Conquering the Data Deluge:
How Hardware & Software Make Critical Data Actionable

Webcast

August 25, 2011

The Panel:

Christopher Perdue, VP for Sierra Energy Group

Wade Malcolm, Senior Director of Accenture's Smart Grid Operations Technology Group

Brian Owenson, Senior Director of Technical Architecture for Oracle's Utilities Global Business

Mohamad Afshar, Product Management responsibility for Oracle's Exalogic Elastic Cloud

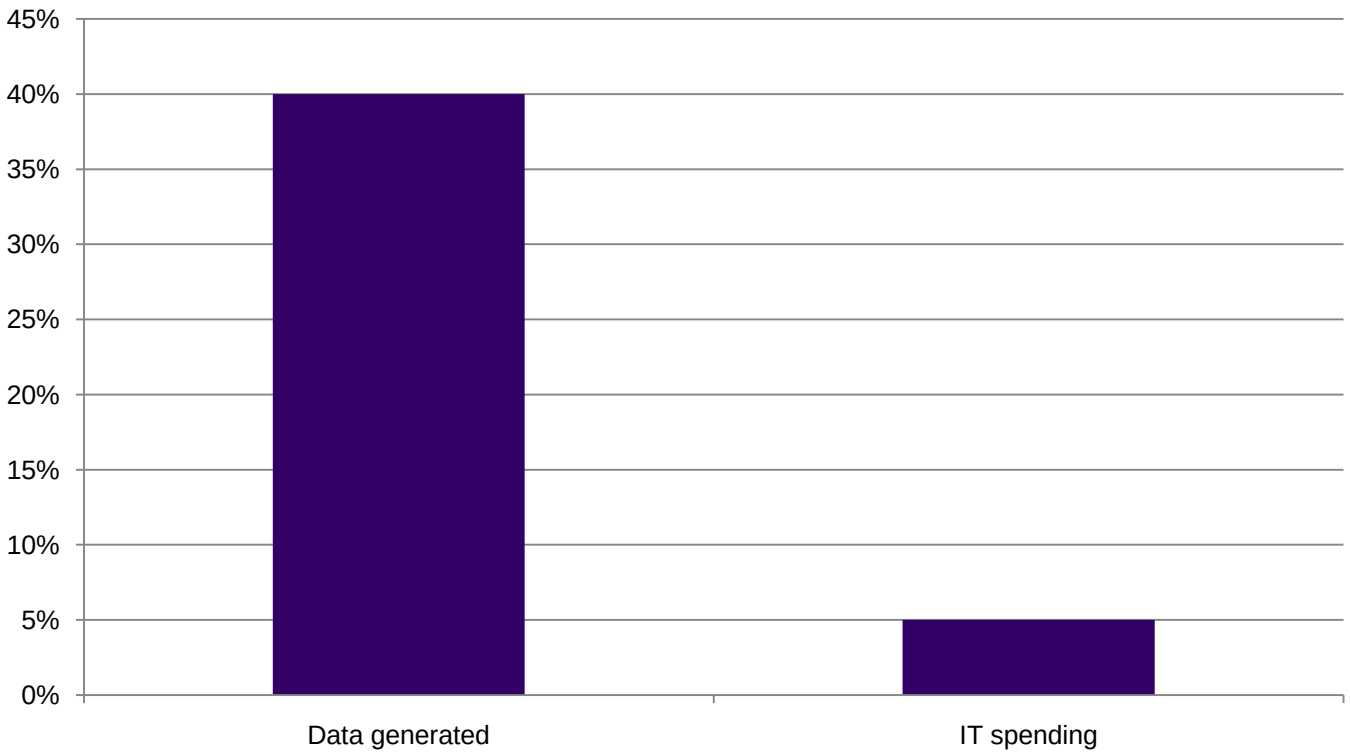
Introducing:

Christopher Perdue, VP for Sierra Energy Group

The Changing Role of Data

Presented by Christopher Perdue
VP, Sierra Energy Group
Phone: 850-499-8727

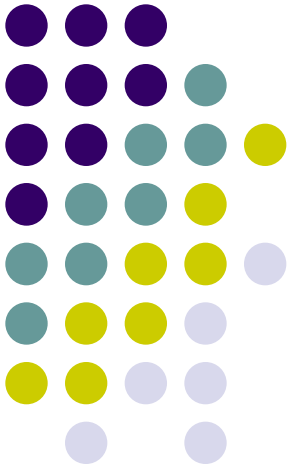
Projected Annual Growth Rates



Source: McKinsey & Co.

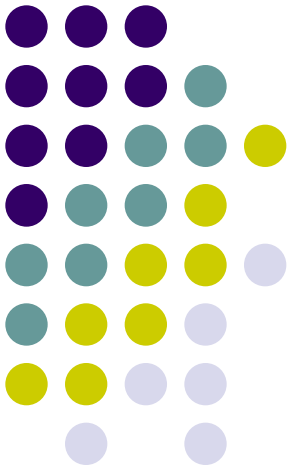
Why Is the Issue of Data Management So Important for Utilities?

- Without the information or “intelligence” that can be derived from smart meters & other smart grid devices, utilities cannot derive the substantial benefits that smart grid deployments can deliver.
- As these deployments significantly increase data quantity & availability, data analytics will become essential.

