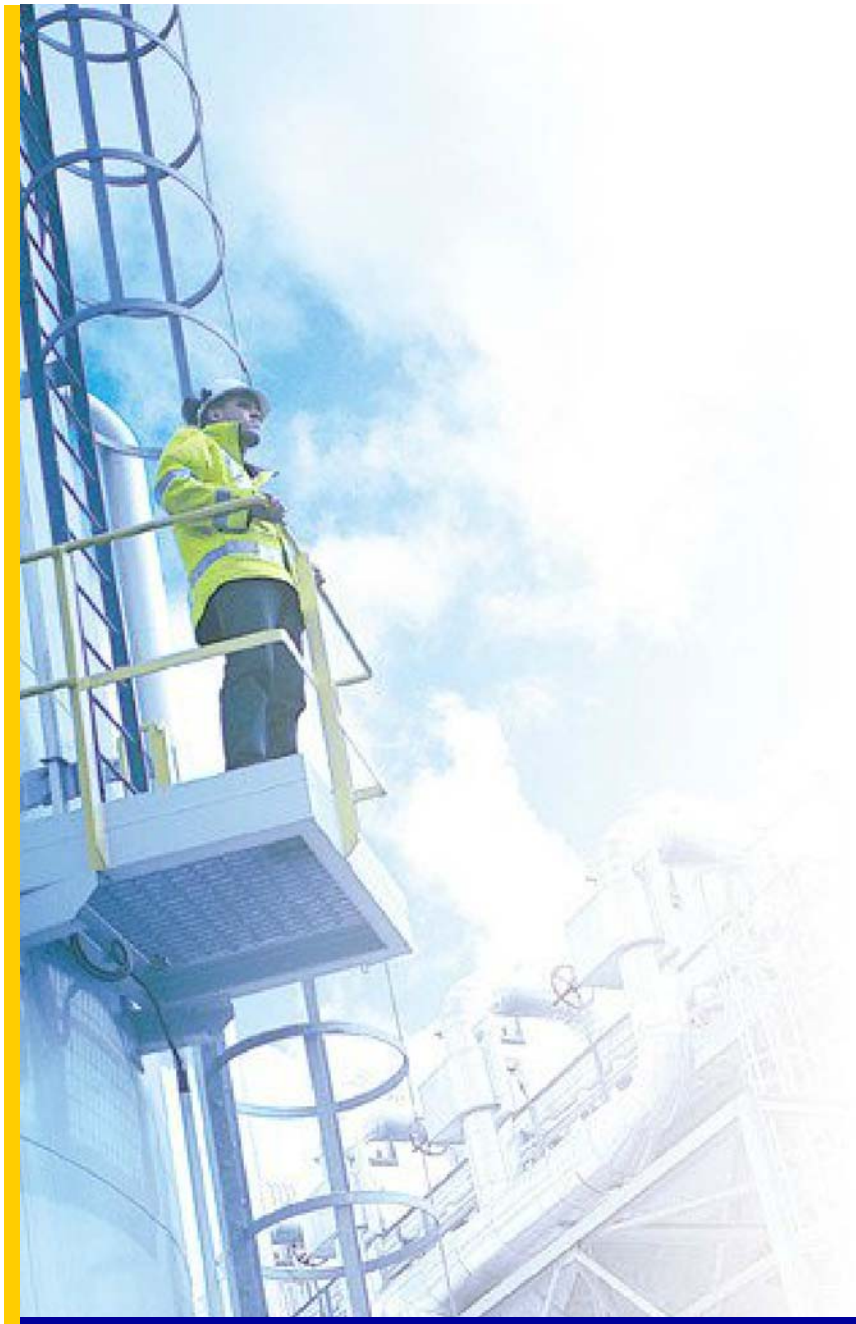


2008 User Conference & Technology Fair

Excellence in Work Processes:

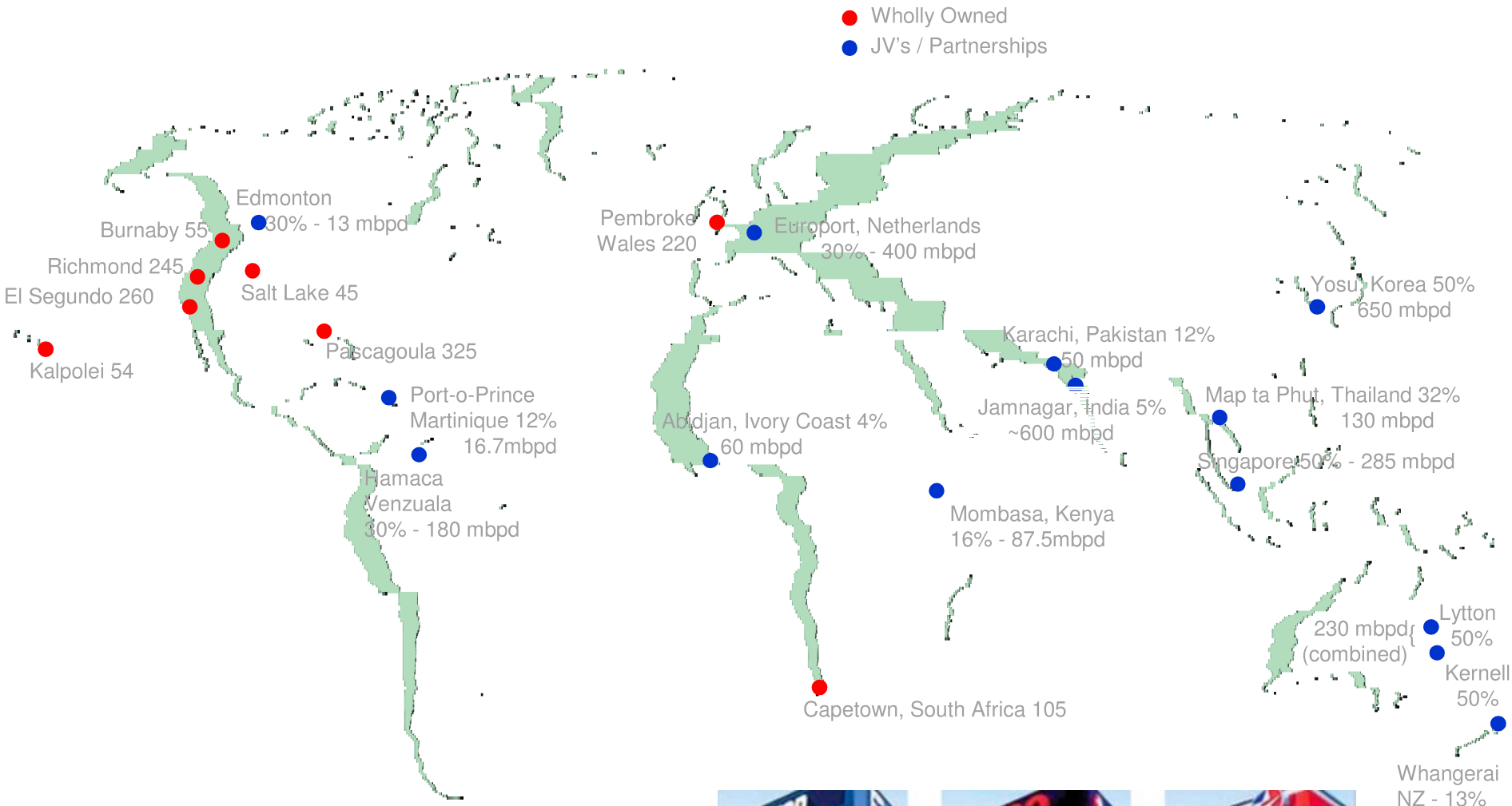
the next generation of IT in manufacturing

