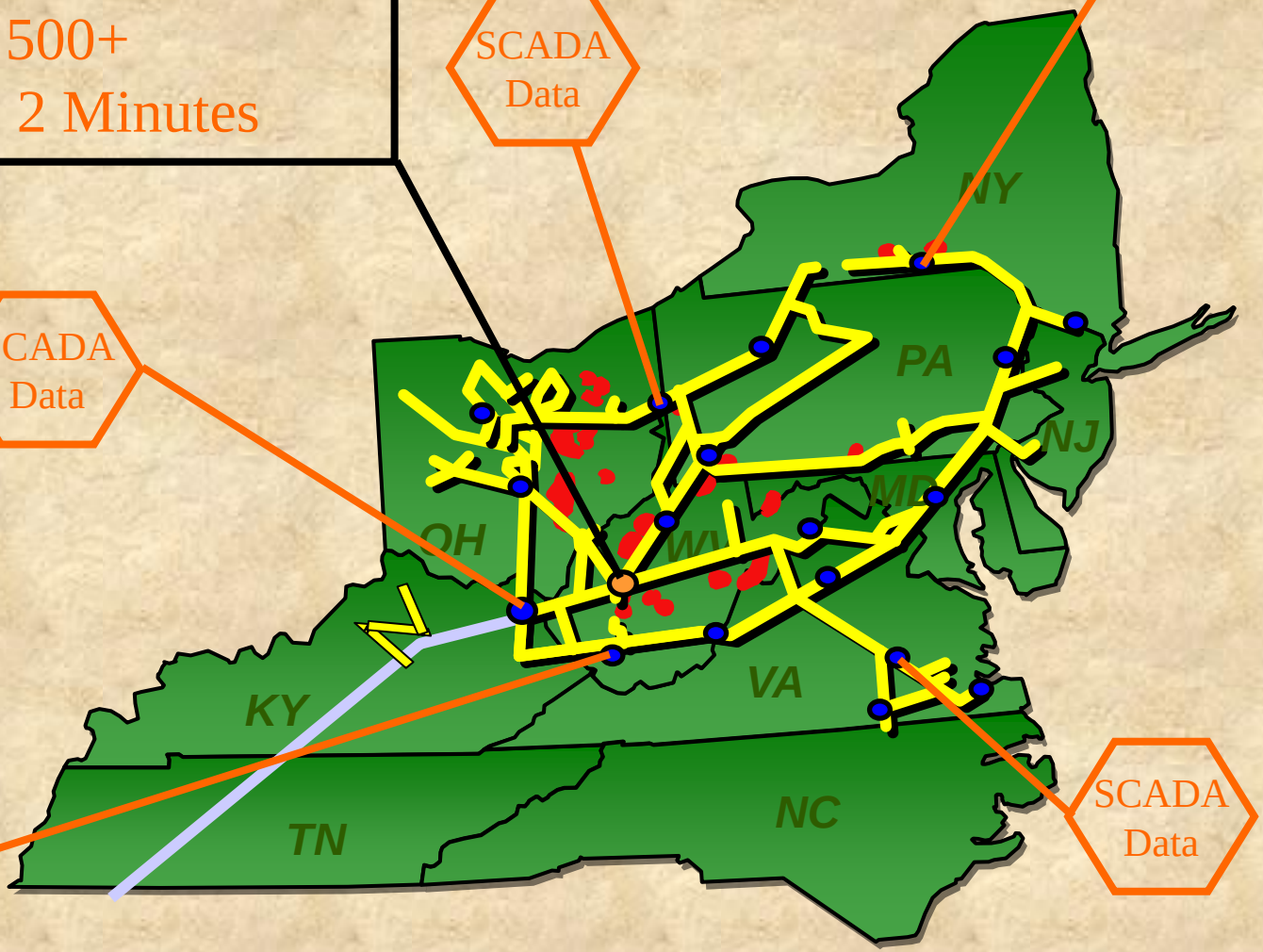
SCADA Data

SCADA Data

SCADA Data

SCADA Data

SCADA Data



EM

Primary Users - Gas Measurement

Users Location - Charleston, WV

Number of Sites - 800+

Data Granularity - 1 Hour

Attributes

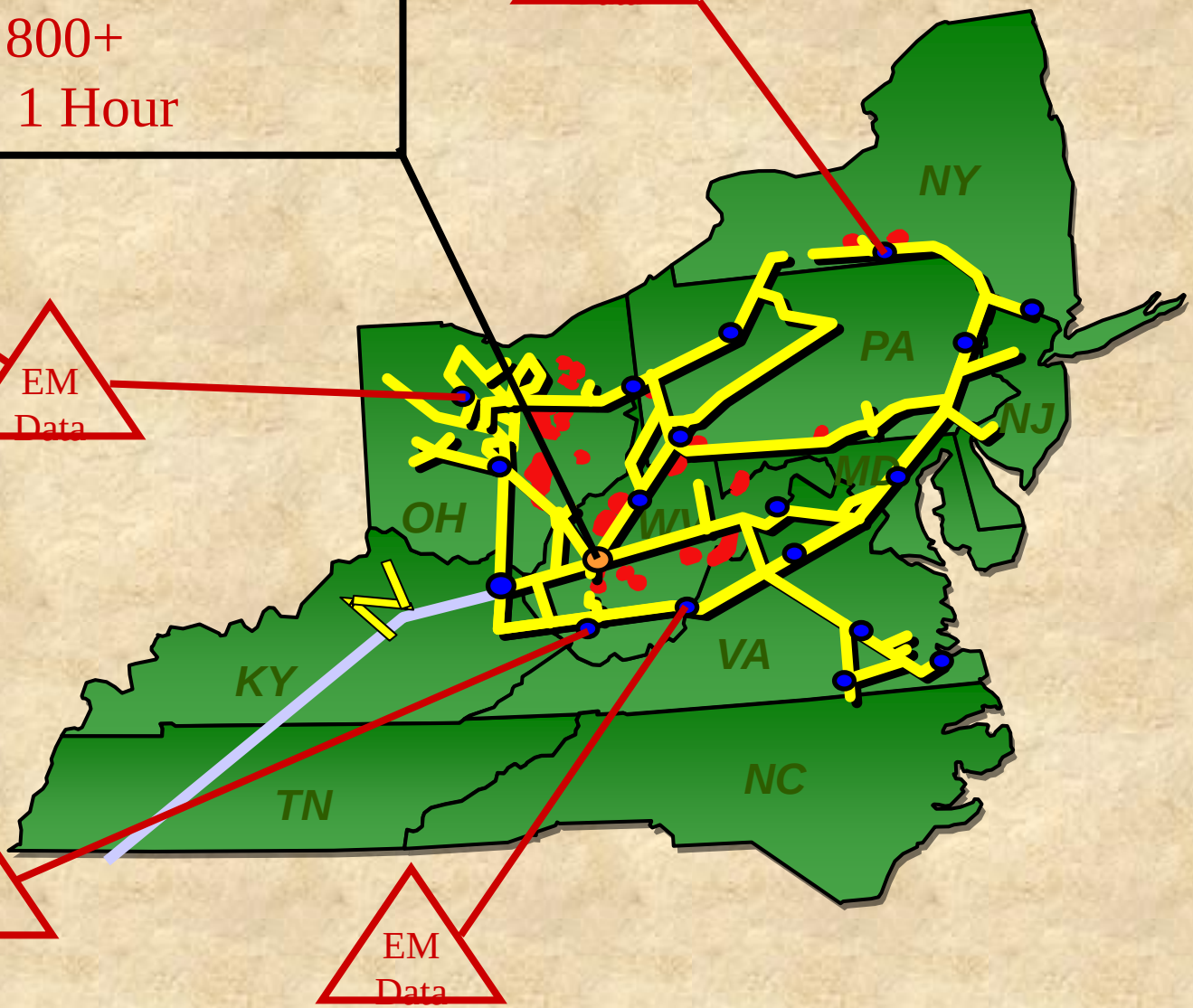
Flow Total
Specific Gravity
BTU
etc...

