Second International Symposium

Distributed Electricity Generation and Smart Grids
17.-18. October, 2007

Smart Metering – Expectations and Opportunities
a Meter Manufacturer‘s View

Walter Scheiber, Actaris-Itron

Agenda

- Actaris-Itron Overview
- Components of Smart Metering
- Smart Meter Technology
- Communication Technology
- Meter Data Management System
- Next Generation Smart Meter System

Electricity

Gas

Water

Heat

Itron & Actaris at a glance

In 2006

$1.7 Billion of revenue*

274 million € EBITDA,

Public company (NASDAQ ITRI)

8,500 people

45 nationalities

Present in 38 countries

30+ productions sites and 70+ sites

300 million meters

in service in the world (in more than 130 countries)

125 years of existence

19th century roots

* 2006 figures

Electricity portfolio

Our tailored solution for every business need

We provide Utilities worldwide with a comprehensive range of high performance meters, systems and services for applications ranging from prepayment and automatic meter management to complex T&D systems.

- **Residential**
  Electromechanical and electronic meters with associated software
- **Prepayment**
  One-way and two-way meters,systems and services for complete data management and revenue collection
- **Automatic Meter Management, AMI**
  Meters and systems for remote reading and data management
- **Commercial and Industrial**
  Meters and systems (including AMM) for commercial to complex industrial
- **Network management** Transmission and Distribution meters and systems; Demand Management
- **Testing, Calibration**
- **Professional Services**

Smart Metering Market Requirements

Multifunction Metering

Driven by Commercial Justification

Long-life Metering

Revenue Collection

Load Management

Functional Integration

Fraud Prevention

Automated Meter Reading Systems

Smart metering

Driven by Legislation

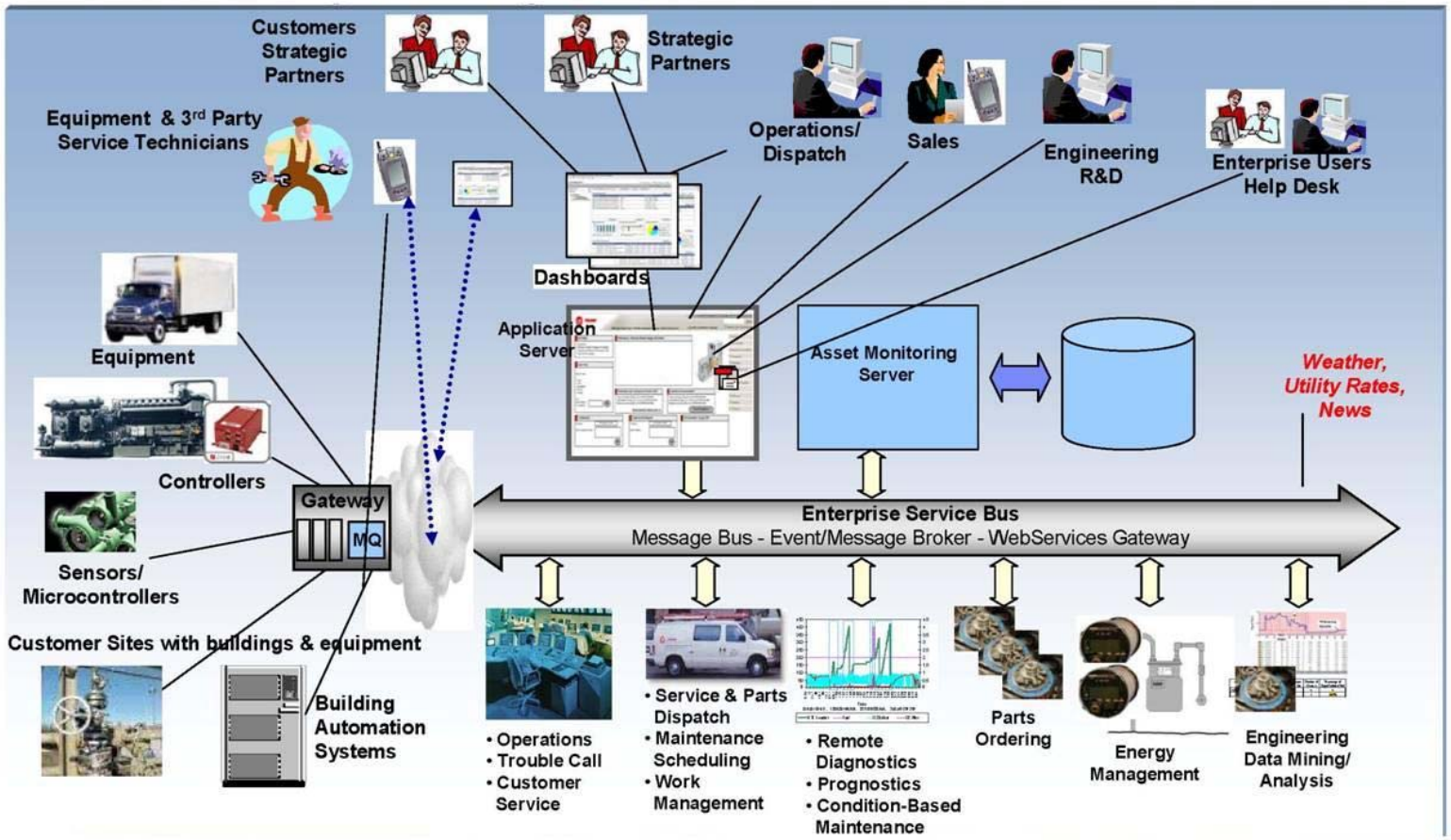
Smart Metering Trends

- **Rising demand for self-communicating residential meters and systems via PLC or GPRS**
- **Increasing need for AMM rather than AMR only,**
  - Remote load management,
  - Remote disconnection
  - Remote reconfiguration
  - Token less prepayment
- **Managed Services**
  - Actaris manages the operation of the AMM System for a fixed contract period
- **More stringent meter reading legislation**