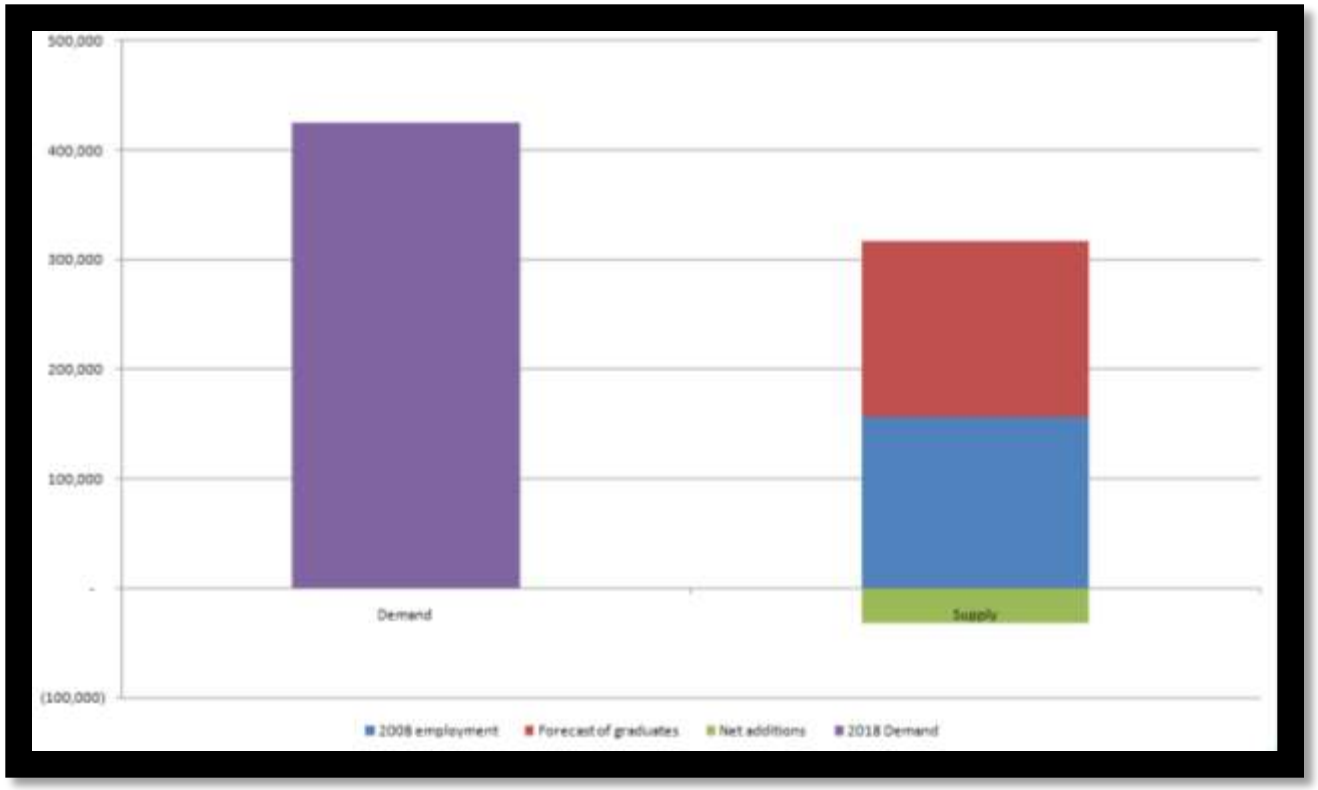


For every million meters served by a smart meter operations team …

- More than 2,000 meter exchanges per day during deployment
- More than 1,000 customer moves per day (assumes 25 percent yearly turnover)
- 10,000 missing reads per day (assumes 99 percent daily read success)
- 20 meter failures per day (assumes a 0.5 percent annual failure rate)
- Approx. 10,000 data changes per day
- More than 97,000,000 meter reads per day (assumes 15-minute data intervals)