Mike Brooks
Staff Technologist
8 April 2008

Chevron

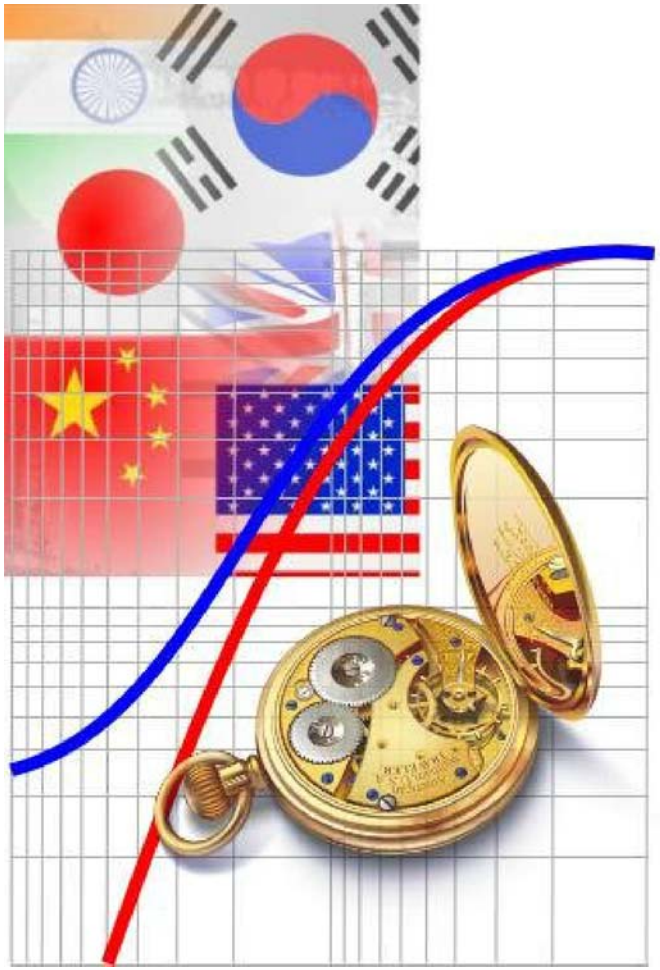
- 2nd largest US integrated energy co.
- 59,000 Employees
- 2.5+ mbpd production
- operates in 180+ Countries
- 2 mbpd in 21 refineries
- 26,500+ fuels retail outlets

Chevron Global Manufacturing



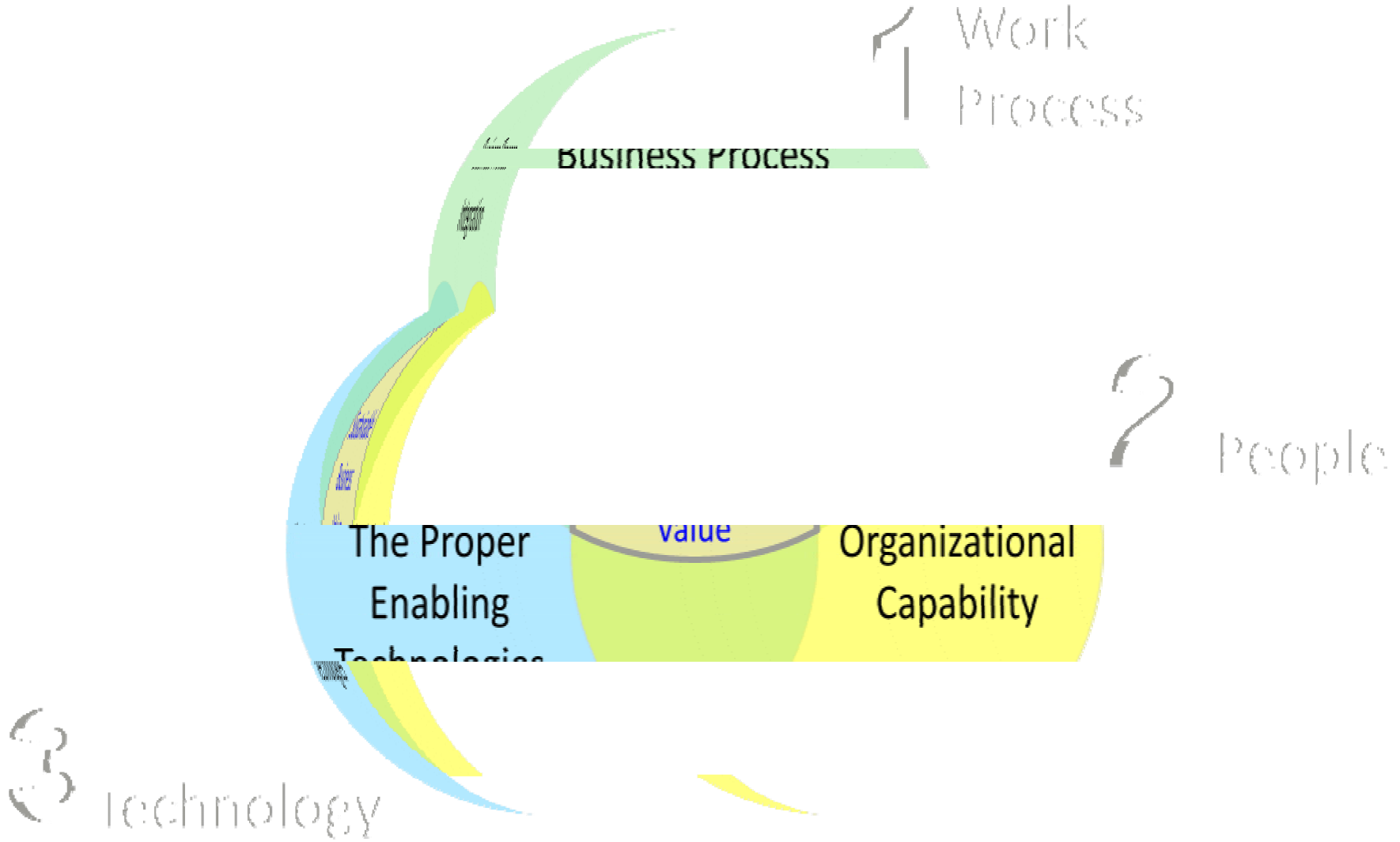
issues that drive our business

- world markets
- crude supply
- value in an "integrated energy company"
- pursuit of efficiency
  - new ways to work
  - new technology deployment
  - real-time enterprise
- *aging workforce*
- technology complexity



refining = people & work processes

operational excellence framework



where is the new opportunity?