EM Data

EM Data

EM Data

EM Data



Compressor Automation

Primary Users - Station Employees

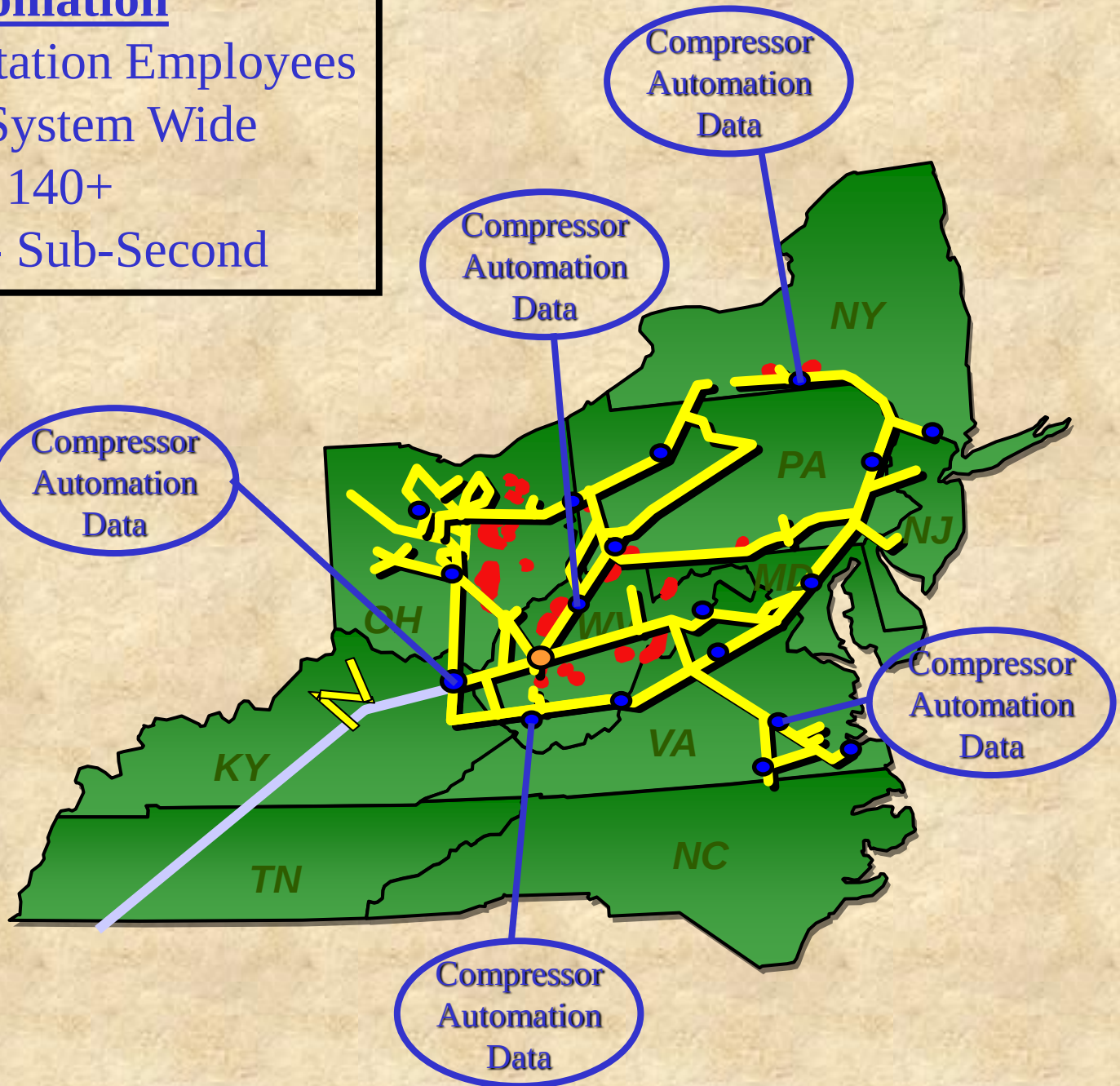
Users Location - System Wide

Number of Sites - 140+

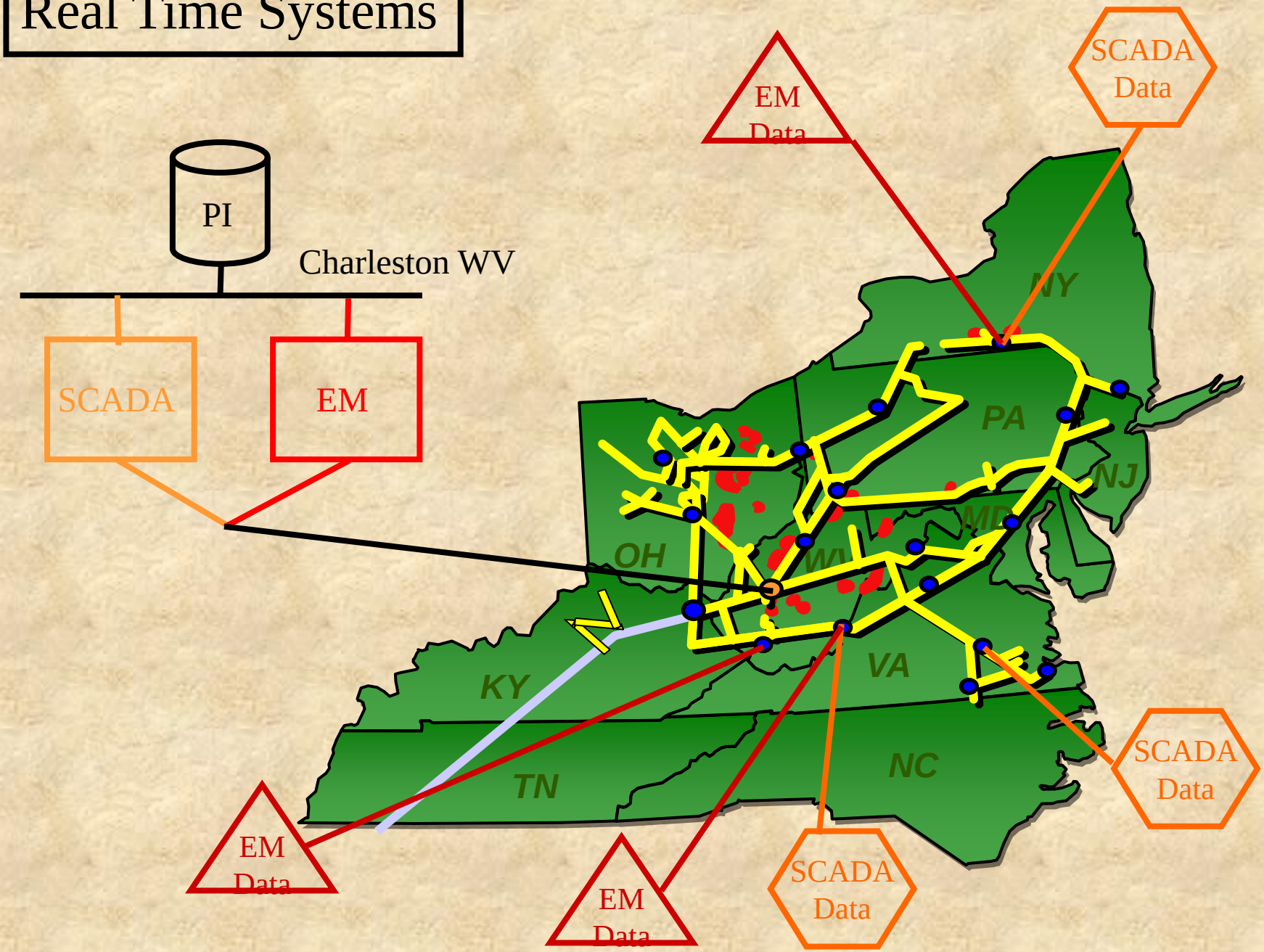
Data Granularity - Sub-Second

Attributes

Oil Pressure
Run Hours
RPM
etc...