Supply & Demand for People with Deep Expertise in Data Analysis in 2018

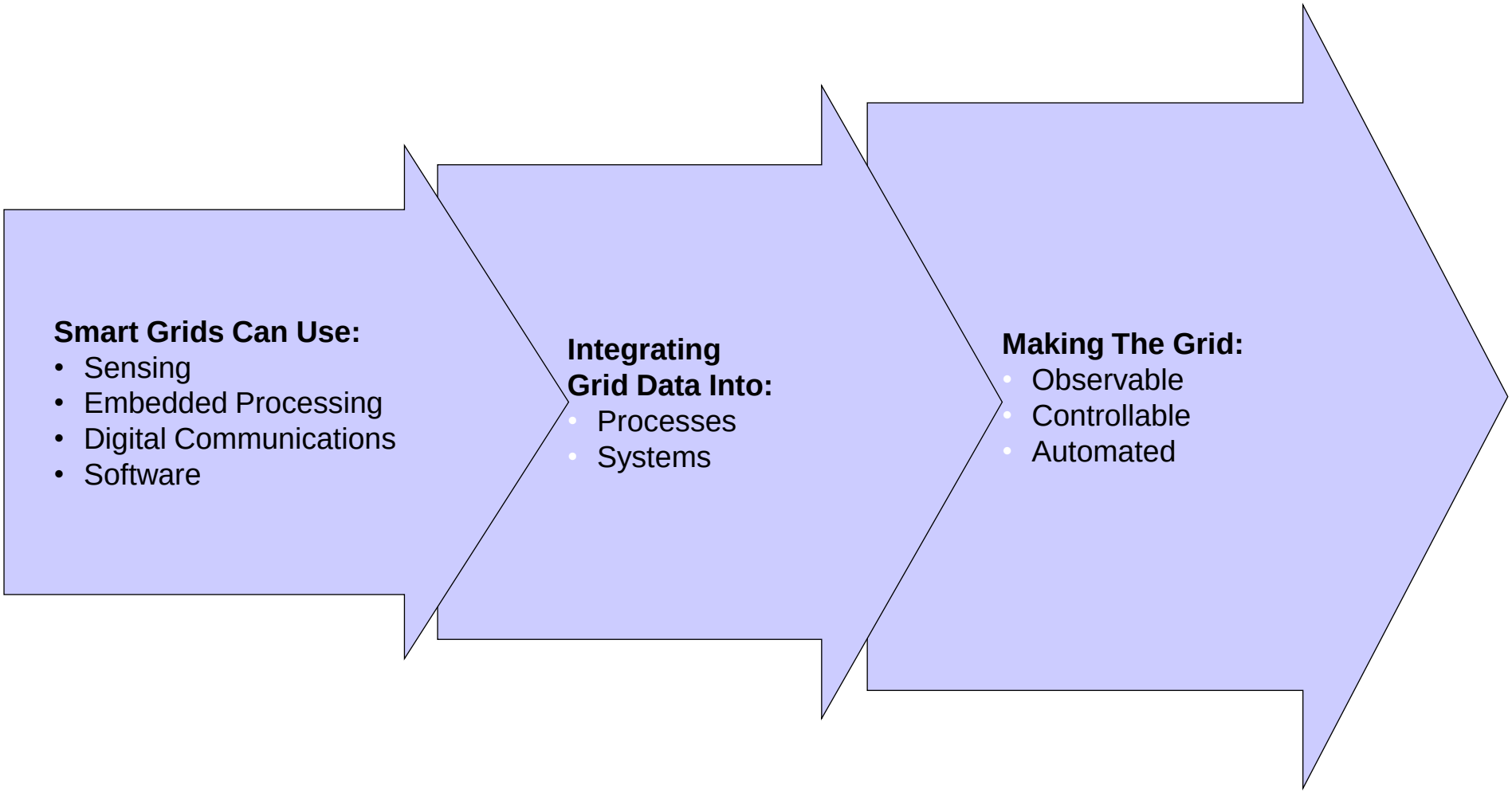


Source: McKinsey Global Institute, Dun & Bradstreet, U.S. Bureau of Labor Statistics, and the U.S. Census Bureau.

Introducing:

Wade Malcolm, Senior Director of Accenture's Smart Grid Operations Technology Group

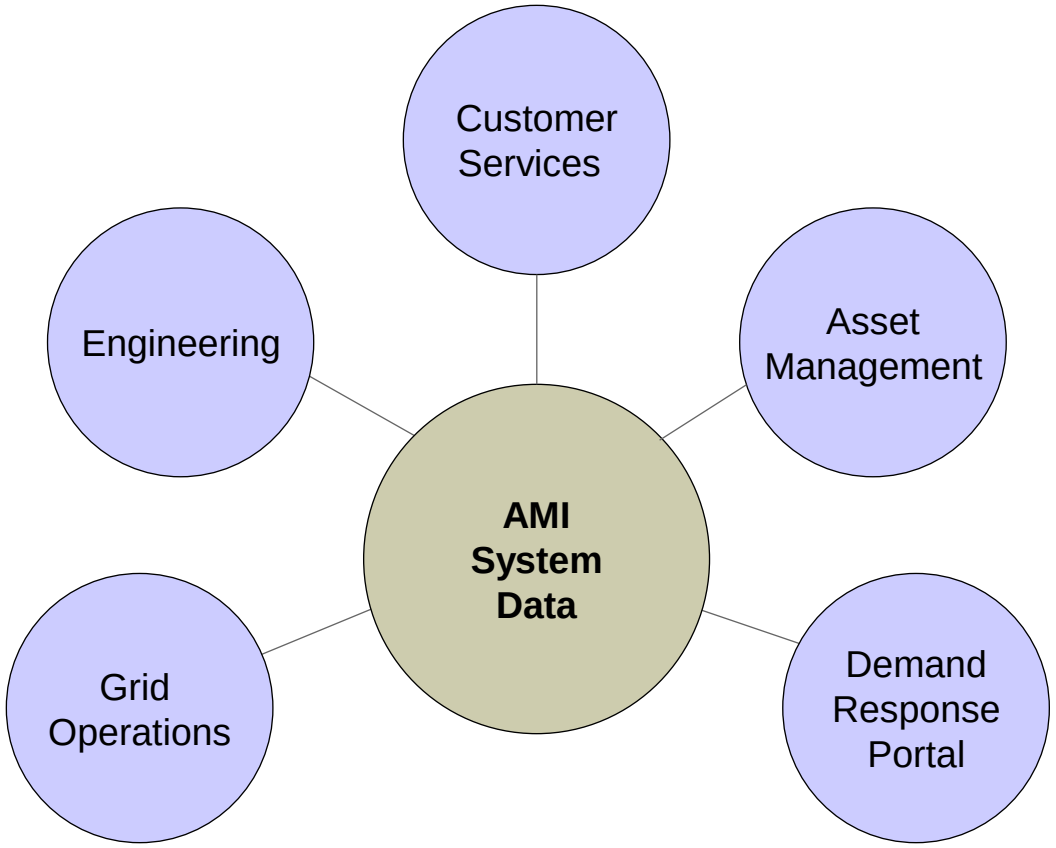
Smart Grid is substantially more dependent on IT than prior operational concepts …