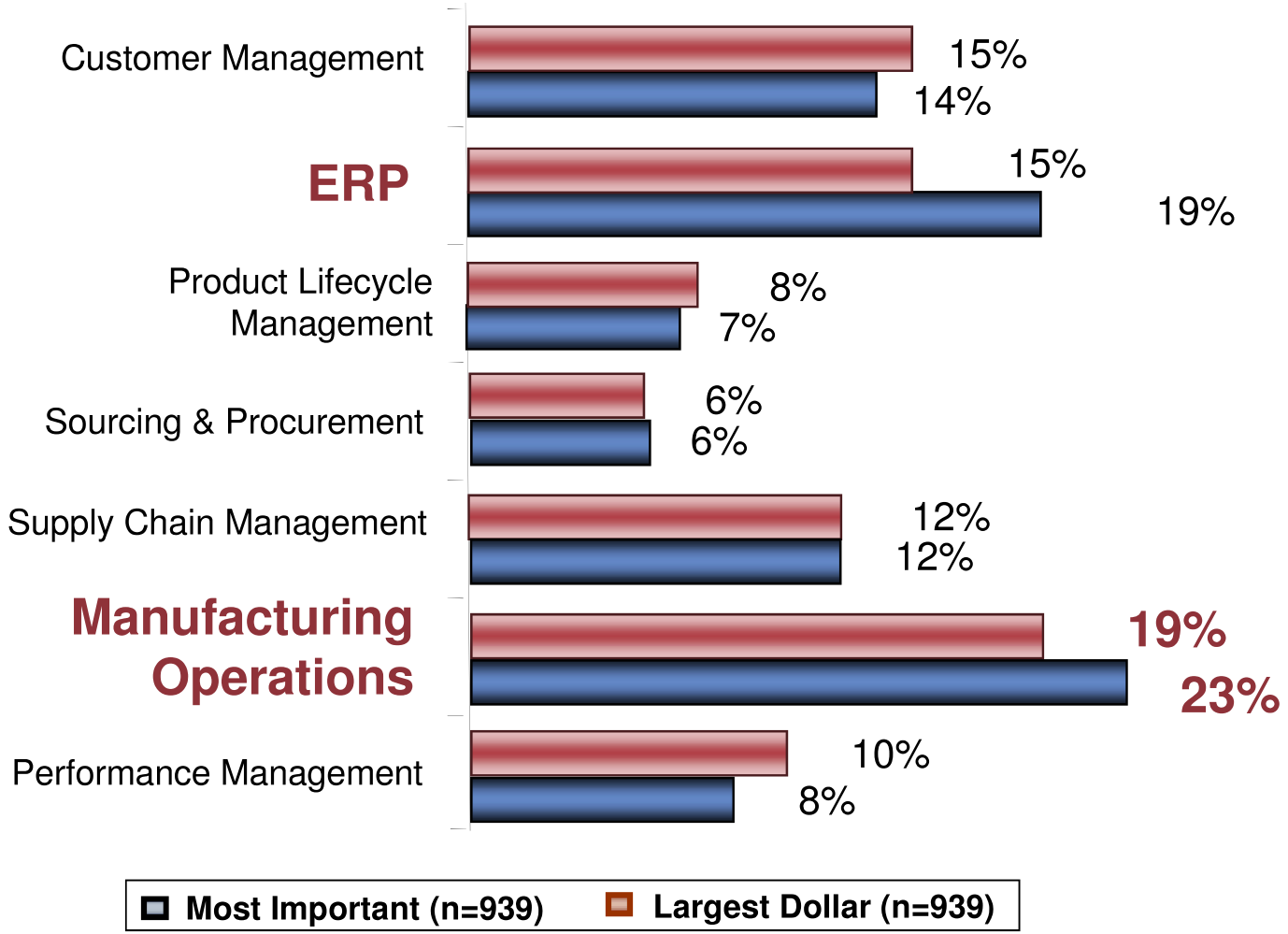
we need a software framework that helps improve the performance of all personnel across all Chevron refineries

must do for production management

…what SAP does for business

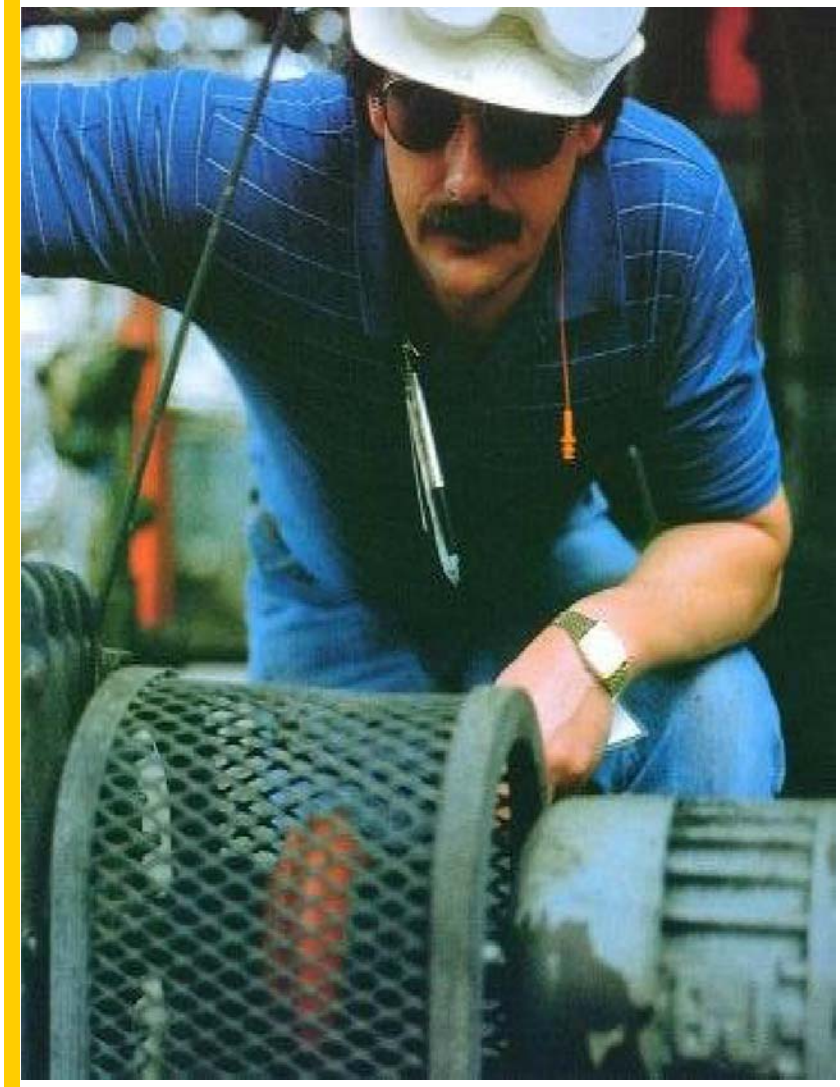
& what Yokogawa does for operations

manufacturing operations ranks #1



Source: *AMR Research 2006-2007 IT Spending Survey (US)*

during a key production run…



- outside operator detects an abnormal situation (e.g. visual inspection, noise, etc.)
- field data readings are wirelessly transmitted and combined with real time process sensor data and suggest impending failure

  maintenance wants to ____?
  operations wants to _____?

- how is the work process handled ?
- should we deal with this in a logical - "institutionalized" - consistent way ?