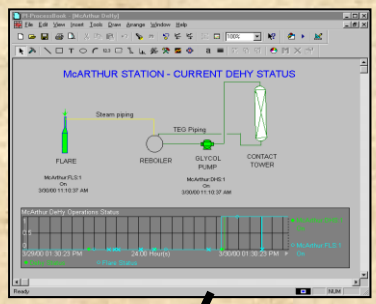


Real Time Systems

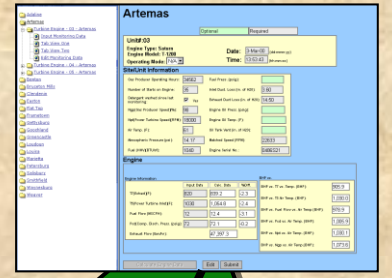


PI Users

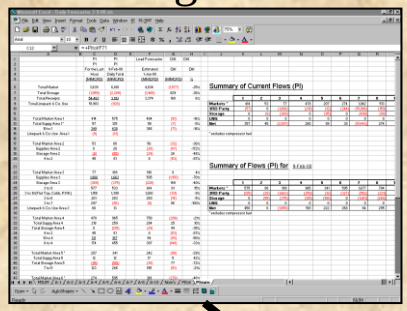
Environmental



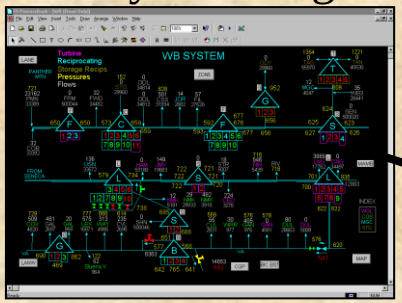
Turbine Monitoring



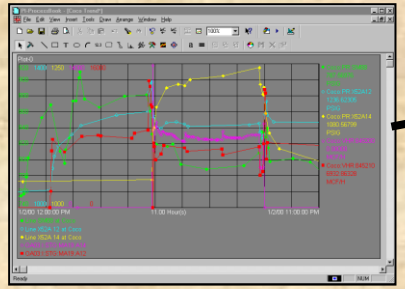
Modeling



Facility Planning