Re-use of “Big Data” is Critical to Benefits Realization

Example: AMI data usage should be mapped out clearly before deployment, including:

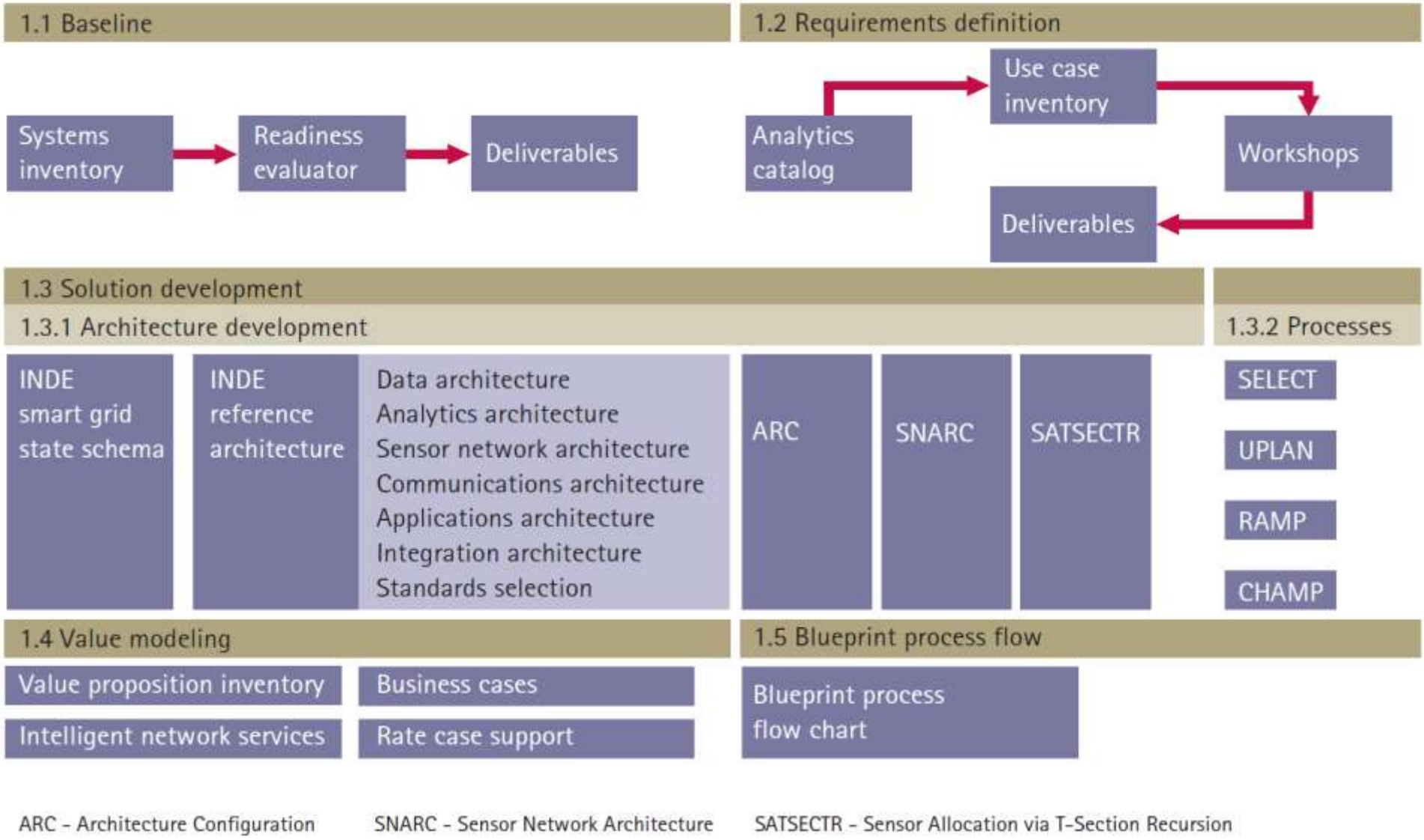
- **Who owns the data and who is a recipient of data in the utility**
- **How the data is being shared**