The most reliable technology based on operational experience

Smart Metering – Integrated in the IT Infratsructure

A Changing World for Meter Manufacturers and Meter Managers



Smart Metering - Dataflow

The Meter Data Management Process

Collection & Communications: Open Standards, Bidirectional Communication to each Meter, Integriated Loadcontrol and Demand Management, Interoperabilty of Meters

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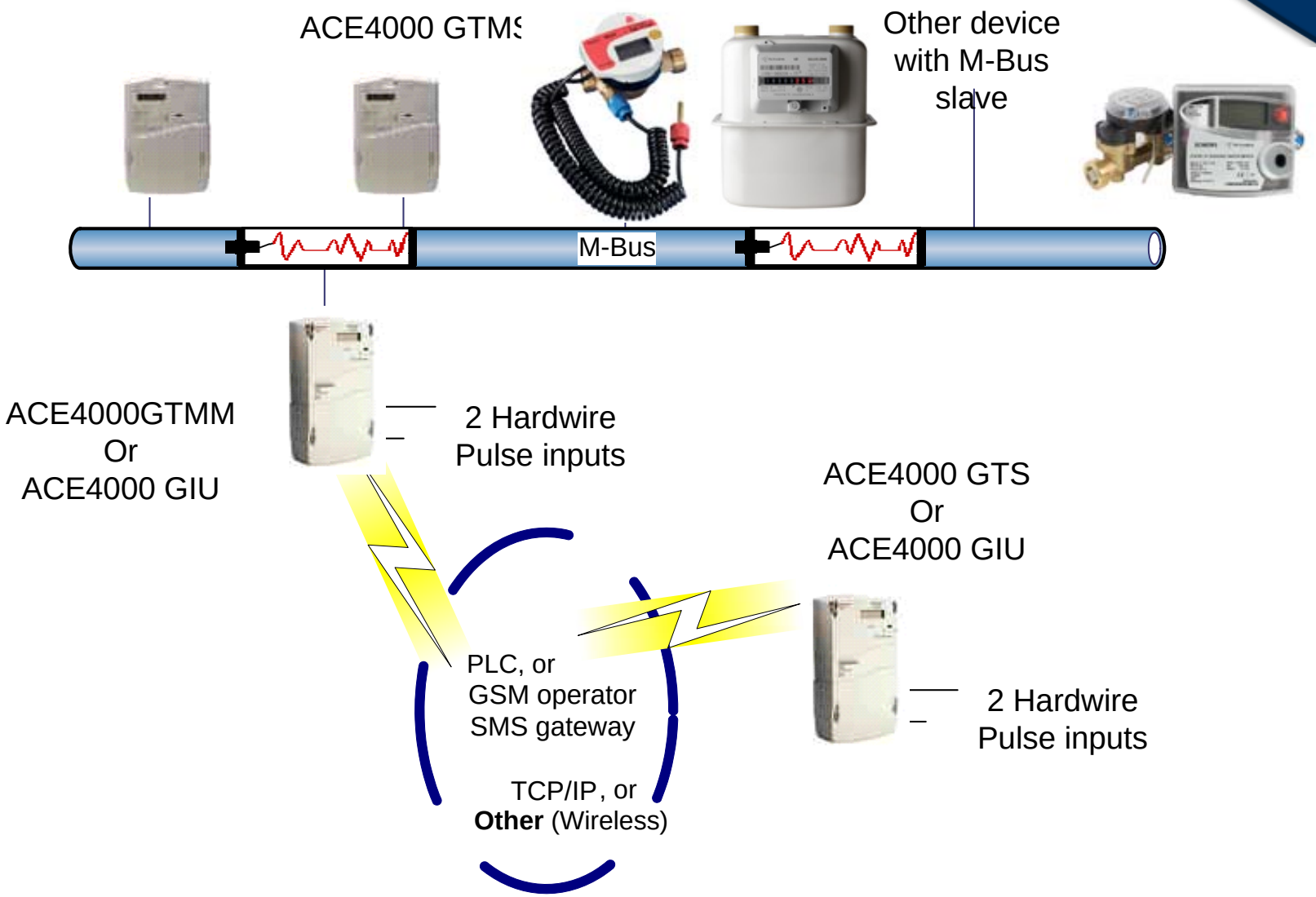
Meter Point – Actaris ACE4000



ACE4000 Residential Meter Specifications

Metrology

- Class 1, 5(100)A, 3x230/400V (4- or 3 wire), 12kV isolation
- Approved for single phase and 3-phase installation.
- -40°C to +70°C temperature range.
- 1 x Pulse Output & 2 x Pulse Inputs, Digital Out / Relay, External or Internal Contactor / Load-limiter

Advanced Features (C&I)

- Multi channel Load profile – 1min to 1 hour
- Active Energy Import/Export, Re-Active Energy
- Billing hourly, daily, monthly.
- Support for up to 4 Tariff rates.
- Event /alarm management for 10 events
  - Magnetic Field Detect, Open Cover Detect, etc.
- Digital input / Digital output control.