current

marketing

accounting

lab

planning

reliability

trading

good enough in the past

maintenance

control

Supply & distribution

management

new collaborative work process

planners

outside operator

field workers

management

ADAPTIVE → IMPROVEMENT

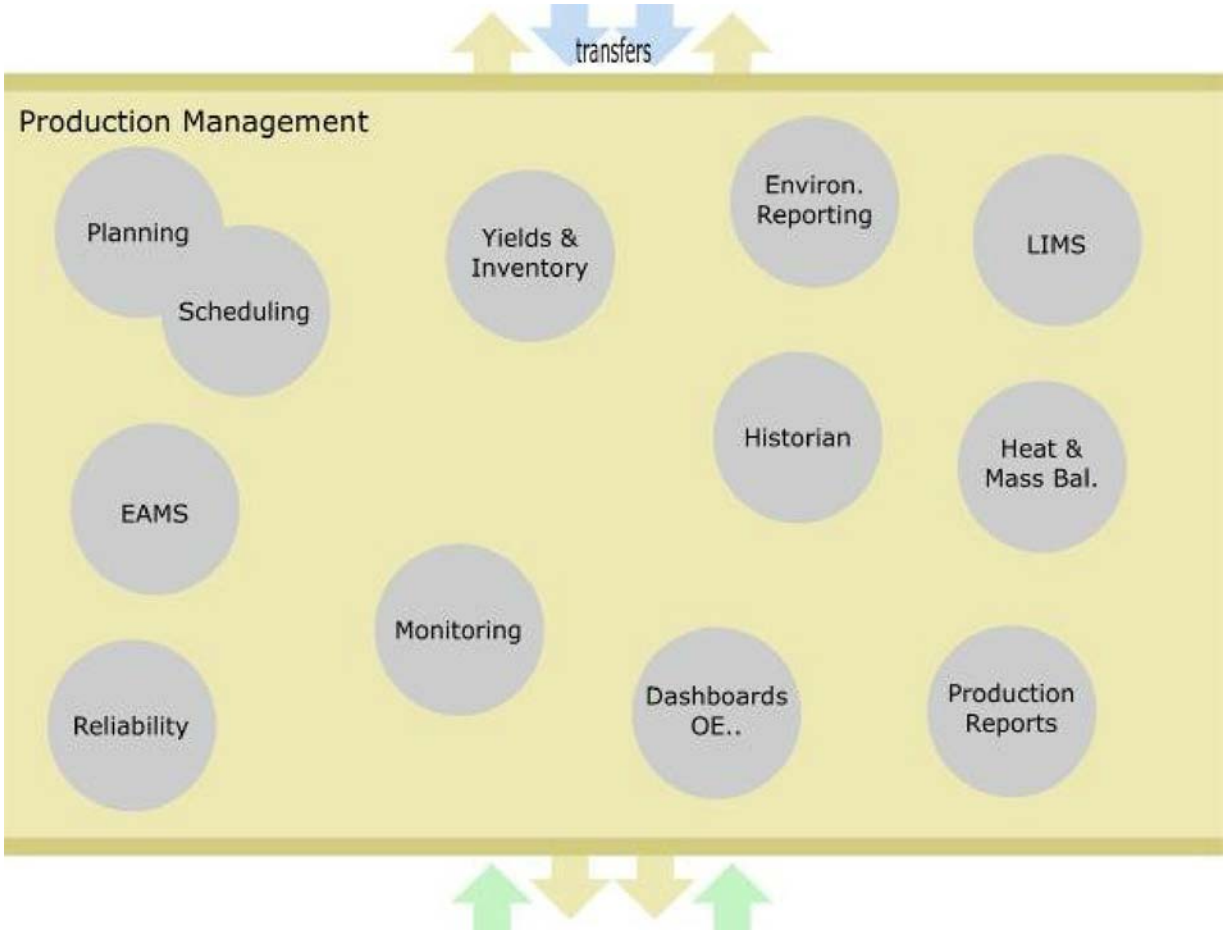
maintenance

board operator

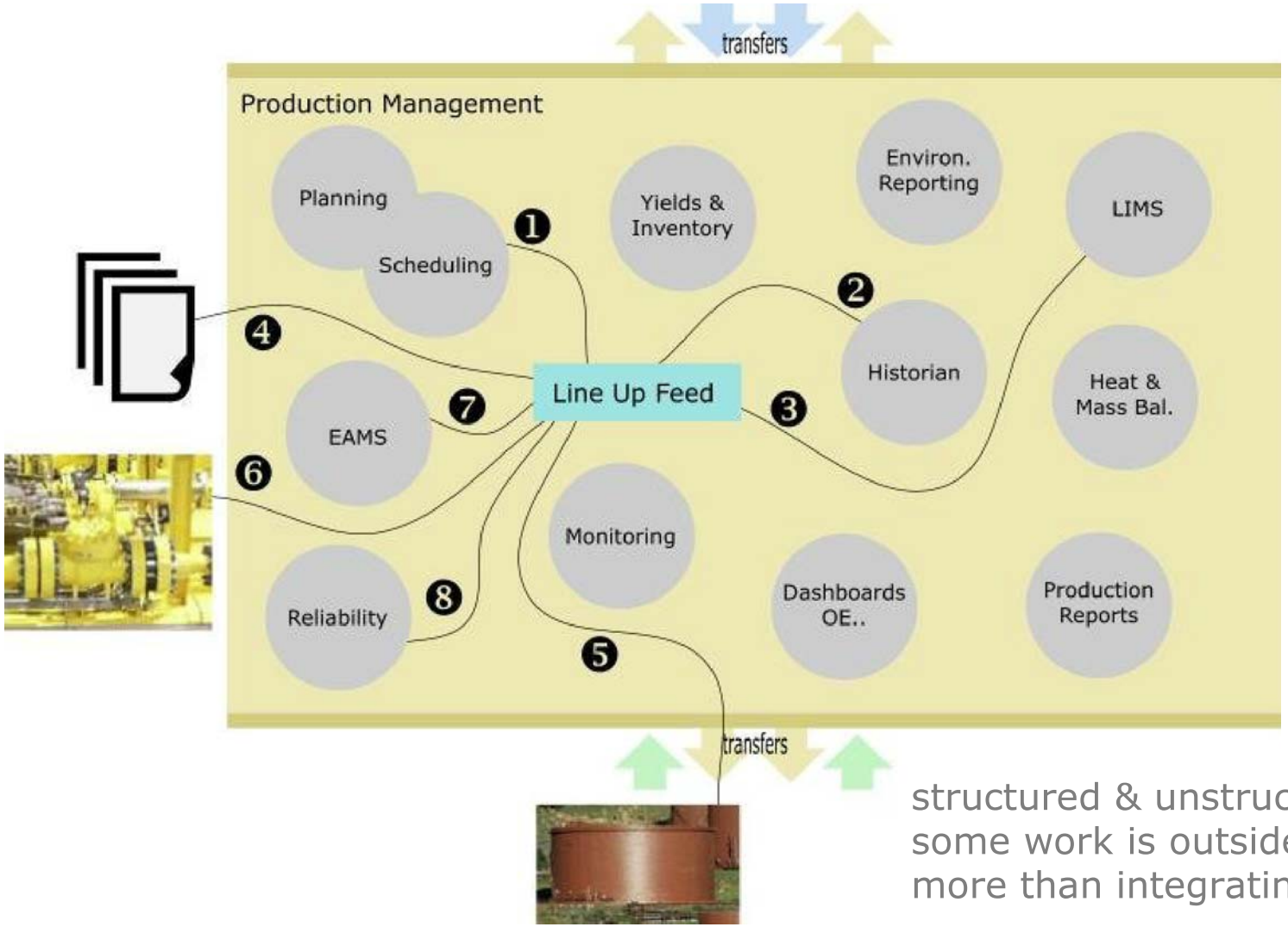
auditable

event-driven

applications in production management



sample work process – the line up



Line Up Feed

1. check schedule
2. check tank level
3. check lab test
4. check assay
5. stir tank
6. inspect eqpt.
7. check maintenance
8. check reliability
9. etc.

structured & unstructured data
some work is outside the applications
more than integrating data