Performance is Only as Good as the Data: Asian Transco Example

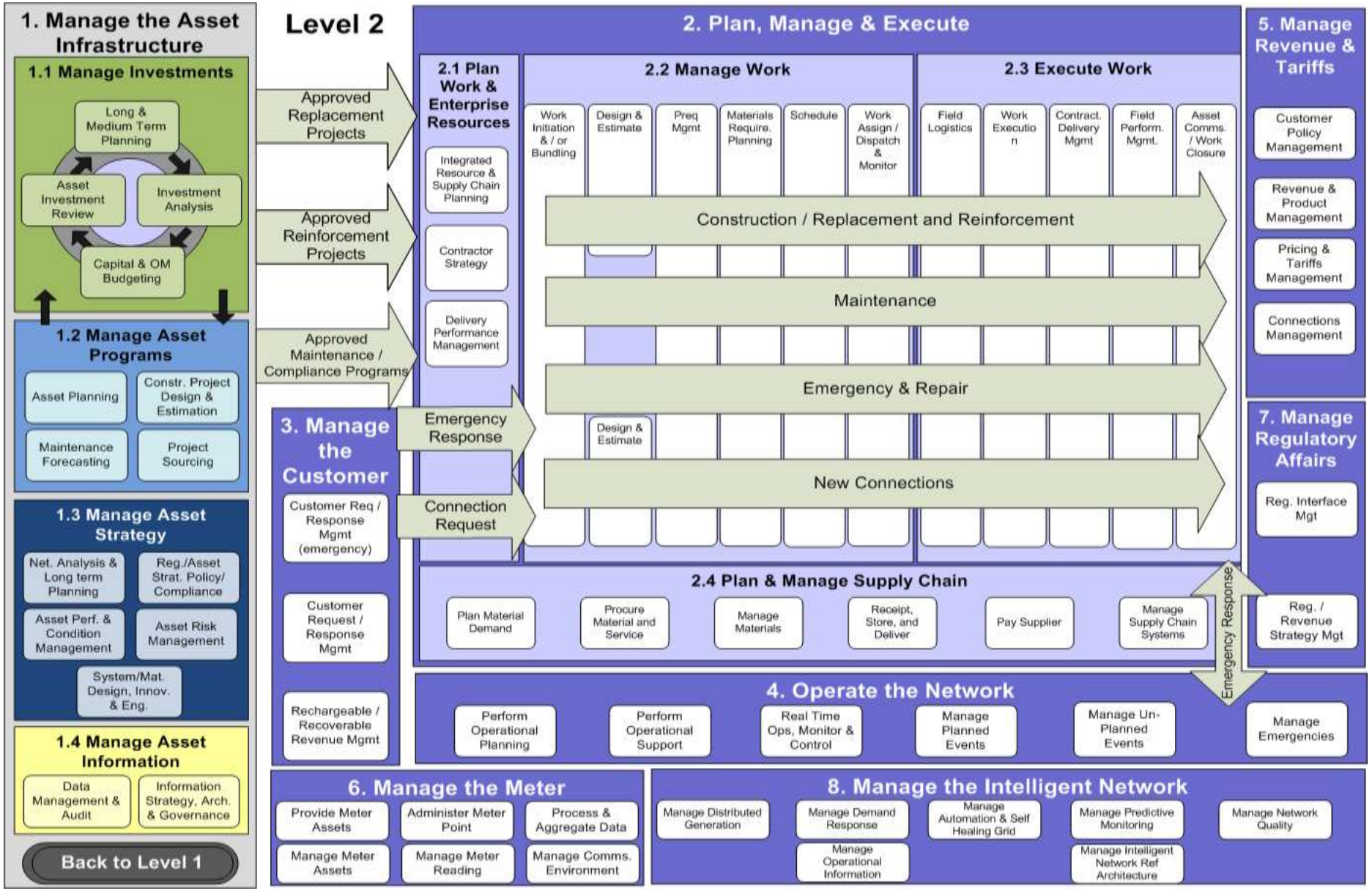
- They wondered why they were not seeing the expected benefits from installation of new technologies such as phasor measurement units and new system management algorithms.
- These systems were integrated with an existing GIS and asset registry to better understand the assets managed and the associated connectivity.
- However, due to the rapid expansion of the Transco system, it was found that the data stored in these systems were highly inaccurate.
- This high error rate actually limited the effectiveness of the utilization of the PMUs and associated applications to optimize the system.
- In this case, a “back to basics” approach was utilized to scrub the data and then test the operational effectiveness of the new technologies and significant improvement was noted.

Accenture has Created INDE (Intelligent Network Data Enterprise)



ARC – Architecture Configuration SNARC – Sensor Network Architecture SATSECTR – Sensor Allocation via T-Section Recursion

Business Processes Should be Optimized to Leverage "Big Data"



Introducing:

Brian Owenson, Senior Director of Technical Architecture for Oracle's Utilities Global Business

Software for High Volume Data Management

- 4 key dimensions to the problem
  - Scalability
  - Flexibility, business capability
  - Openness, standards
  - Integrated processes