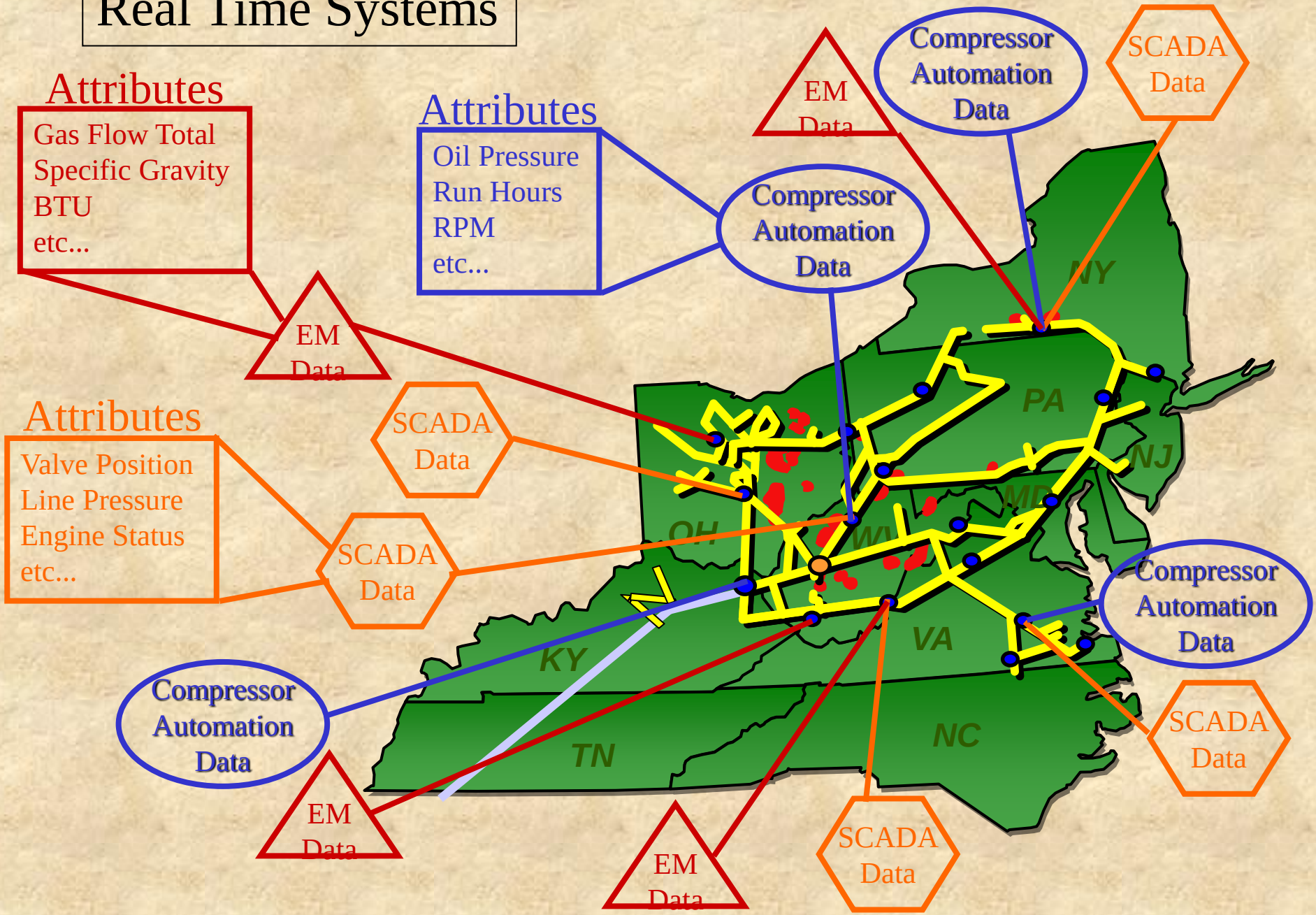


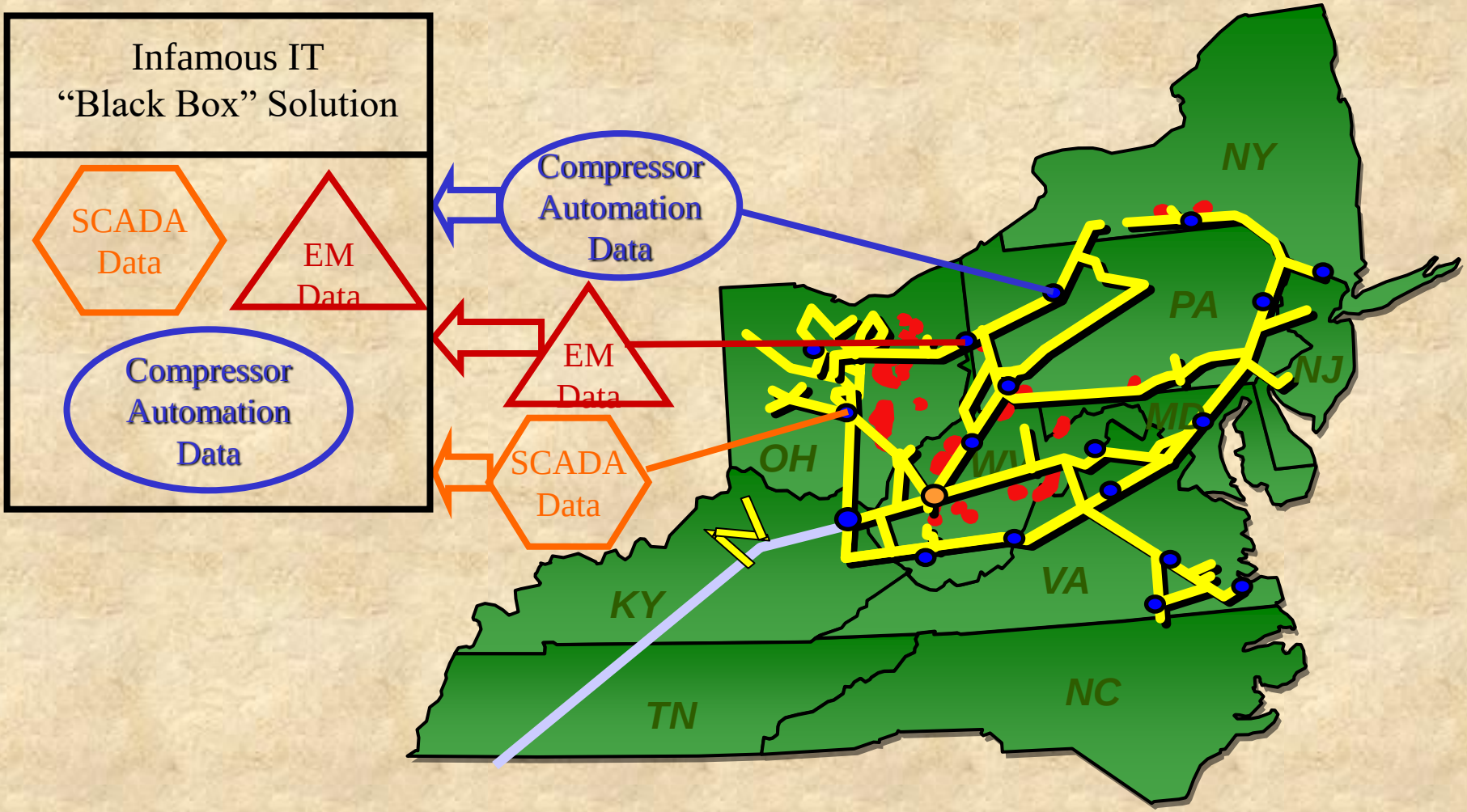
Gas Control

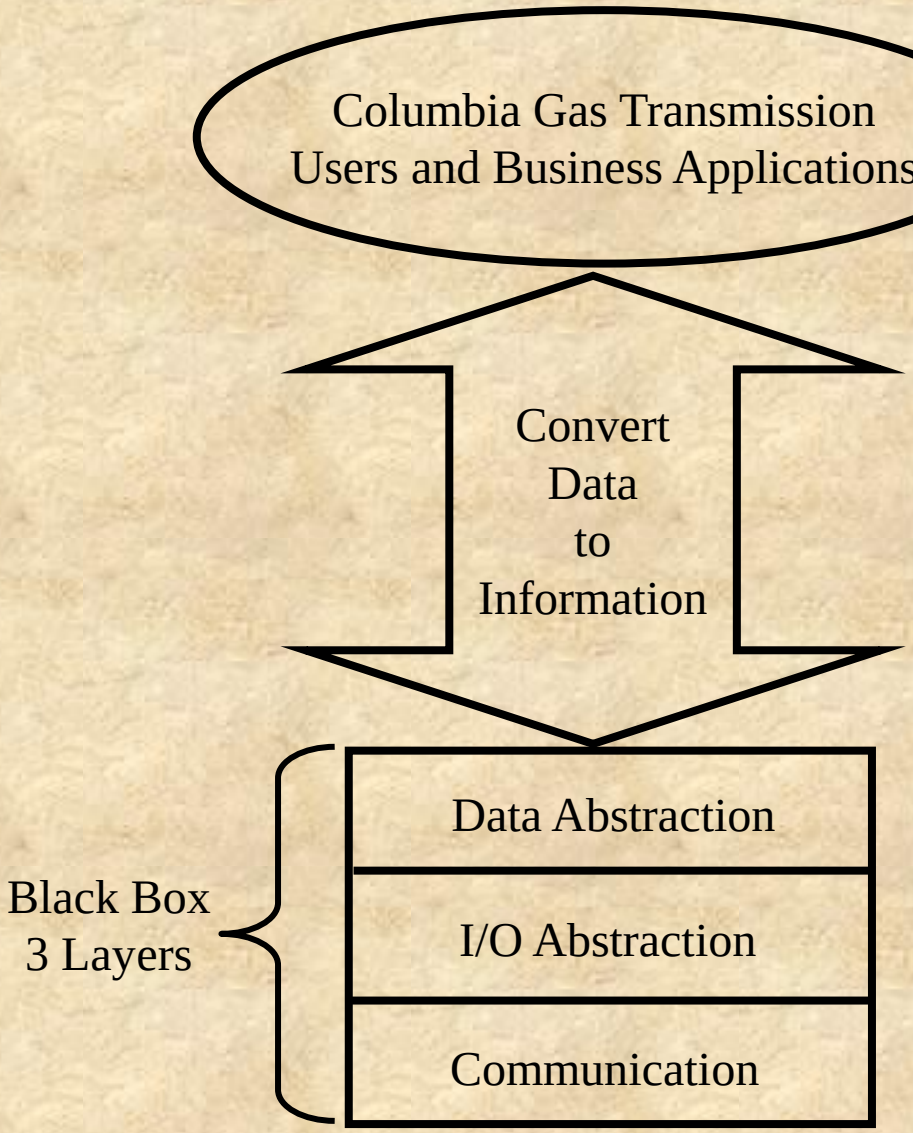


Field

Real Time Systems




Infamous IT
"Black Box" Solution
SCADA Data
EM Data
Compressor Automation Data
Compressor Automation Data
EM Data
SCADA Data
NY
PA
NJ
MD
OH
WV
VA
KY
TN
NC