Communication

- Full SMS & GPRS support, or PLC, (or Other Wireless)
- Internal and external aerial solutions
- M-Bus master interface (slave meters plug & play)
- “Plug-&-Play”, XML-based communications

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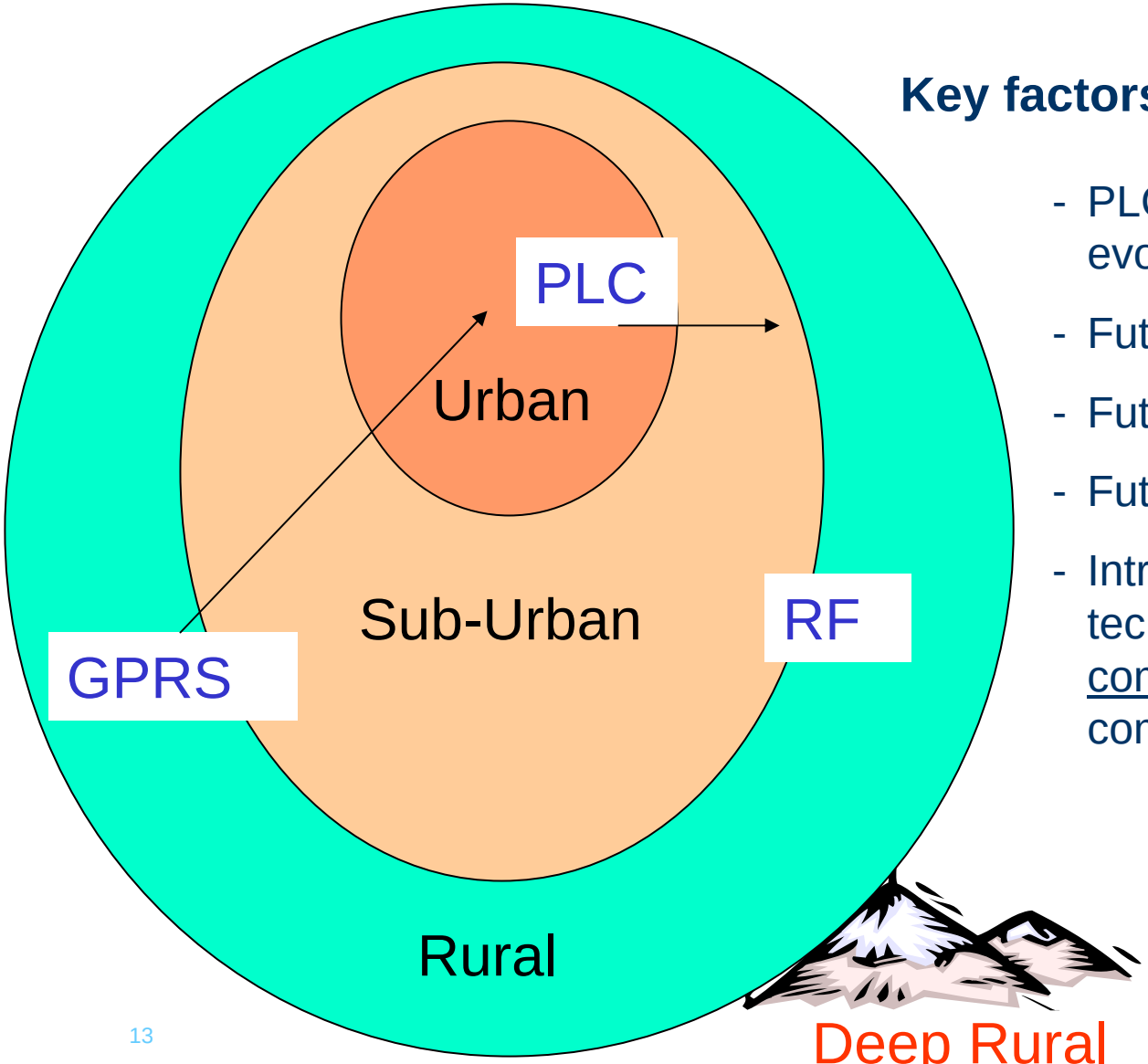
Which Communication Technology For Which Situation ?



Key factors for the future:

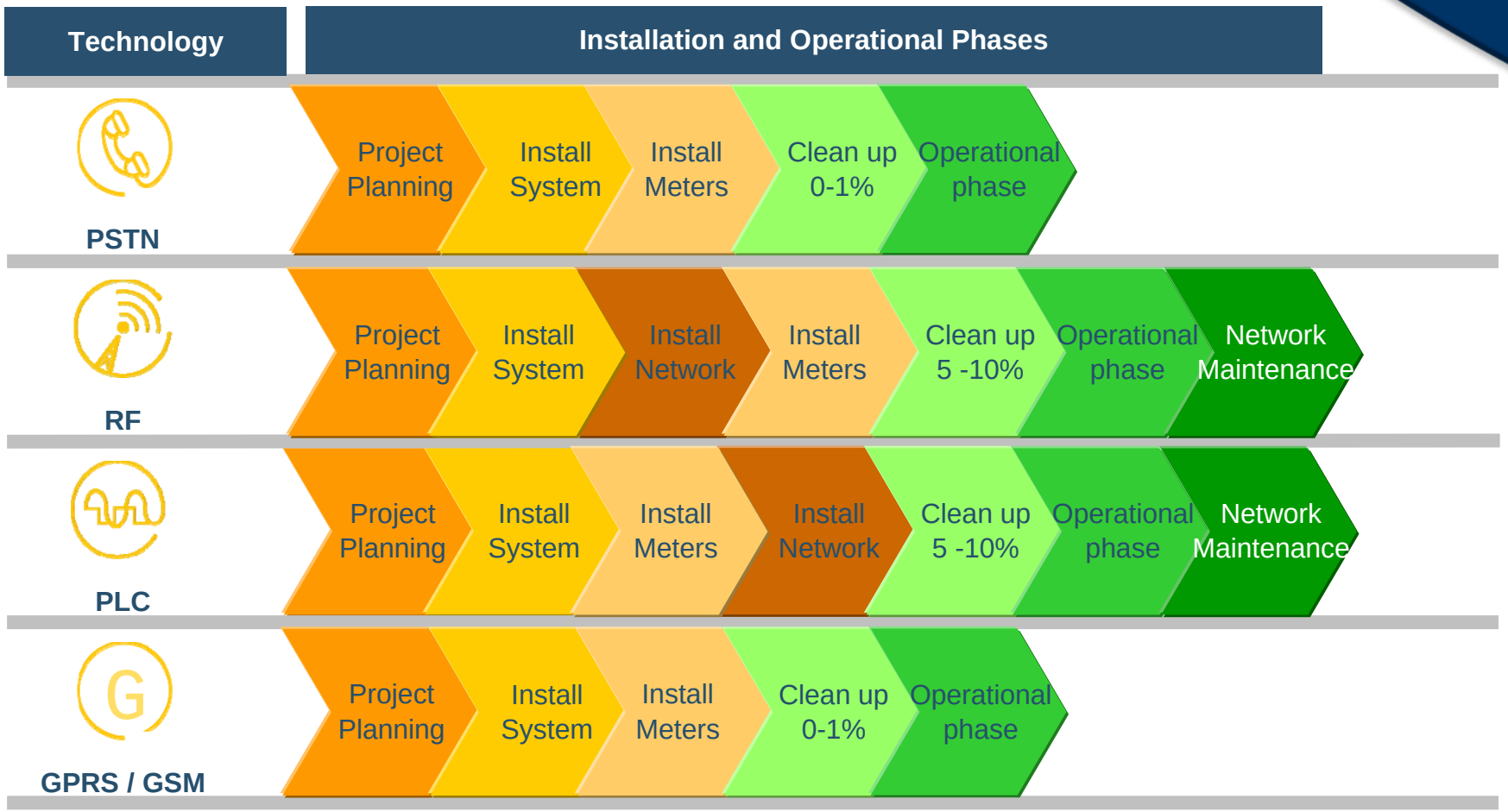
- PLC & RF technology evolution ?
- Future modem prices ?
- Future GPRS operator prices ?
- Future costs of field work ?
- Introduction of new technologies which are commercially & practically competitive ?

Technology comparison

Technology	Application	Advantage	Disadvantage
 PSTN	• High volume data • Commercial / Industrial • Concentrator to system	• Reliability • High network availability	• Communication cost • Modem cost
 RF	• High density Urban • Rural • AMR (Monthly(95%) • Load Management	• Customer can own network • Speed of communication • Low cost communication	• Location of concentrators • Network Maintenance cost • Experience and expertise
 PLC	• High density Urban • AMR (Monthly (95%) + • Load Management • Used in Stable network	• Customer can own network • Attractive meter cost	• Network Maintenance cost • Experience and Expertise • Variable with load level
 GPRS / GSM	• High density Urban • Rural • AMR (Monthly (100%) + • Load Management	• Reliability • Low installation cost • Quick rollout	• Cost of modem

Note – Fibre Optic Cables:
Lack of infrastructure in many cities and expensive to invest. Proprietary Fibre network is not economically viable.

Technology comparison



Key Risk Assessment Of Current Technologies

Key Risks Assessment	PLC Risk	GPRS Risk	RF Risk
Inadequate Technical Coverage / Performance	Medium	Medium	High
Failing Dedicated Infrastructure Hardware Impact	High	None	High
Dependency On "Proprietary" Skills	High	Low	High
Network Infrastructure Maintenance "Peace Of Mind"	High	Low	High
Performance Interference Due To Changing Factors	Medium	Low	Medium
Dependency On Individual Companies (Future Price, Stability, Availability, ...)	High	Low	High

What costs do utilities associate with these risk differentials ??

Technology Life Cycle Cost Comparison (2005, Customer Analysis in Sweden)

A Scenario…….

Summary Annual Cost Per Metering Point	PLC €	GPRS €	RF €
Investment Annual Costs (including meter & installation)	21,7	22,5	27,4
Maintenance Annual Costs	8,4	4,5	11,1
Annual Communication Costs	1,6	3,3	2,7
Total Annual Costs Per Point For Utility	**31,6**	**30,3**	**41,2**

Key Notes:

1) PLC & GPRS costings based on urban area ("best case" for PLC).
2) GPRS costing assumes 4 meters "daisy-chained" in a meter room.
   (note that most urban meter rooms in Sweden have many more than 4 meters)
3) RF costing represents a typical rural town environment ("best case" for RF).
4) GPRS costings based on latest quotes for modems and traffic costs.
5) 10 year life cycle assumed for all calculations.