Meter Data Management on Exadata / Exalogic

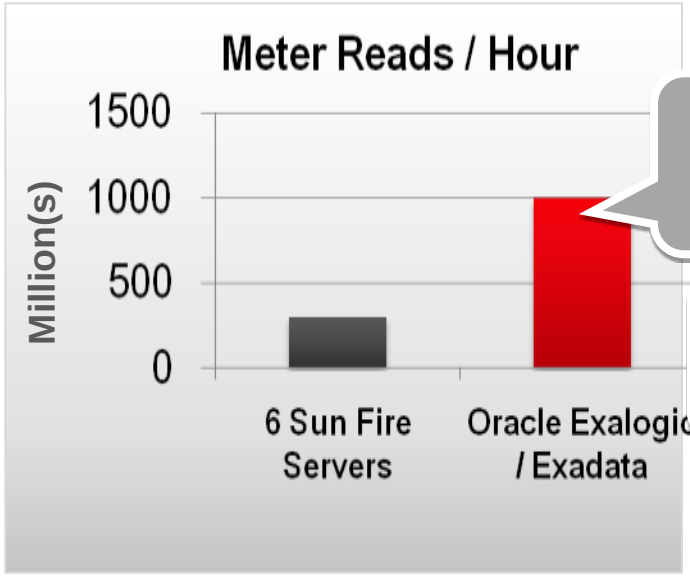
Scenario

Load Interval Meter Reads
Apply Validation / Editing / Estimation Rules

Process Data for 4 Bill Determinants / Bill

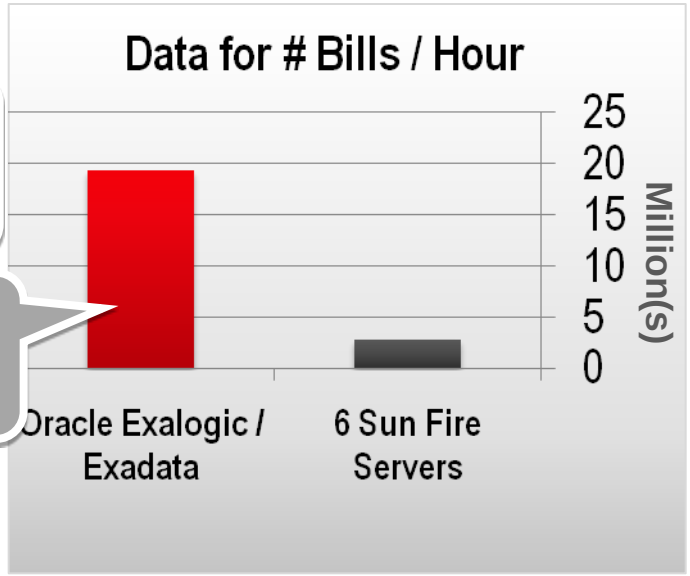
1 Rack of Exalogic

1 Rack of Exadata



1 Billion Meter Reads Processed/hr
(3 X more with Exadata)

Data for 19.3 Million Bills/hr
(7 X more with Exadata)

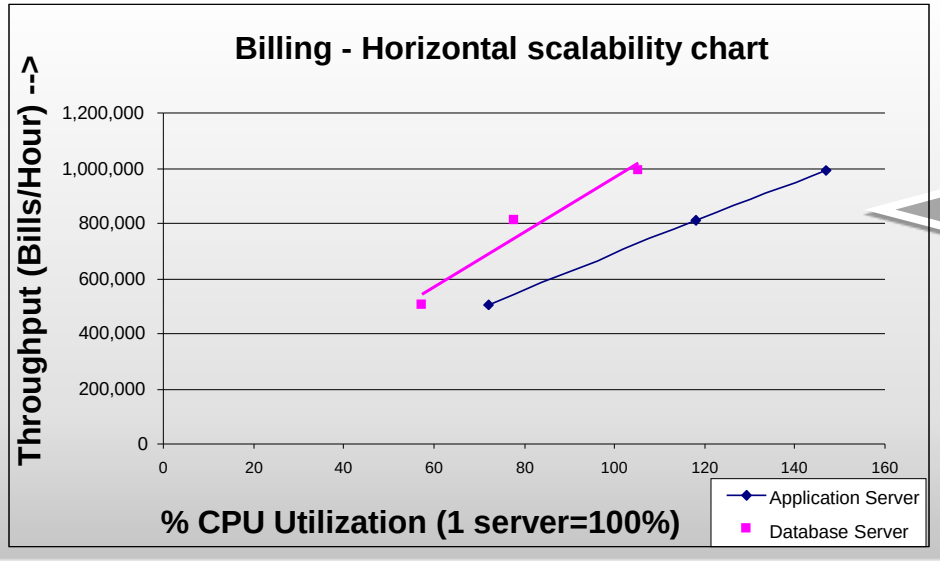


Customer Care and Billing On Exadata

“1 Million bills calculated per hour”

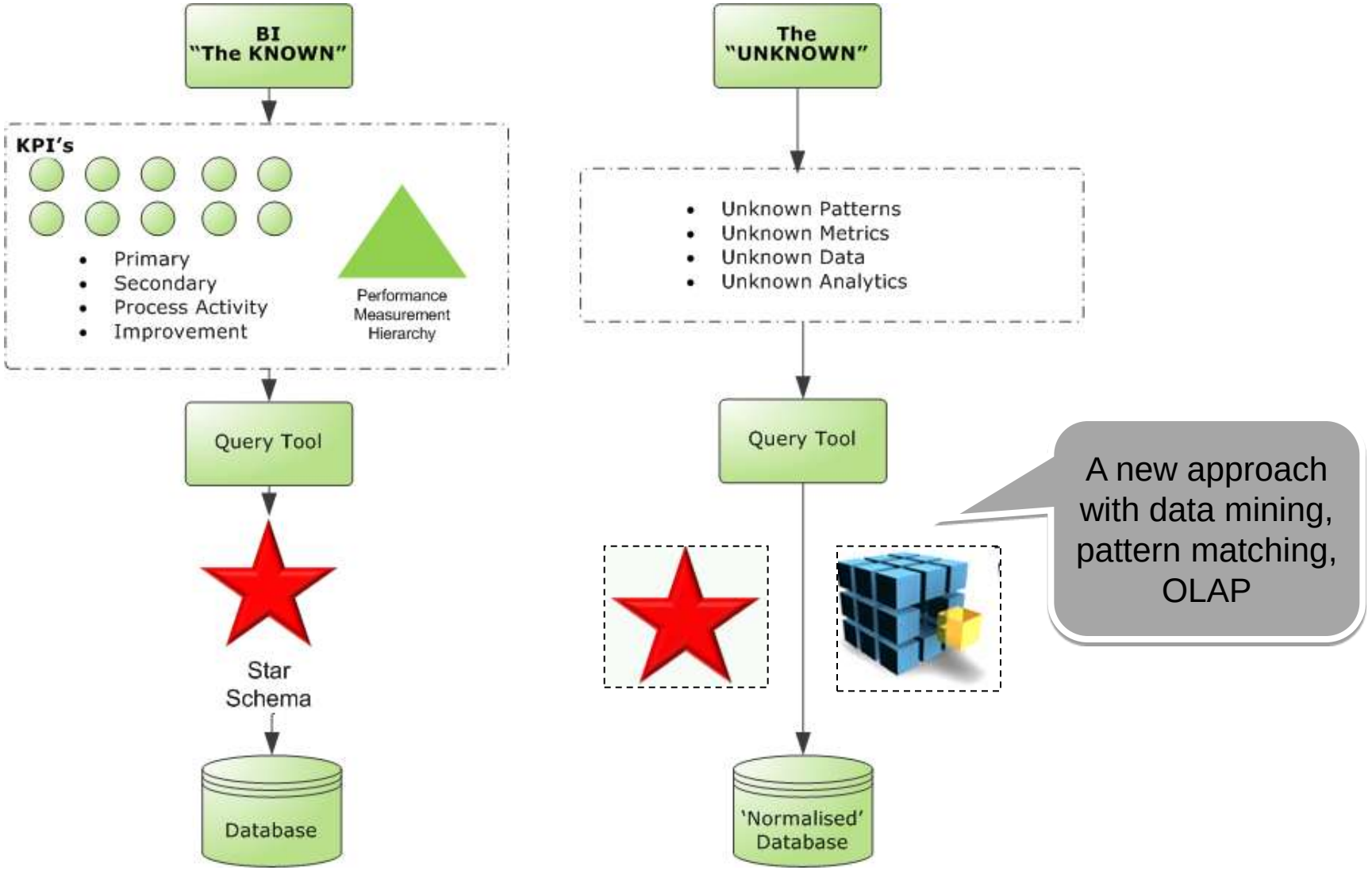
at 55% Database CPU utilization (quarter rack Exadata machine)