POPTARTS

Presentation

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Across

Real

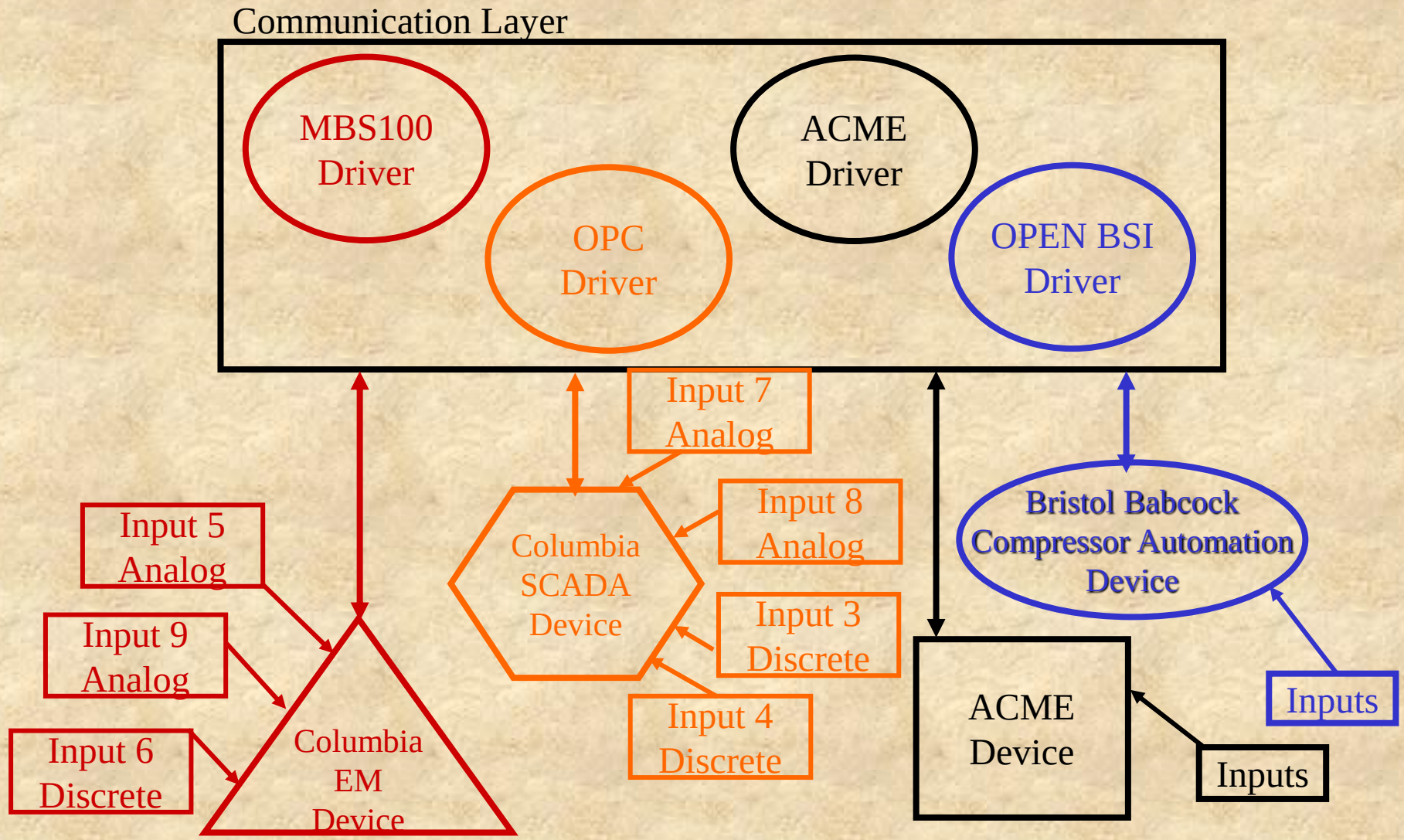
ime

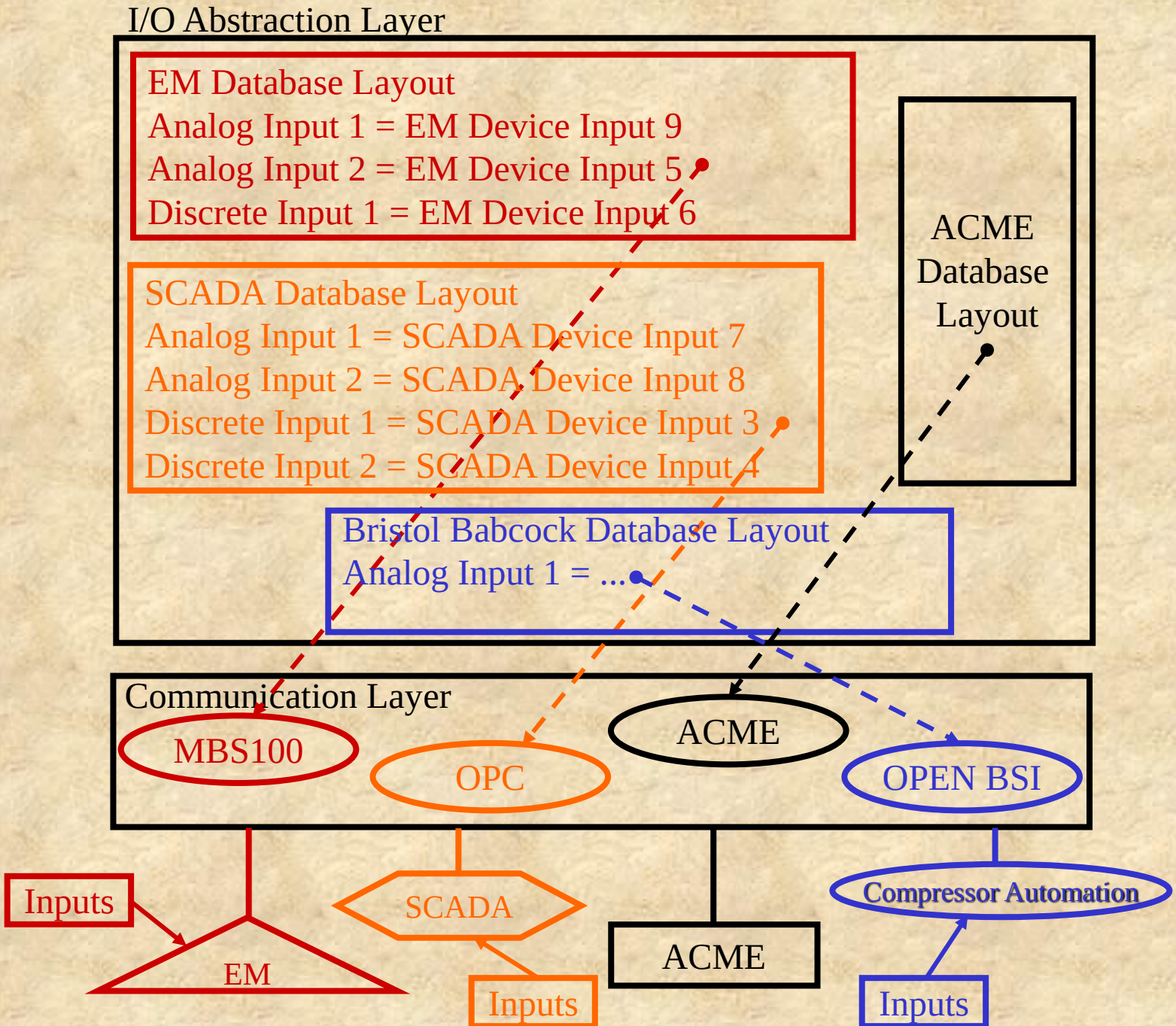
Systems

Disclaimer: The name "POPTARTS" does not reflect the views of management and therefore will only be used as an internal engineering name.

Purpose

- Support for Low Cost Field Devices with non-standard data
- Support for Low Cost Field Devices with non-standard communications



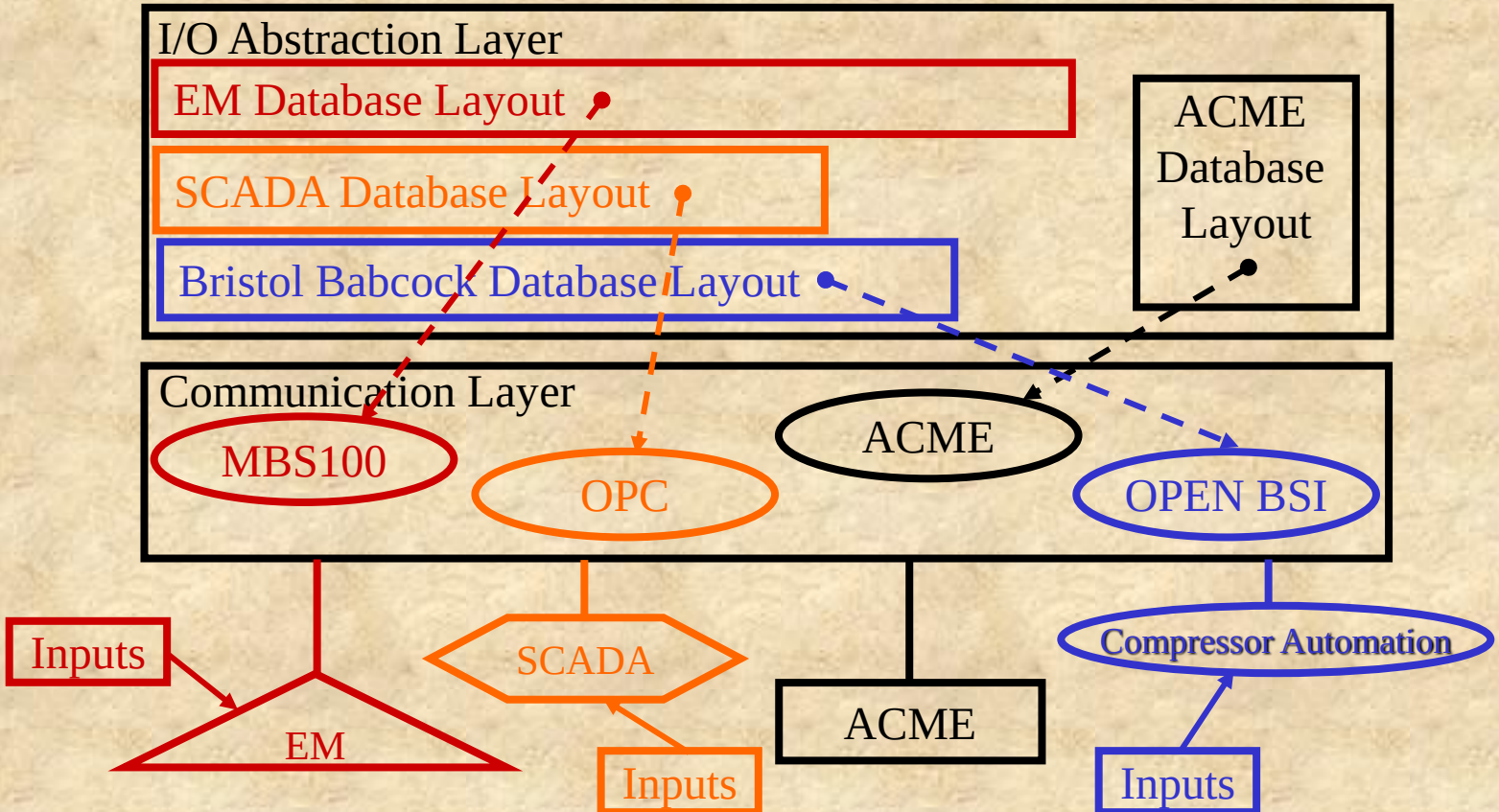

I/O Abstraction Layer
EM Database Layout
Analog Input 1 = EM Device Input 9
Analog Input 2 = EM Device Input 5
Discrete Input 1 = EM Device Input 6
SCADA Database Layout
Analog Input 1 = SCADA Device Input 7
Analog Input 2 = SCADA Device Input 8
Discrete Input 1 = SCADA Device Input 3
Discrete Input 2 = SCADA Device Input 4
ACME Database Layout
Bristol Babcock Database Layout
Analog Input 1 = ...
Communication Layer
MBS100
OPC
ACME
OPEN BSI
Inputs
EM
SCADA
Inputs
ACME
Compressor Automation
Inputs