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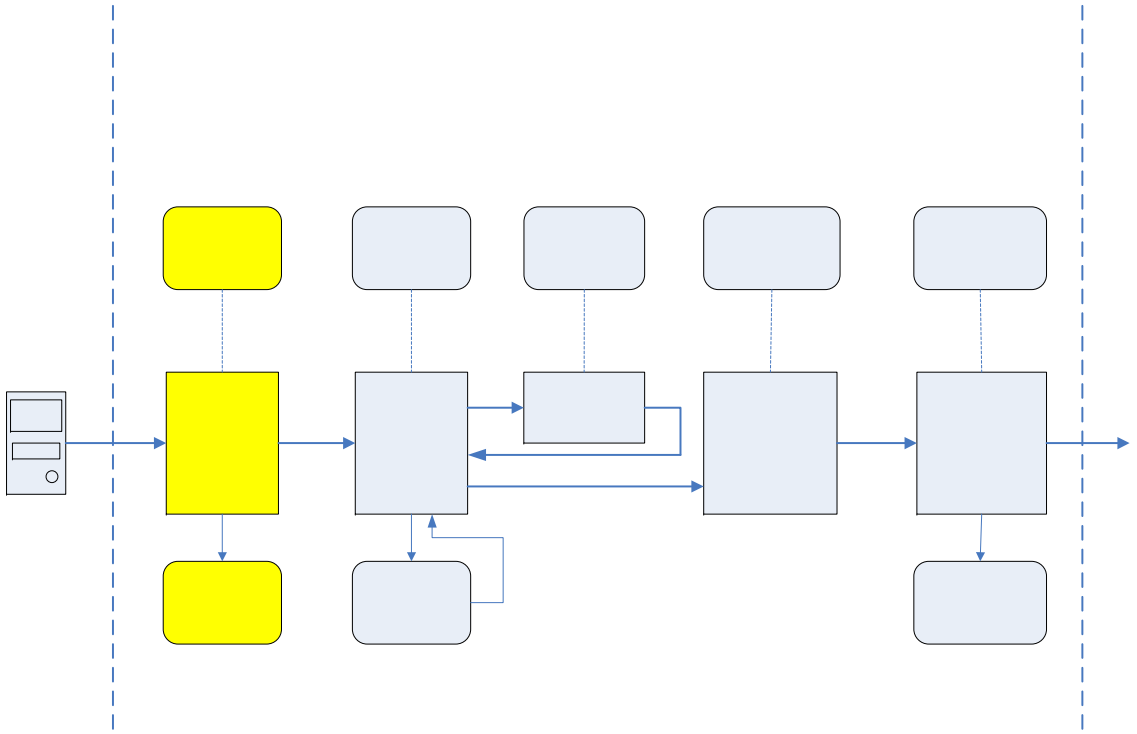
Actaris-Itron Smart Meter Data Management

Products & Services

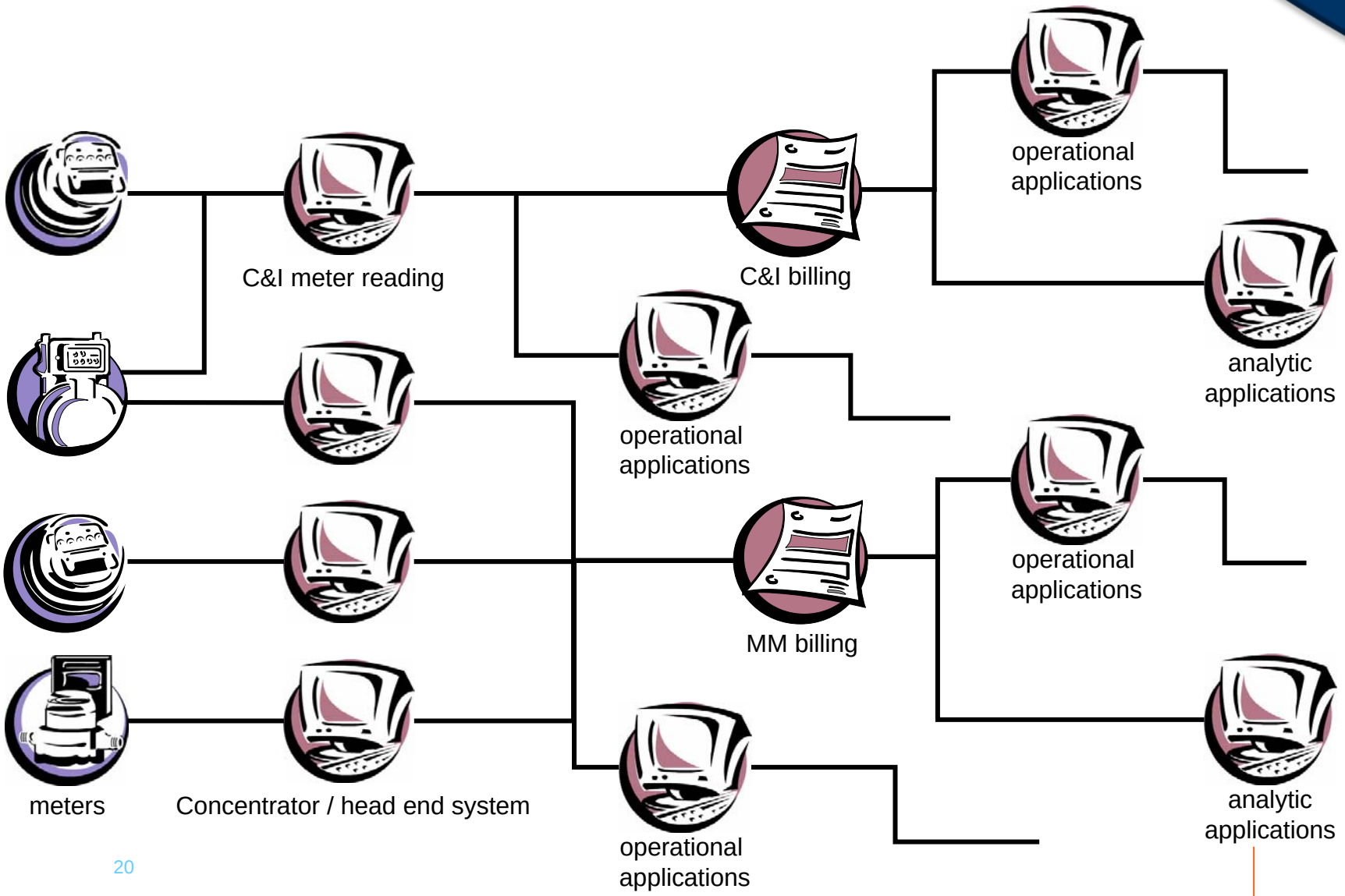
- Meter Technology
- Meter Data Collection Technology
- Field Workforce
- Water Loss Management
- Meter Data Management
- Distribution Asset Management
- Revenue Assurance
- Energy Forecasting
- Enterprise Energy Management
- Load Research
- Customer Care & Billing
- Enterprise Edition Customer Care
- MV-PBS
- MV-WEB
- MV-WEB Services
- Demand Response