“Equivalent to a Utility billing 20 Million customers on a monthly basis”



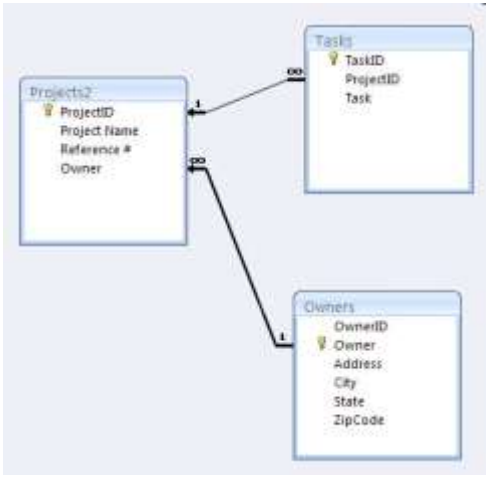
The billing batch process showed near linear scalability and uniform load distribution across the DB servers.

BI and the Unknown – 'The Two Parts'



Relational Data Is Standard, Open

- Maintain data in 3rd normal form
  - Accessible
  - Secure
  - Consistant
  - Accurate



- If we do an "apples vs. oranges" comparison with other published data we see:

Test of 1 Million Meters	Time Series	Traditional DB	ExaLogic / ExaData
1day of 15 minute intervals	18 minutes	7 hours	6 minutes

  - Note that the Exa-tests included full VEE

Oracle Smart Metering Solution

Simple Deployment + Best Performance = Lowest TCO

Engineered Systems

Foundation for Smart Metering

Smart Meter Business Processes

Meter to Cash

Meter to Operations

Meter to Usage Analytics

Meter to Customer

Oracle's Complete, Integrated Solution for Utilities On Engineered Systems - *Conceptual*

App Server
Oracle Linux

ExaLogic
1/4, 1/2, Full Rack

Utilities Applications

- Customer Care & Billing
- Meter Data Mgmt
- Mobile Work Mgmt
- Network Mgmt
- Work & Asset Mgmt
- Web Self Service

Middleware

- SOA Suite (BPEL PM, Oracle Service Bus)
- WebLogic Server (Coherence, Clustering)

Database Server
Oracle Linux

ExaData
1/4, 1/2, Full Rack

- Database 11gR2 (Clustering, Partitioning, Advanced Compression)

Oracle BI for Utilities

Oracle Enterprise Manager + Utilities Packages

Pre-installed and Configured

Introducing:

Mohamad Afshar, Product Management responsibility for Oracle's Exalogic Elastic Cloud