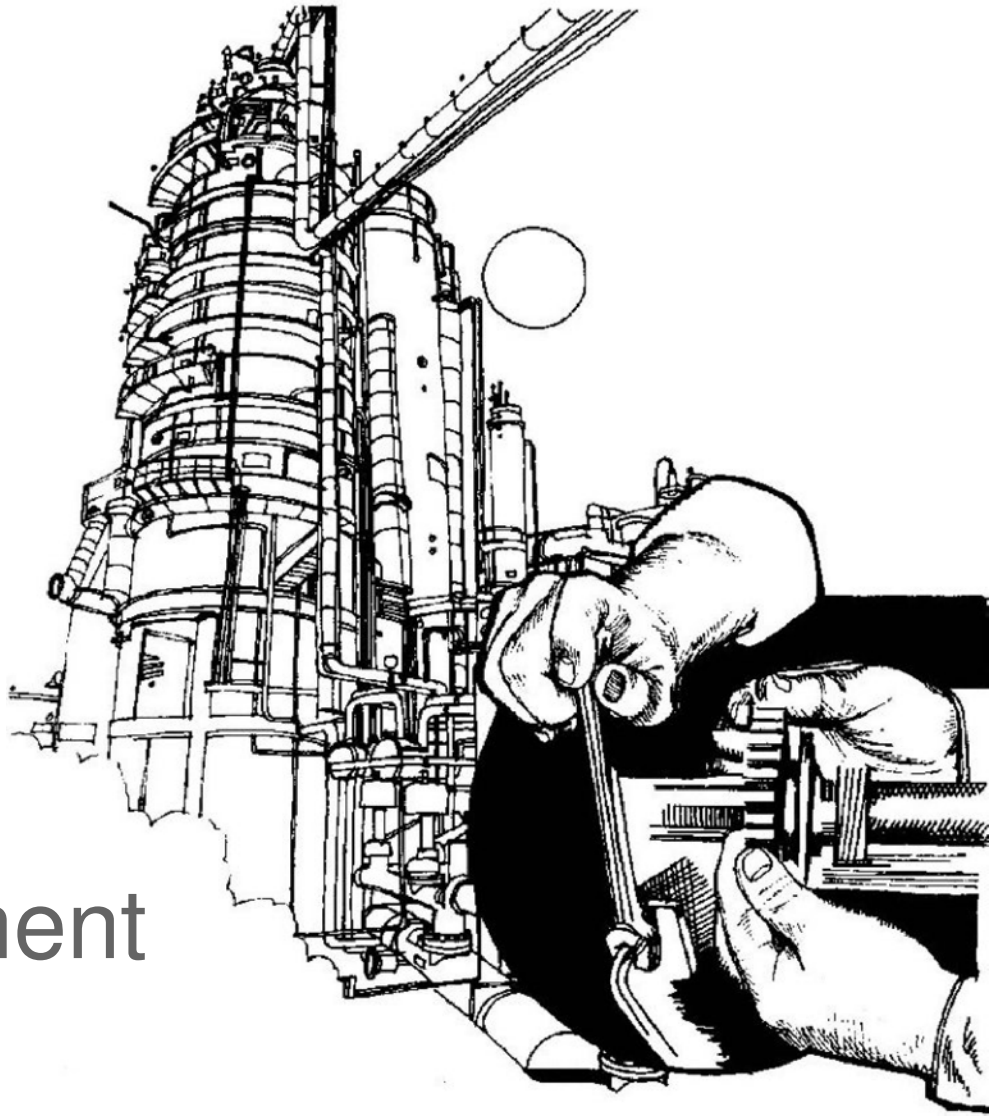
hi-level requirements

1. collaborative work processes enabled by, but separated from the IT underpinnings
2. secures data within primary systems, but provides easy data exchange and sharing
3. users find information easily, without knowledge of where it is stored
4. isolates/abstracts implementation & vendor packages

services - SOA - BOA

key ideas

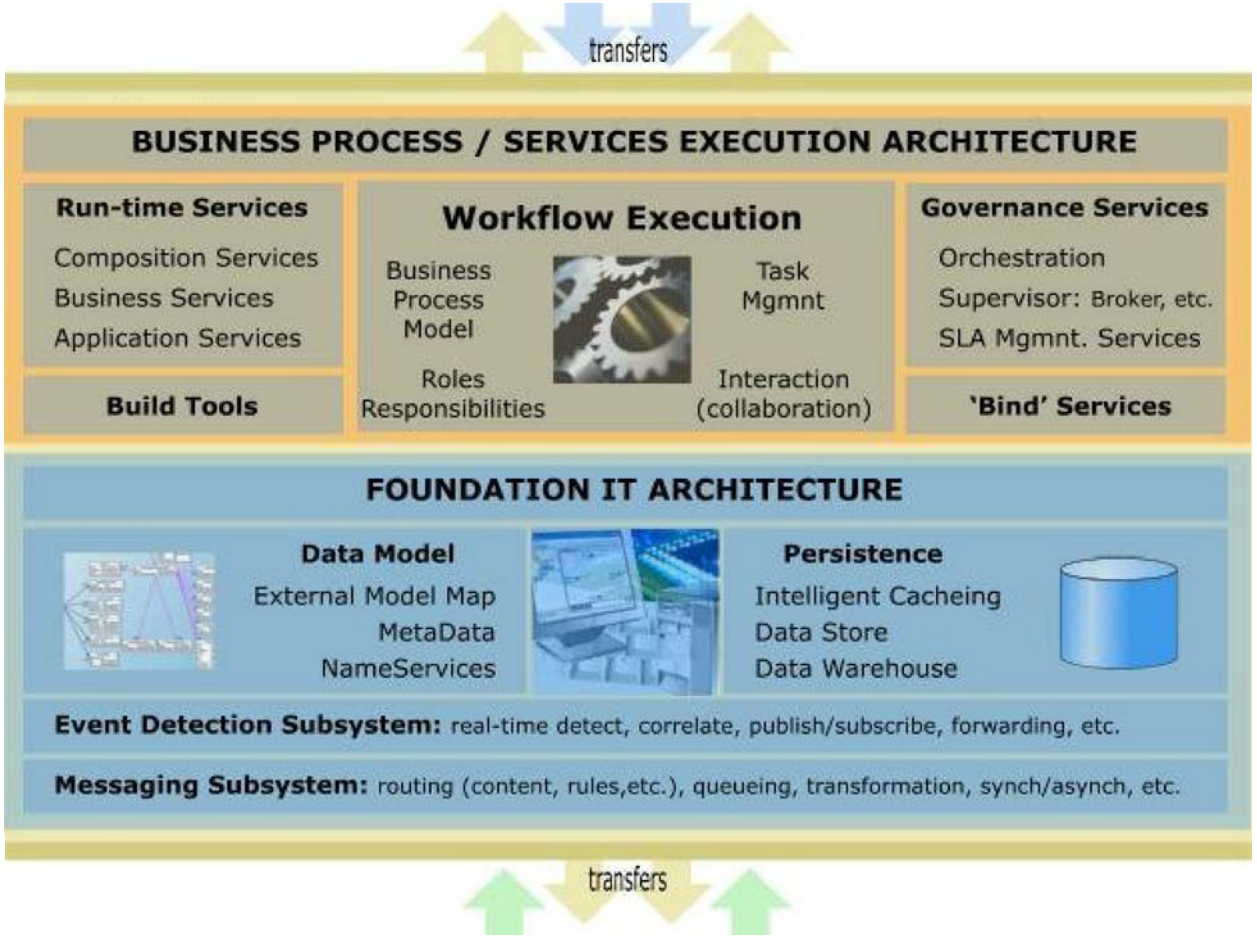
- federated
  - name-service
  - metadata
  - directory services
- exchange
- services broker
- technology alignment



two highly-coupled ‘piece parts’

- rich SOA supports IT foundation that can enable work process
- framework that implements work processes using services