- Distribution System Design
- Consulting & Analysis Services
- Implementation Services
- Managed Services
- Support Services
- Product Index

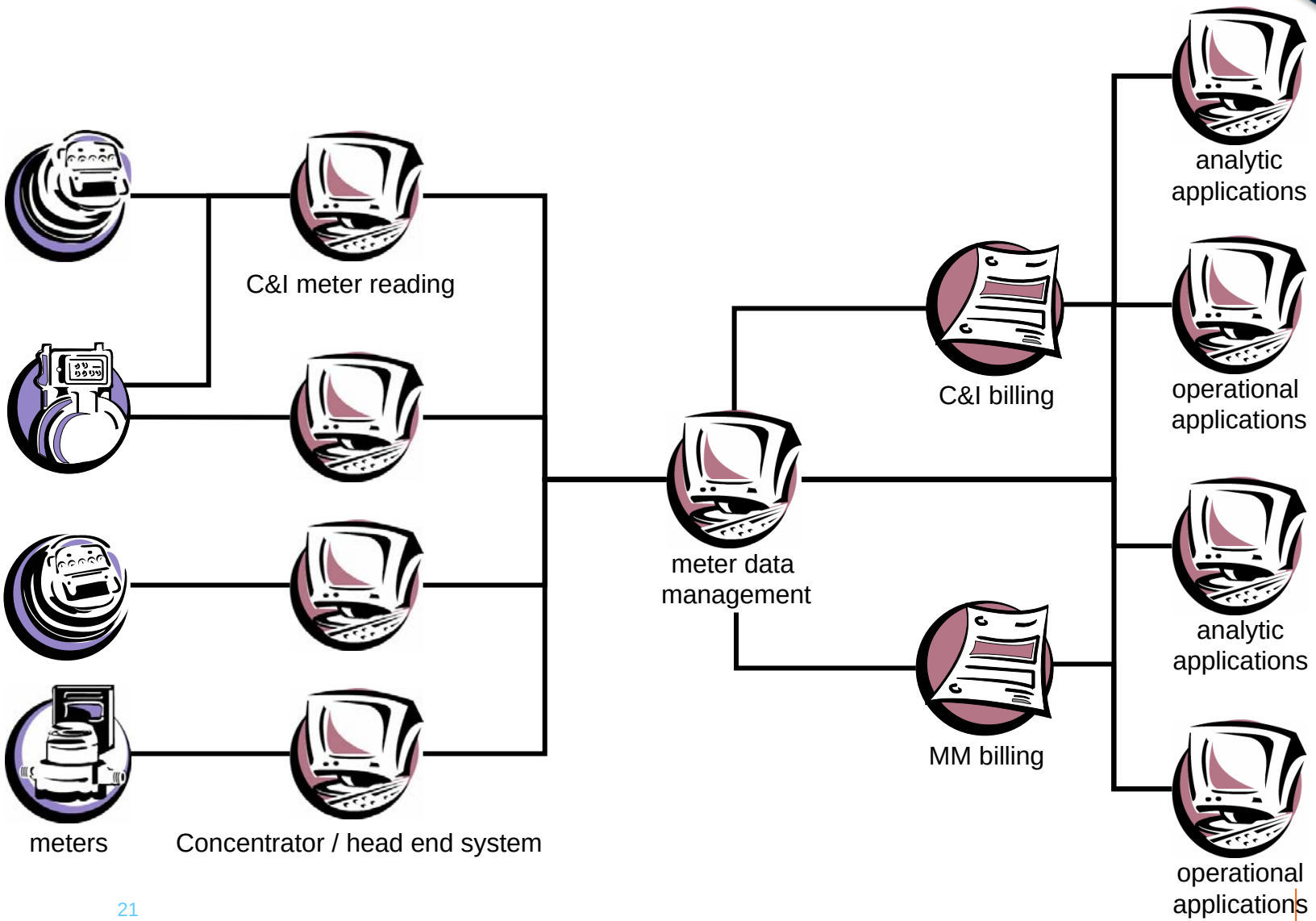
- Meter Data Management
- Hosting Services
- Rate Services Related Solutions
- Increase Revenue Assurance
- Improve Customer Service
- Manage Large Volumes of Meter Data
- Manage Energy Use at Multiple Facilities