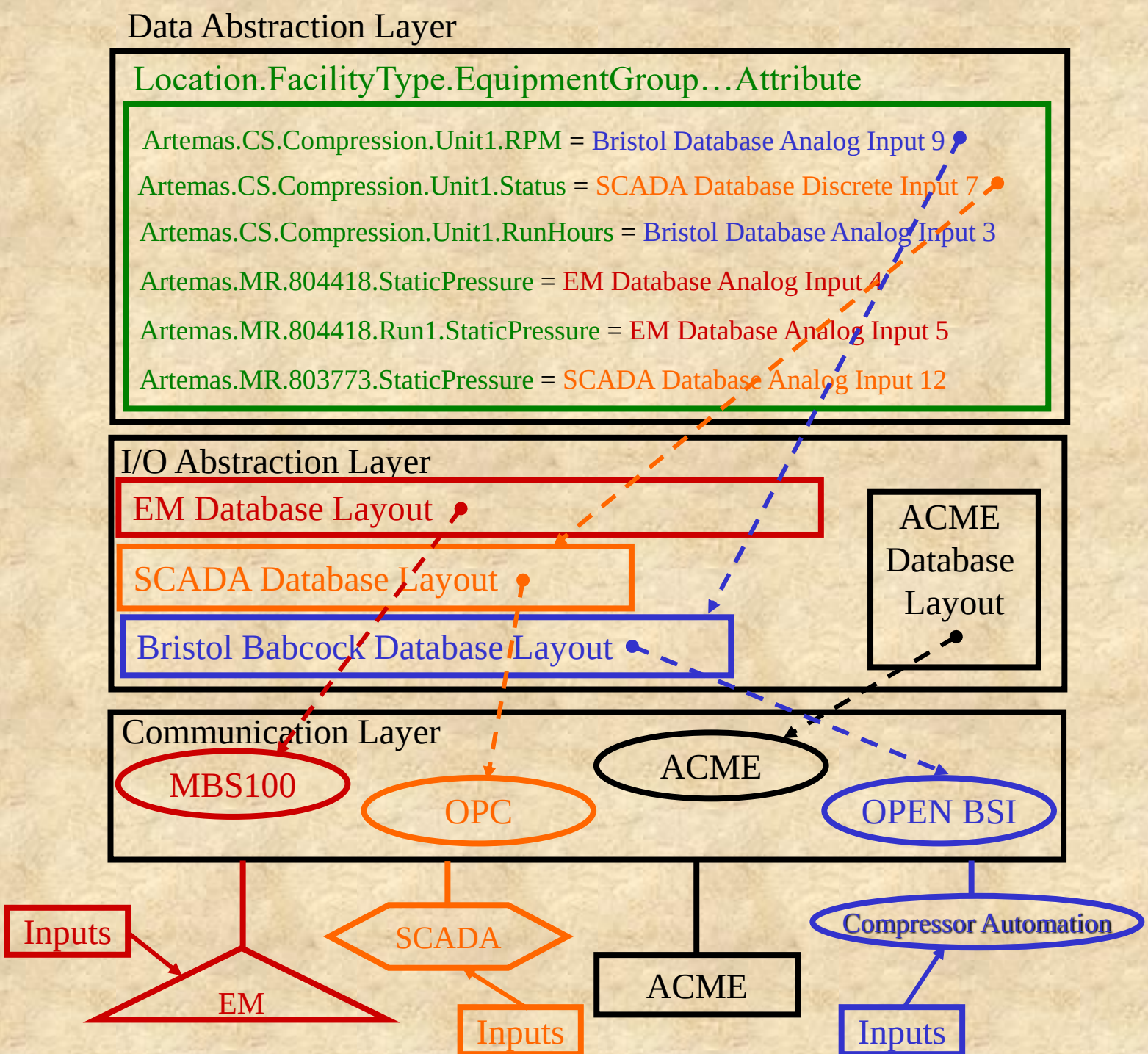
Purpose

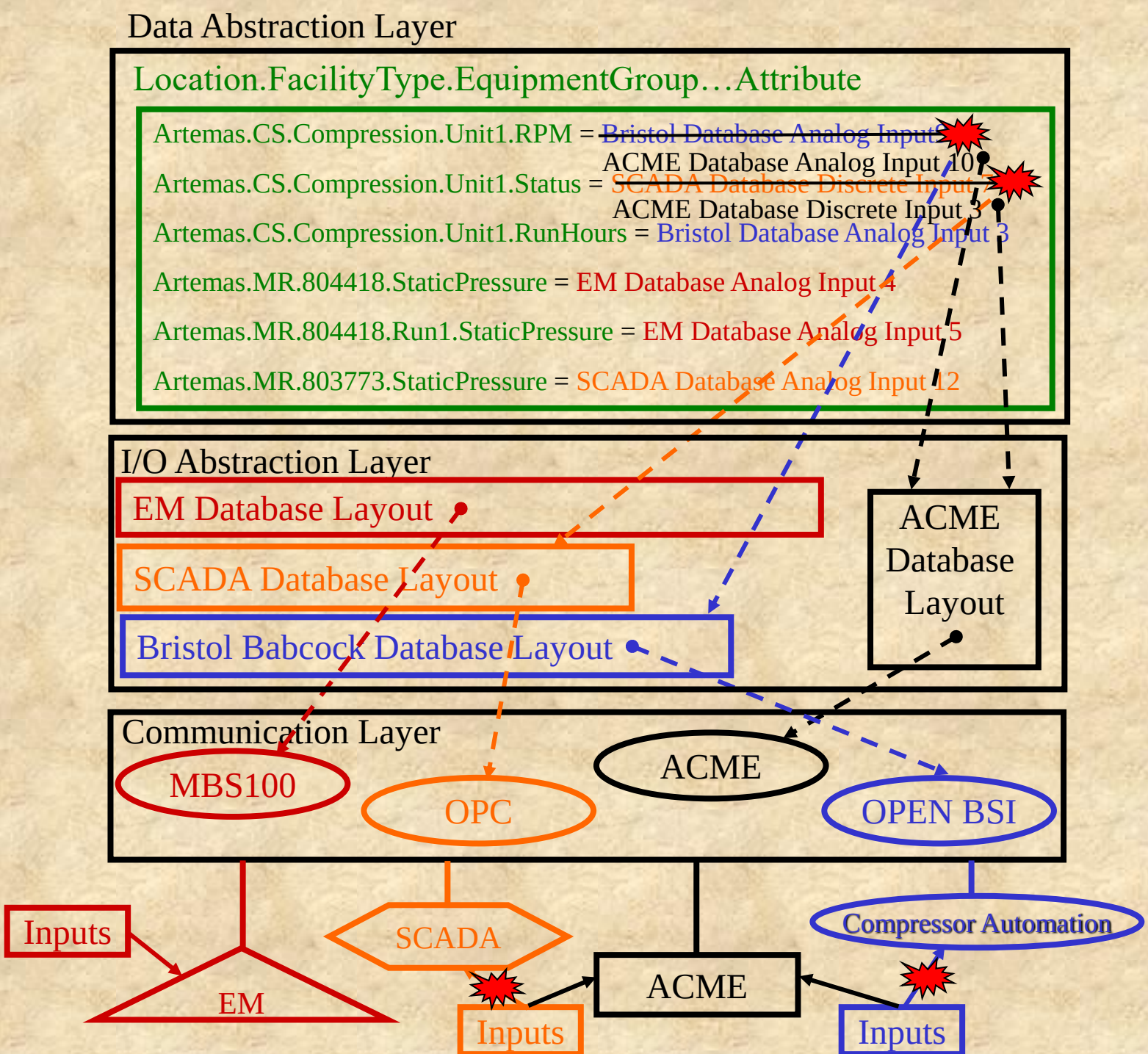
•Remove Field Device Database Layout from Business Applications