required foundation



2

1

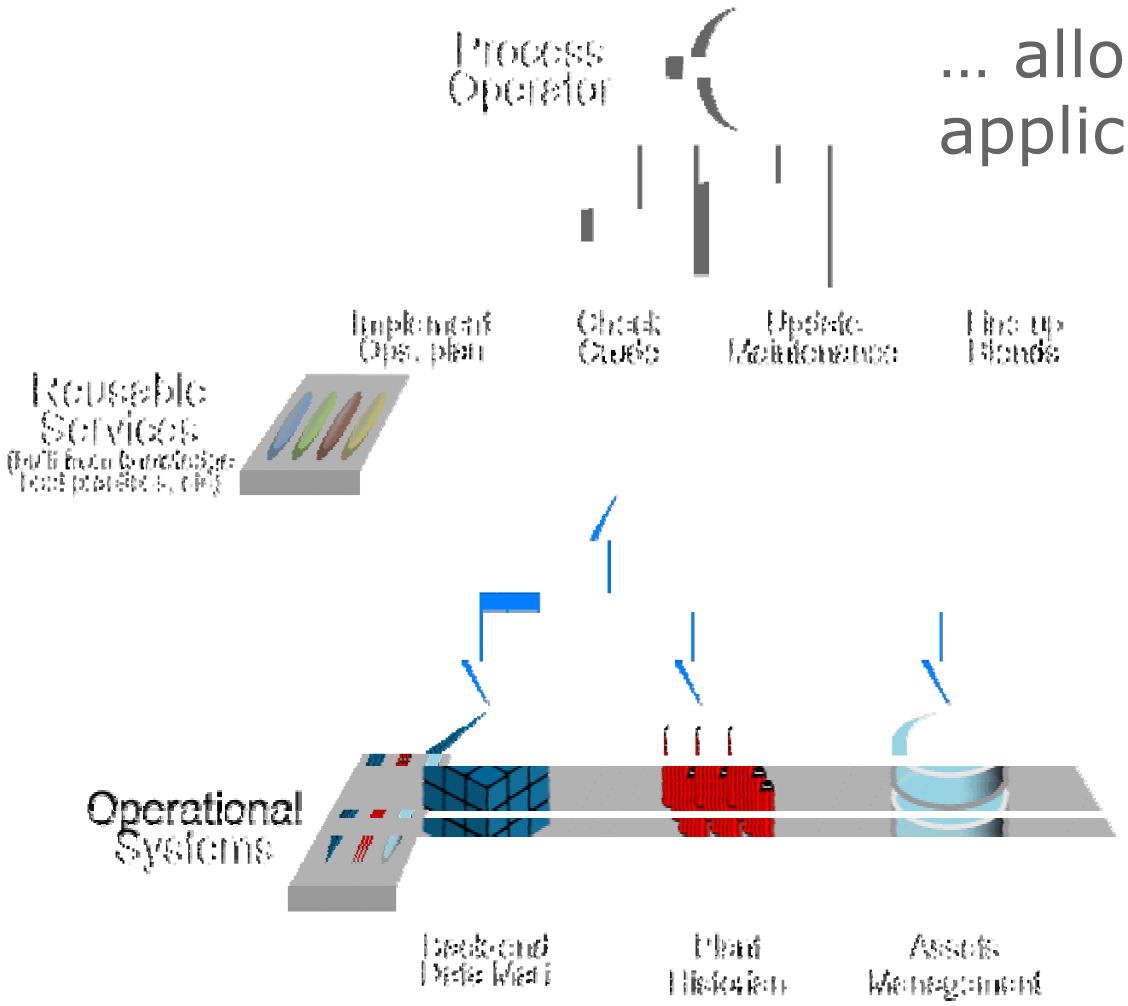
boa

companies are spending too much money on integration & the sustaining & running of existing business capability versus innovation & creation of new capability. companies want this to change. and they know this is possible with soa.

IBM

opportunity… to remove the work process … from the IT underpinnings

soa...



... allows decomposition of applications into services

reusable building blocks

reusable services enable a nimble IT infrastructure that can adapt to meet changing business needs

soa governance

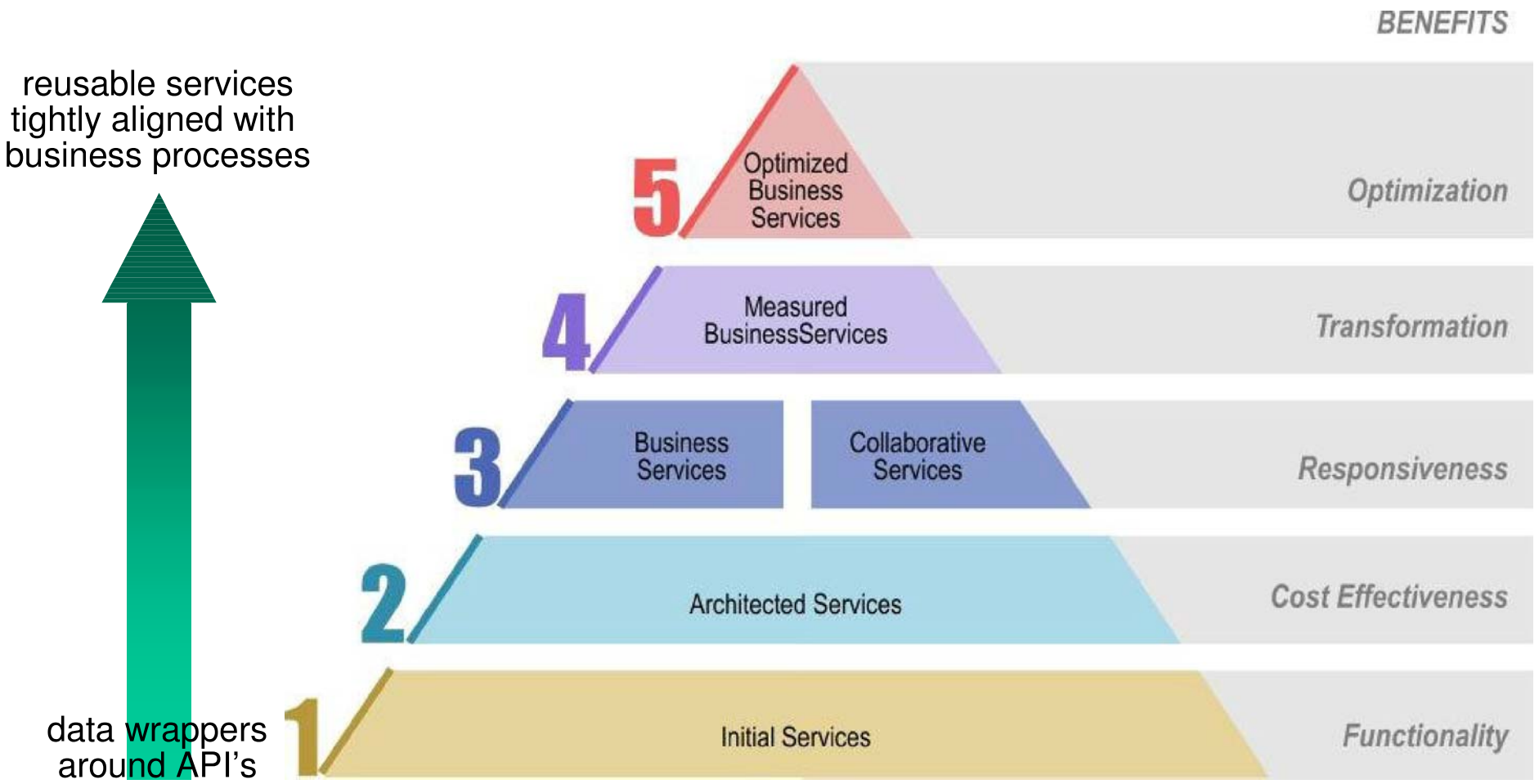
enforce policy: design, usage…
steward service integrity
coordinate people & processes
promote efficiency

diverse, heterogeneous services, used in ad hoc fashion by a set of diverse applications ?

governed by business rules known only to the applications themselves ?

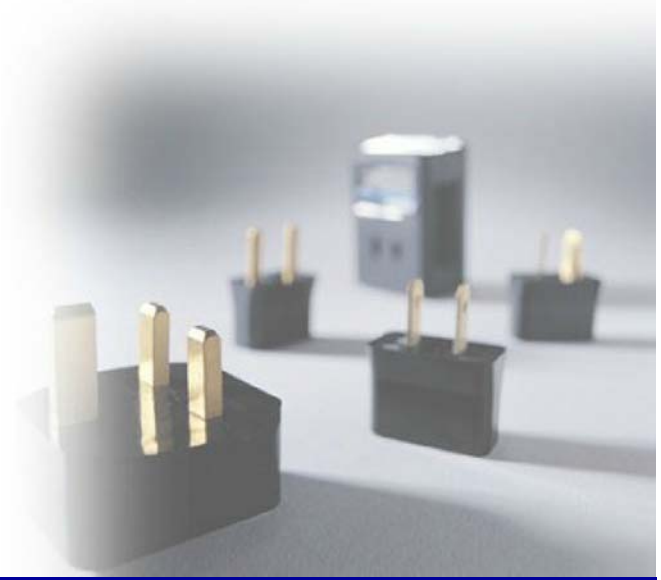
at best complex and at worst highly ambiguous