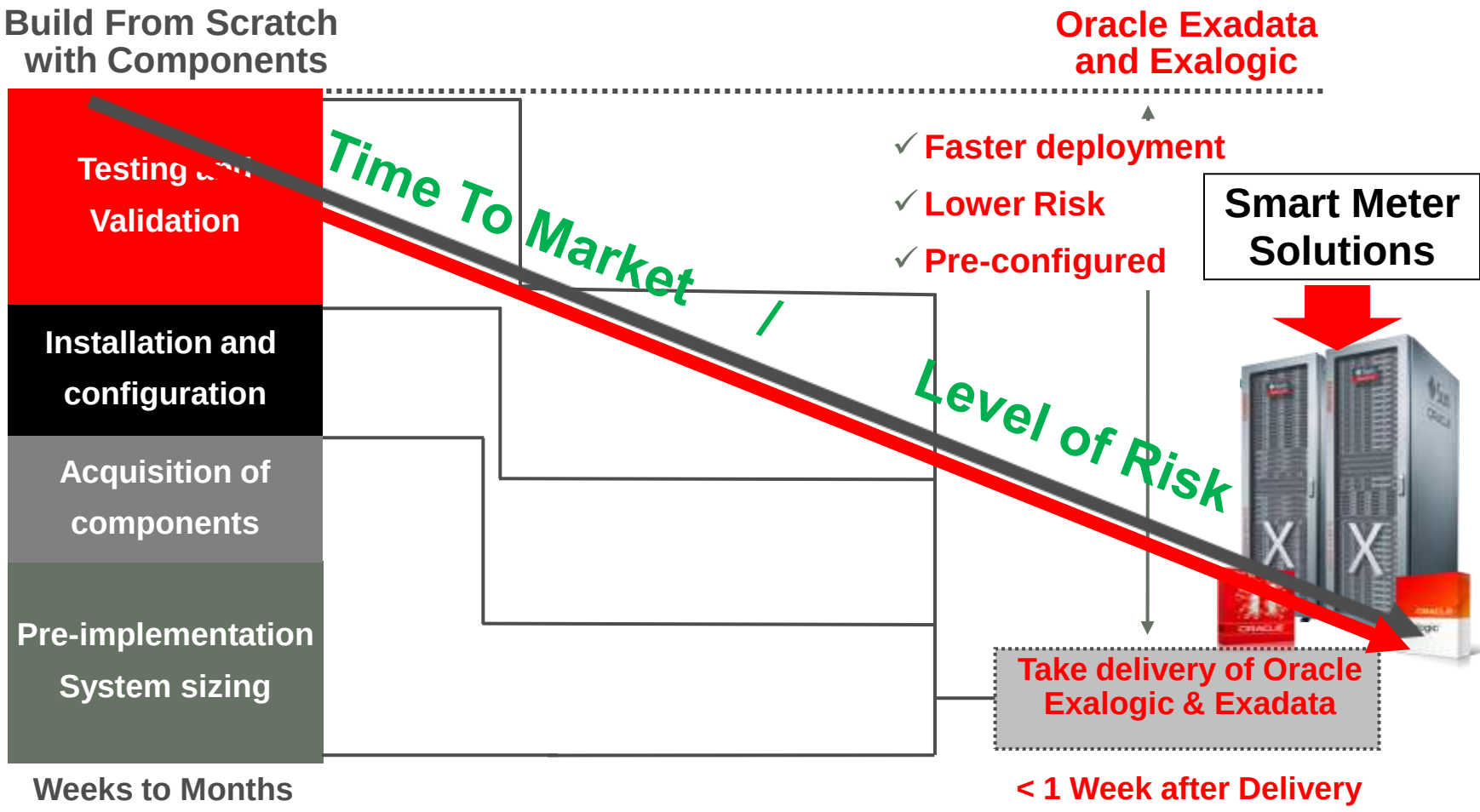
Oracle Exadata & Exalogic

Extreme Performance, Engineered Systems

Building the 21st Century Datacenter

Why Oracle Engineered Systems For Utilities?

Fastest Time to Value / Lowest Risk



Oracle Exalogic and Exadata

Infrastructure for smart grid and smart metering applications

IT Benefits

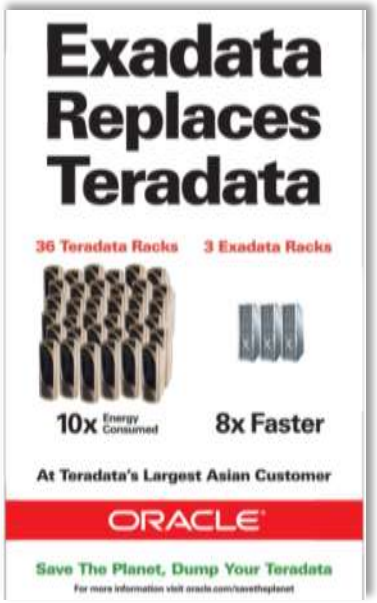
Meter Data Management
Customer Care and Billing

Mobile Workforce Management
Meter Data Analytics

Smart Grid Gateway

- **Engineered and Optimized Infrastructure**
  - Ready to Run System requires less integration
  - Extreme performance and scalability are a business imperative
  - Integrated management reduces OPEX
  - Simplified maintenance eliminates downtime
  - Improved support reduces risk

Spectacular Performance and Savings



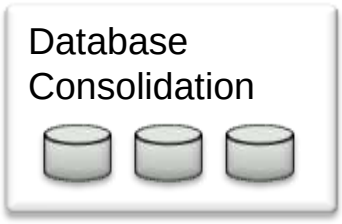
"Softbank created a warehouse up to 8x faster while reducing costs 50%"
— *Keiichiro Shimizu, Softbank*

"Turkcell's largest 250 TB DB is now only 27 TB with Exadata Compression"
— *Ferhat Sengonul, Turkcell*

"Performance improved 17x with no changes to our application"
— *Jim Duffy, BNP Paribas*

Engineered Systems - Utilities Customer Snapshots

Western USA



-Savings of 30% on operational costs

- Reduced energy costs by 30%

-Compressed 40 terabytes to 10 terabytes

-Reduced time to produce a report by tenfold from 27 minutes to 3 minutes

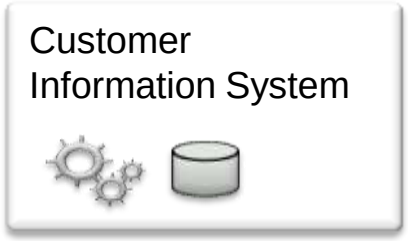
Midwest

- Reduce time to update warehouse from 37 hours to 9 hours

- 4 of the top 6 SQL statements ran > 92% faster

-Reduction in storage/disk space by > 87%

Asia / Pacific



- Supports1M customers

- Improve efficiency and provide better experience

-Improved ad-hoc times on queries by 80%

Conquering the Data Deluge:
How Hardware & Software
Make Critical Data Actionable

Questions & Answers

webcastquestions@energycentral.com