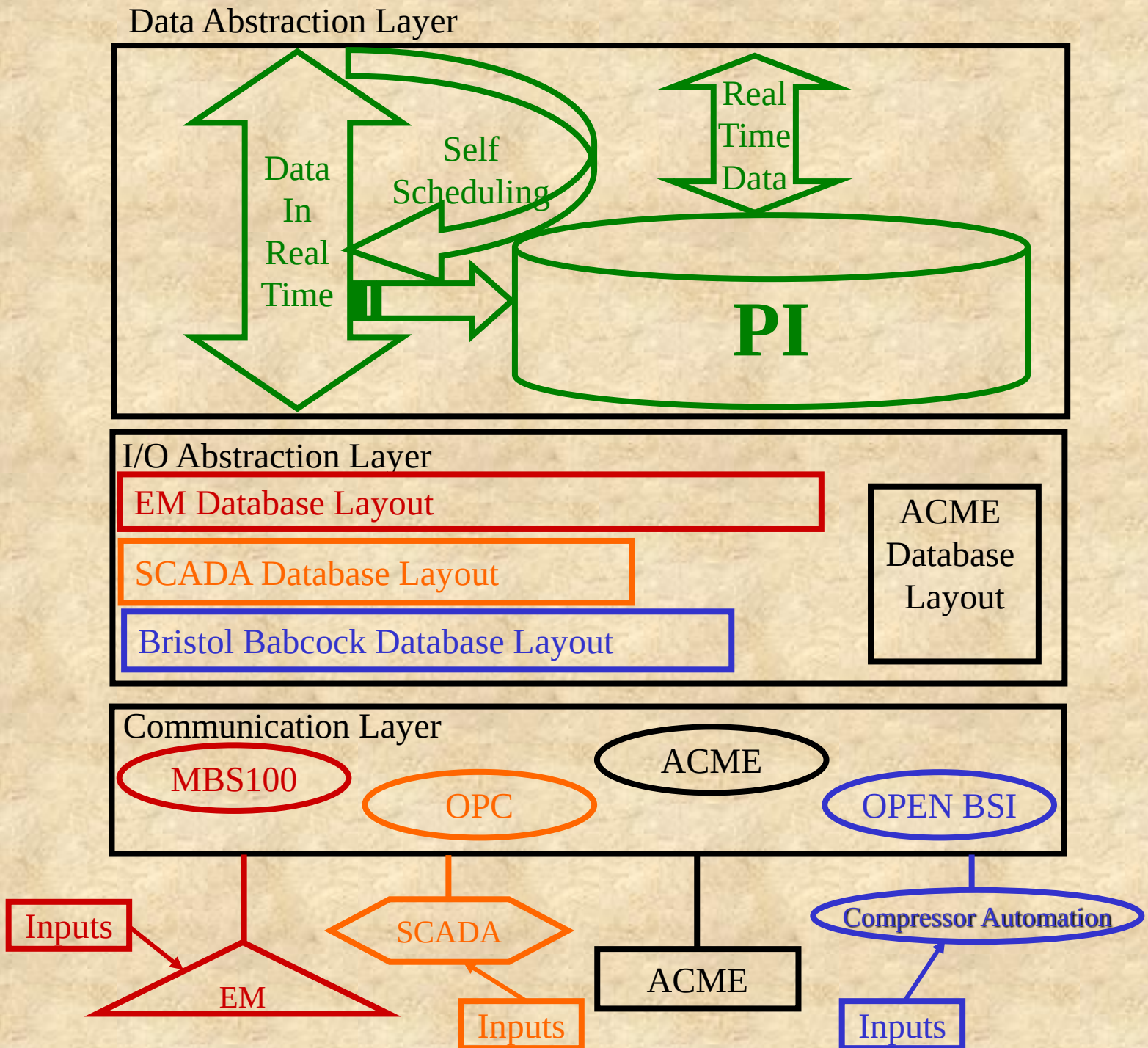
• Separate Business Requirements and Field Device Requirements

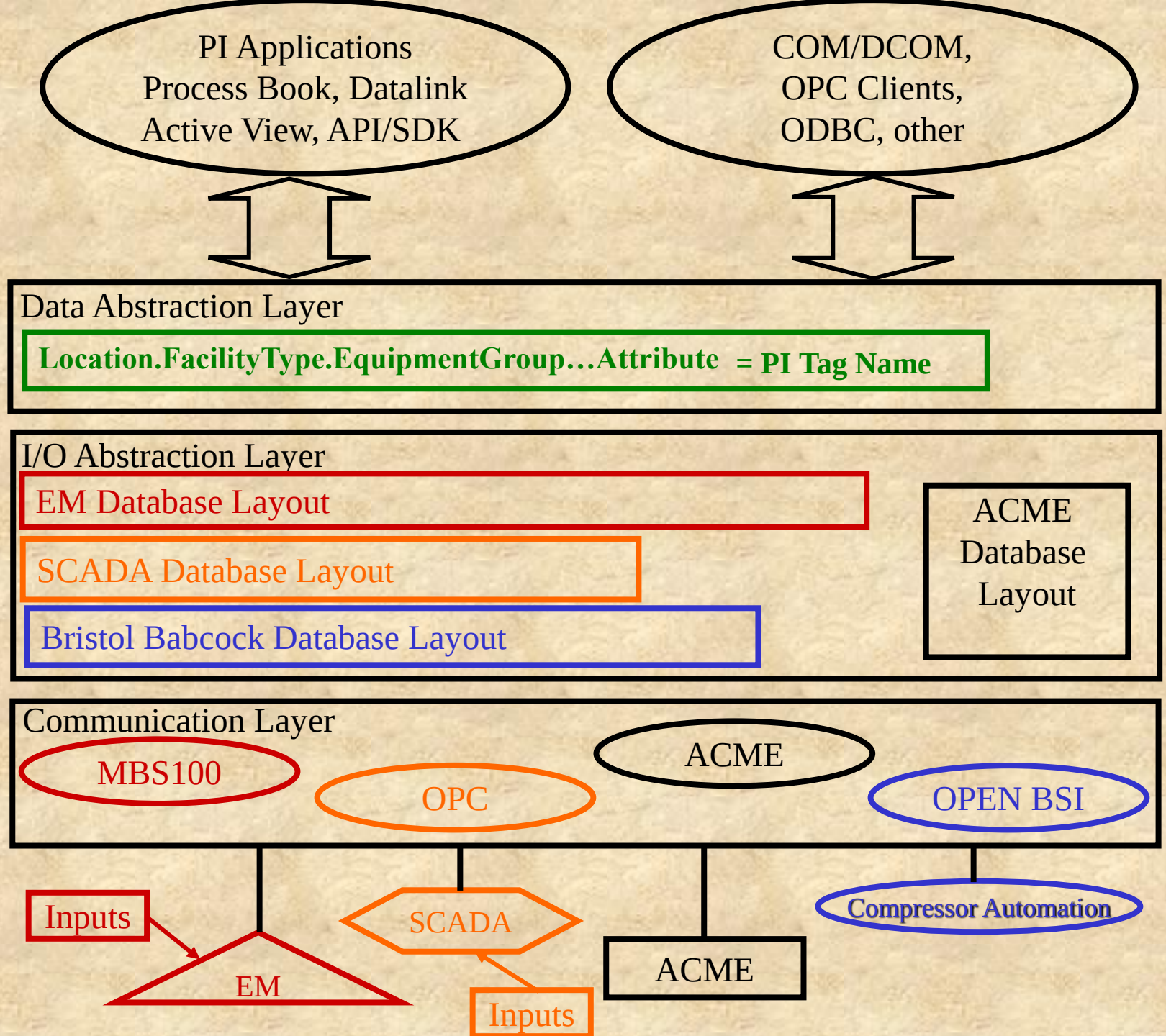
• Opportunity to Automate Field Device Configuration