soa maturity model

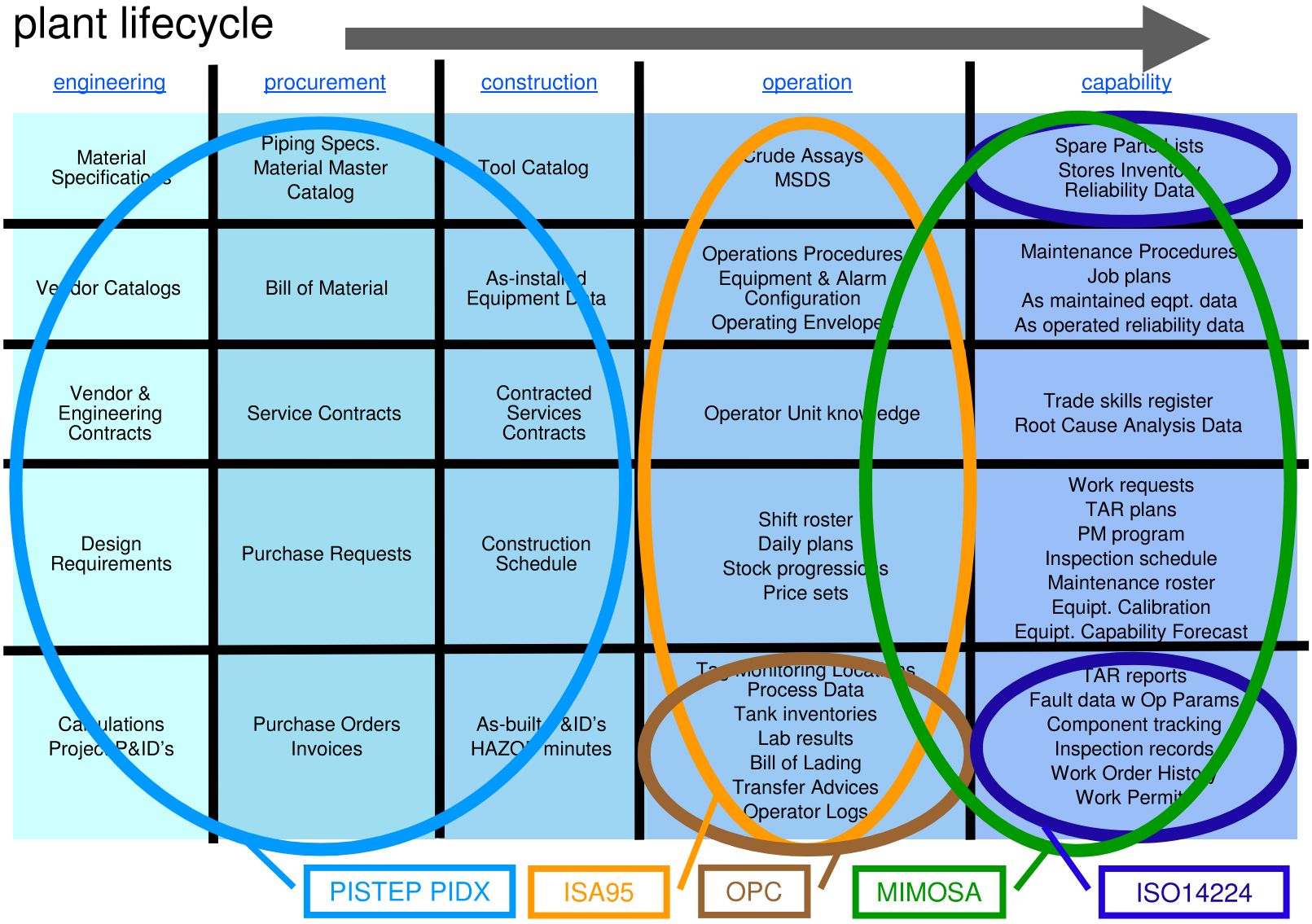


standards → agility

- lower TCO
- share costs
- faster transform to mainstream IT
- agility
- not proprietary
- interoperability



bp data model map



bp data model map

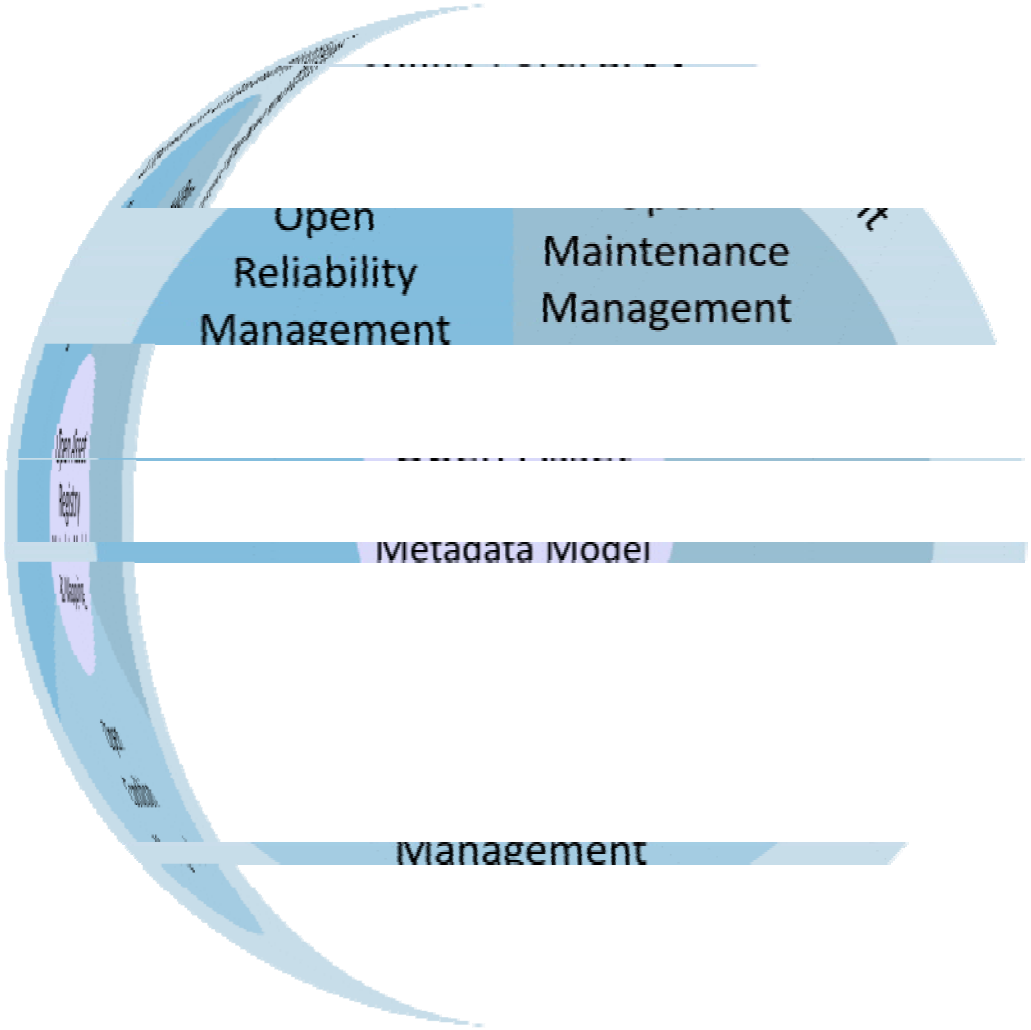
plant lifecycle

	engineering	procurement	construction	operation	capability
materials model	Material Specifications	Piping Specs. Material Master Catalog	Tool Catalog	Cycle Assay MSDS	Spare Parts Lists Spares Inventory Reliability Data
equipment model	Vendor Catalogs	Bill of Material	As-built Equipment Data	Operations Procedures Equipment & Asset Configuration Operating Envelopes	Maintenance Procedures Job plans As-maintained equip. data As-operated reliability data
personnel model	Vendor & Engineering Contracts	Service Contracts	Contracted Services Contracts	Operator Job Knowledge	Trade skills register Root Cause Analysis Data
plant model	Design Requirements	Purchase Requests	Construction Schedule	Shift roster Utility plans Stock preparations Pipe work	Work requests PM plans PM program Inspection schedule Maintenance roster Expert Calibration Engine Capability Forecast
actuals model	Calculations Project P&ID's	Purchase Orders Invoices	As-built P&ID's HAZOP minutes	Turbomachinery Analysis Process Data Tank Inventories Lab results Bill of Lading Operator Actions Operator Logs	PM reports Failure Mode Effects Analysis Component trending Inspection records Work Order History Work Permits

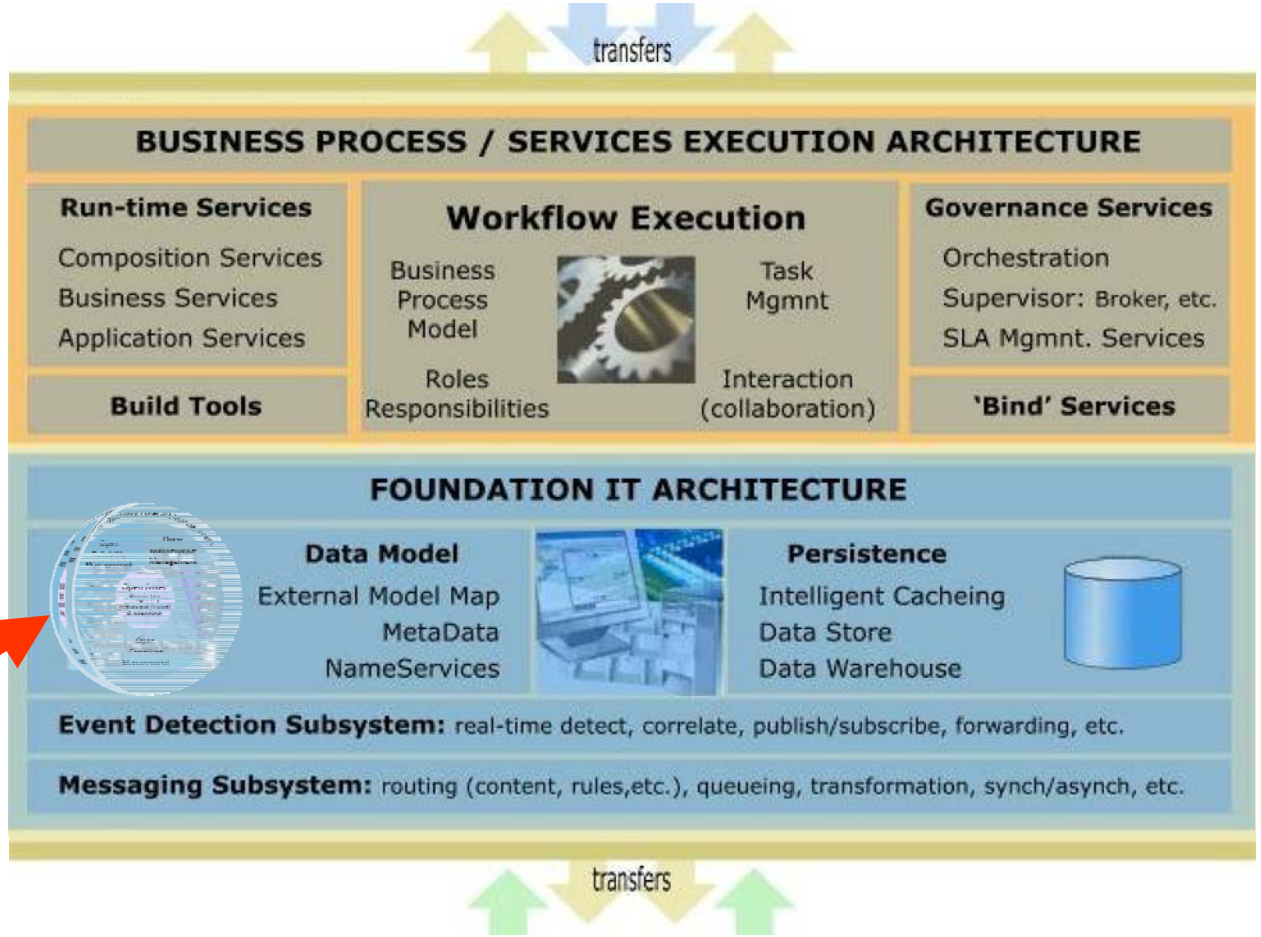
openO&M standards
(based on MIMOSA, OPC, ISA95, etc.

mimosa summary

- nameservices
- metadata
- model maps
- abstraction
- not proprietary
- interoperability



required foundation



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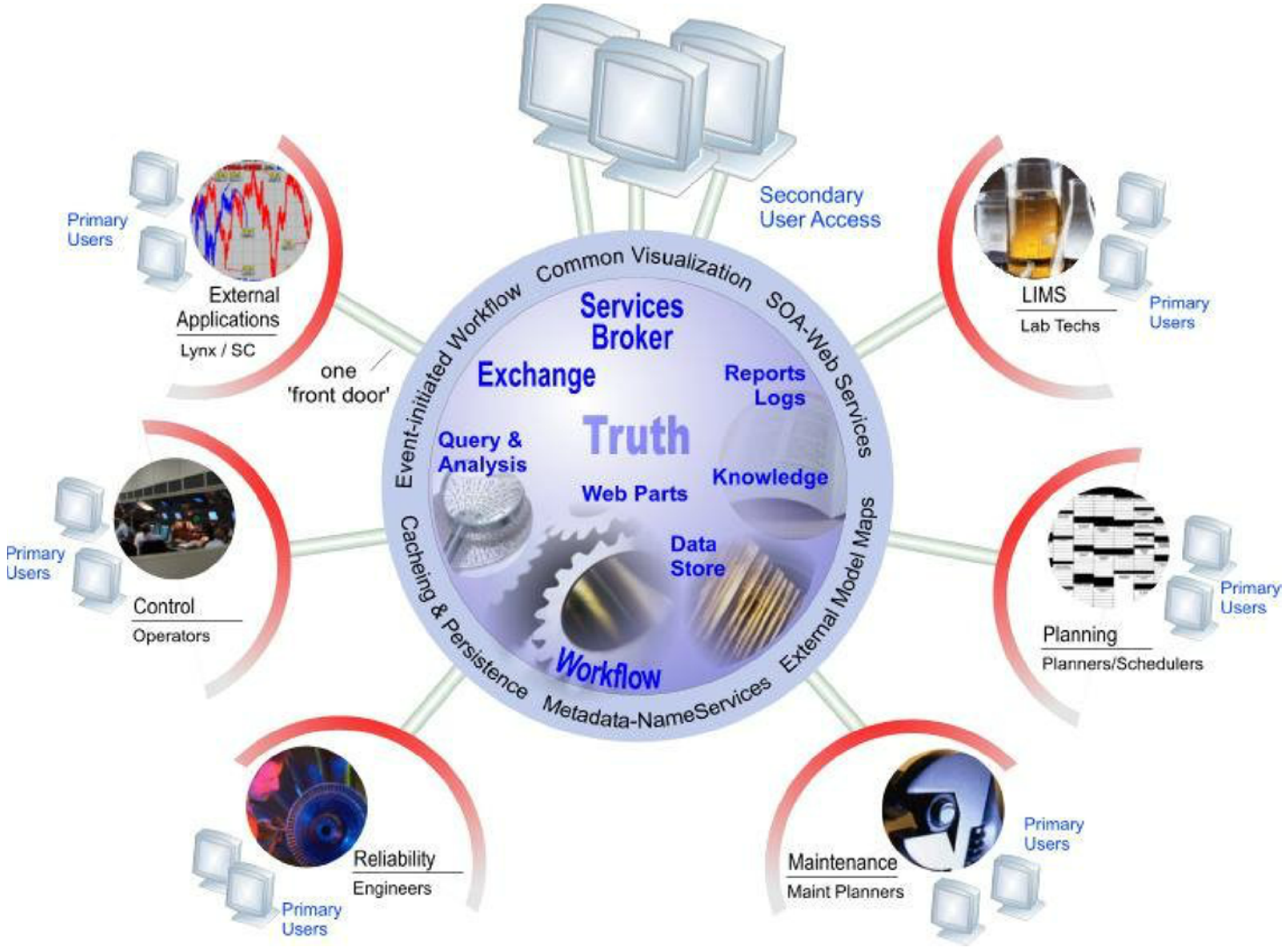
1

OpenO&M

the proposal



the approach

1 **lead the industry, drive COTS**

2 standards… liberate us…
help them deliver what we need

3 Push hard for services maturity
that exceeds current offerings

more than a bag of services and workflow

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Thank you

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