Data Abstraction Layer
Location.FacilityType.EquipmentGroup…Attribute
Artemas.CS.Compression.Unit1.RPM = Bristol Database Analog Input 9
Artemas.CS.Compression.Unit1.Status = SCADA Database Discrete Input 7
Artemas.CS.Compression.Unit1.RunHours = Bristol Database Analog Input 3
Artemas.MR.804418.StaticPressure = EM Database Analog Input 4
Artemas.MR.804418.Run1.StaticPressure = EM Database Analog Input 5
Artemas.MR.803773.StaticPressure = SCADA Database Analog Input 12
I/O Abstraction Layer
EM Database Layout
SCADA Database Layout
Bristol Babcock Database Layout
ACME Database Layout
Communication Layer
MBS100
OPC
ACME
OPEN BSI
Inputs
EM
SCADA
Inputs
ACME
Compressor Automation
Inputs

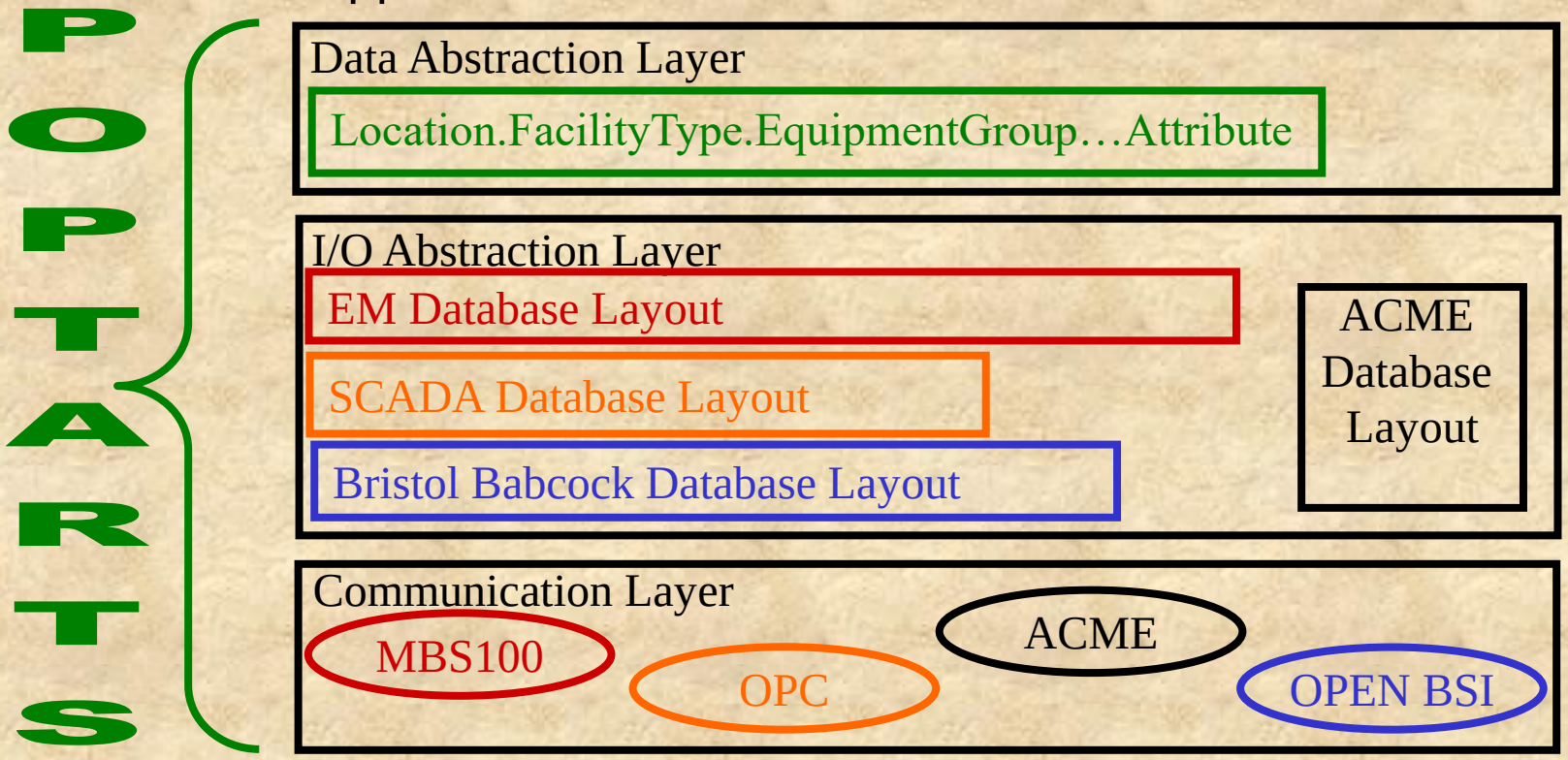

Data Abstraction Layer
Location.FacilityType.EquipmentGroup…Attribute
Artemas.CS.Compression.Unit1.RPM = Bristol Database Analog Input 2
ACME Database Analog Input 10
Artemas.CS.Compression.Unit1.Status = SCADA Database Discrete Input 1
ACME Database Discrete Input 3
Artemas.CS.Compression.Unit1.RunHours = Bristol Database Analog Input 3
Artemas.MR.804418.StaticPressure = EM Database Analog Input 4
Artemas.MR.804418.Run1.StaticPressure = EM Database Analog Input 5
Artemas.MR.803773.StaticPressure = SCADA Database Analog Input 12
I/O Abstraction Layer
EM Database Layout
SCADA Database Layout
Bristol Babcock Database Layout
ACME Database Layout
Communication Layer
MBS100
OPC
ACME
OPEN BSI
Inputs
EM
SCADA
Inputs
ACME
Compressor Automation
Inputs


Data Abstraction Layer
Data In Real Time
Self Scheduling
Real Time Data
PI
I/O Abstraction Layer
EM Database Layout
SCADA Database Layout
Bristol Babcock Database Layout
ACME Database Layout
Communication Layer
MBS100
OPC
ACME
OPEN BSI
Inputs
EM
SCADA
Inputs
ACME
Compressor Automation
Inputs


PI Applications
Process Book, Datalink
Active View, API/SDK
COM/DCOM,
OPC Clients,
ODBC, other
Data Abstraction Layer
Location.FacilityType.EquipmentGroup…Attribute = PI Tag Name
I/O Abstraction Layer
EM Database Layout
SCADA Database Layout
Bristol Babcock Database Layout
ACME
Database
Layout
Communication Layer
MBS100
OPC
ACME
OPEN BSI
Inputs
EM
SCADA
Inputs
ACME
Compressor Automation

Anticipated Uses

- Provide Efficiency data from Compressor Stations
- Support for Operations Optimization
- Support for Reliability Centered Maintenance
- Support for Standards
- Increased Remote Monitoring by Field Personnel
- Support for External Customer Access



Conclusion

• The object model provides for an unambiguous namespace that is easily navigable by users familiar with the physical assets and equipment.

•PI provides a proven and reliable archive for vast quantities of operational data.

•PI desktop tools permit us to utilize our existing investment in Microsoft operating systems and office applications.

•Standards such as COM/DCOM, ODBC, and OPC will drastically simplify the task of interfacing both legacy and new applications to real time operational data.

•Our experience suggests that the most valuable uses for this data are not yet known and will not appear until after several months of data have been archived. These uses will provide the value of real time data as a corporate asset.

Questions With Answers

- Product used to implement POPTARTS?
  - •OA Enterprise by Wellspring Solutions Inc. integrated with the PI historian using the PI SDK/API.
- Project Sponsors/Drivers?
  - •IT Infrastructure Project.
- Project Timeframe?
  - • This year implement namespace and start using PI tools for access.

Questions Without Answers

- How many POPTARTS boxes?
- Where will they be located?
- What Granularity of Data is needed?
- Will the current PI tools support our new namespace?