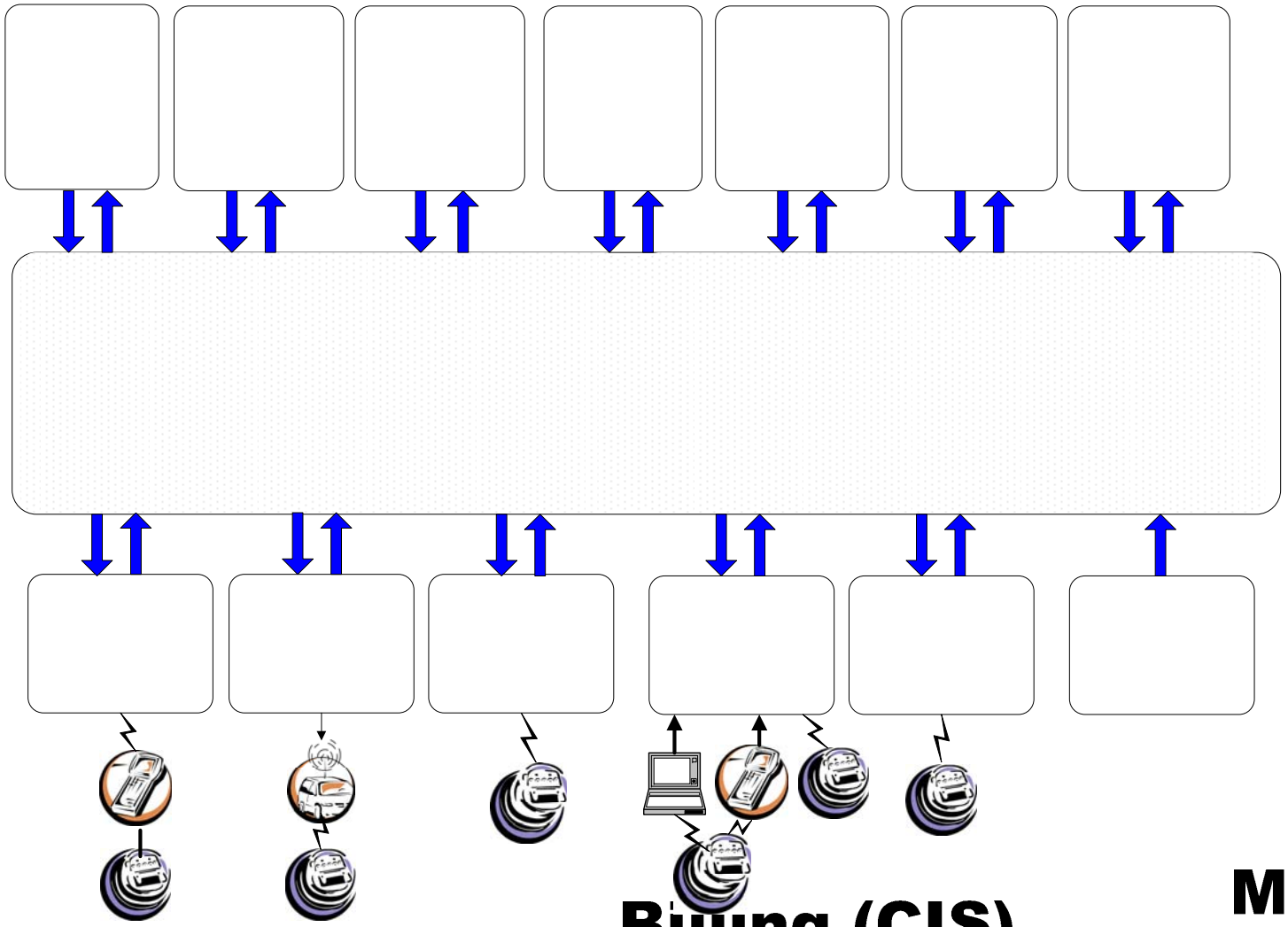
Meter Management – Traditional View



Meter Data Management – Itron IEE View



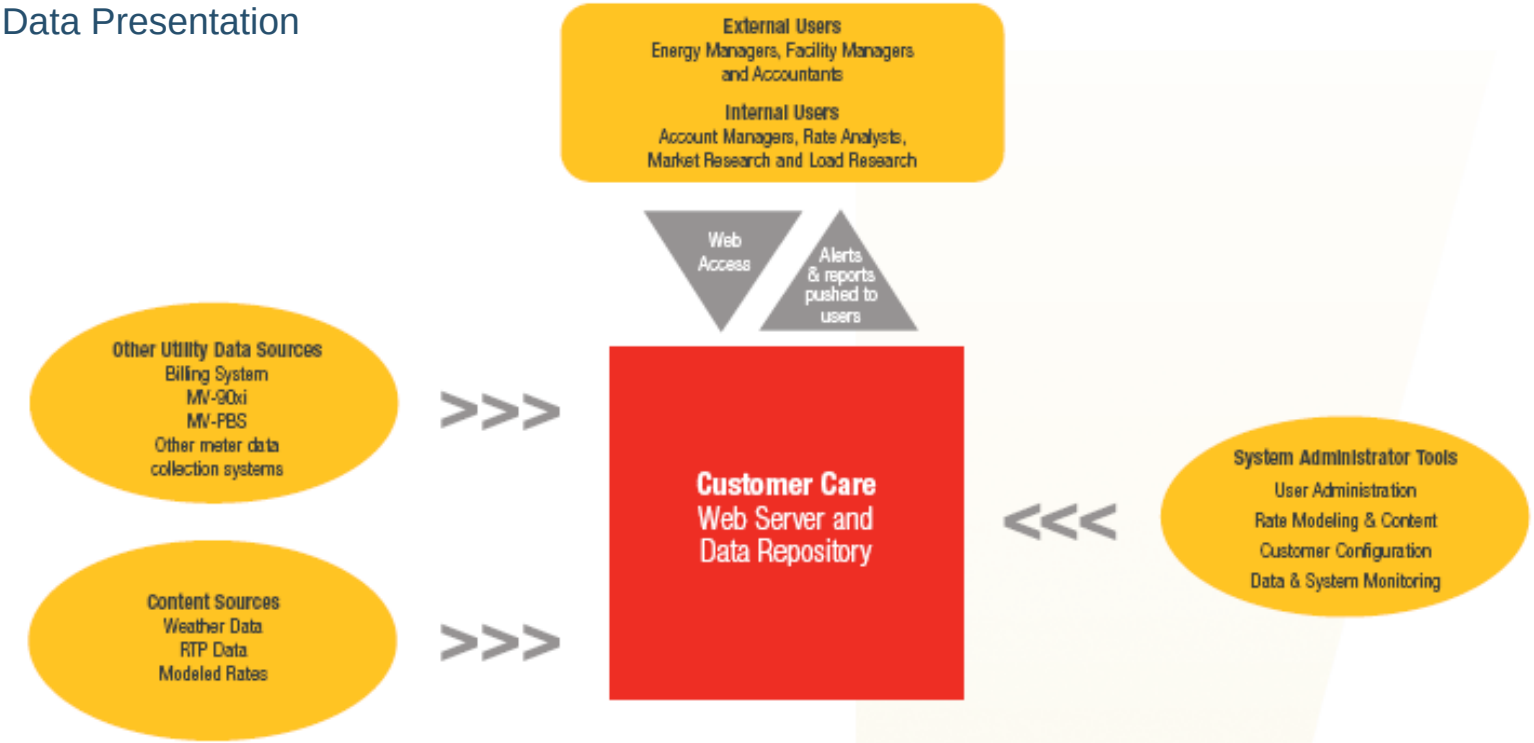
Itron Enterprise Edition: IEE - MDM



IEE – Module: “Customer Care”

Customer Care Combines Energy-, Cost-, and Bill-Analysis in One Integrated Package

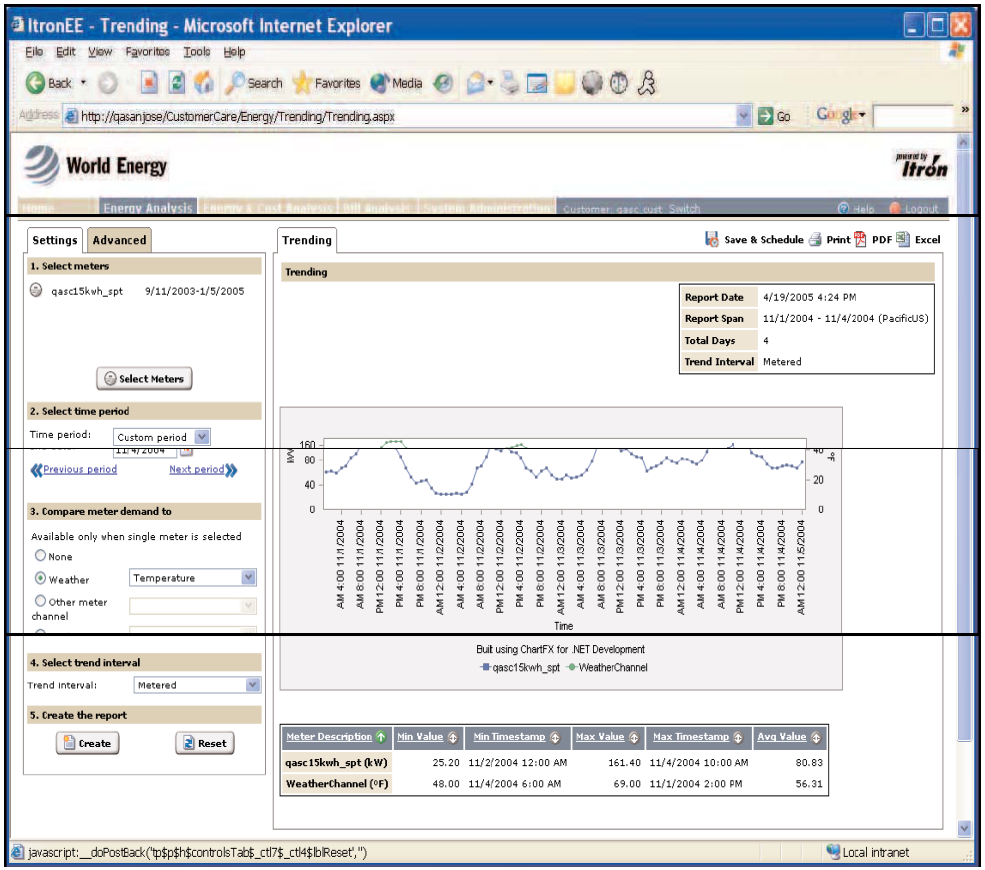
- Leveraging Data from Multiple Sources
- Unified Data Presentation



Empowers Customers to Change Behavior -> Optimise Energy Usage, Save Money:

- How does my new dynamic rate work? How much of my bill is attributed to high price periods?
- What happens to my costs if I adjust usage?

Itron IEE Customer Care Modul



- Custom Web-Interface allows to generate and view Reports, Trend Analyses, Benchmarking, etc.
- Bills can be read, analyzed and compared
- Automatic transmission of Data per email, Alarms can be sent via SMS
- „What-If“ Analyses

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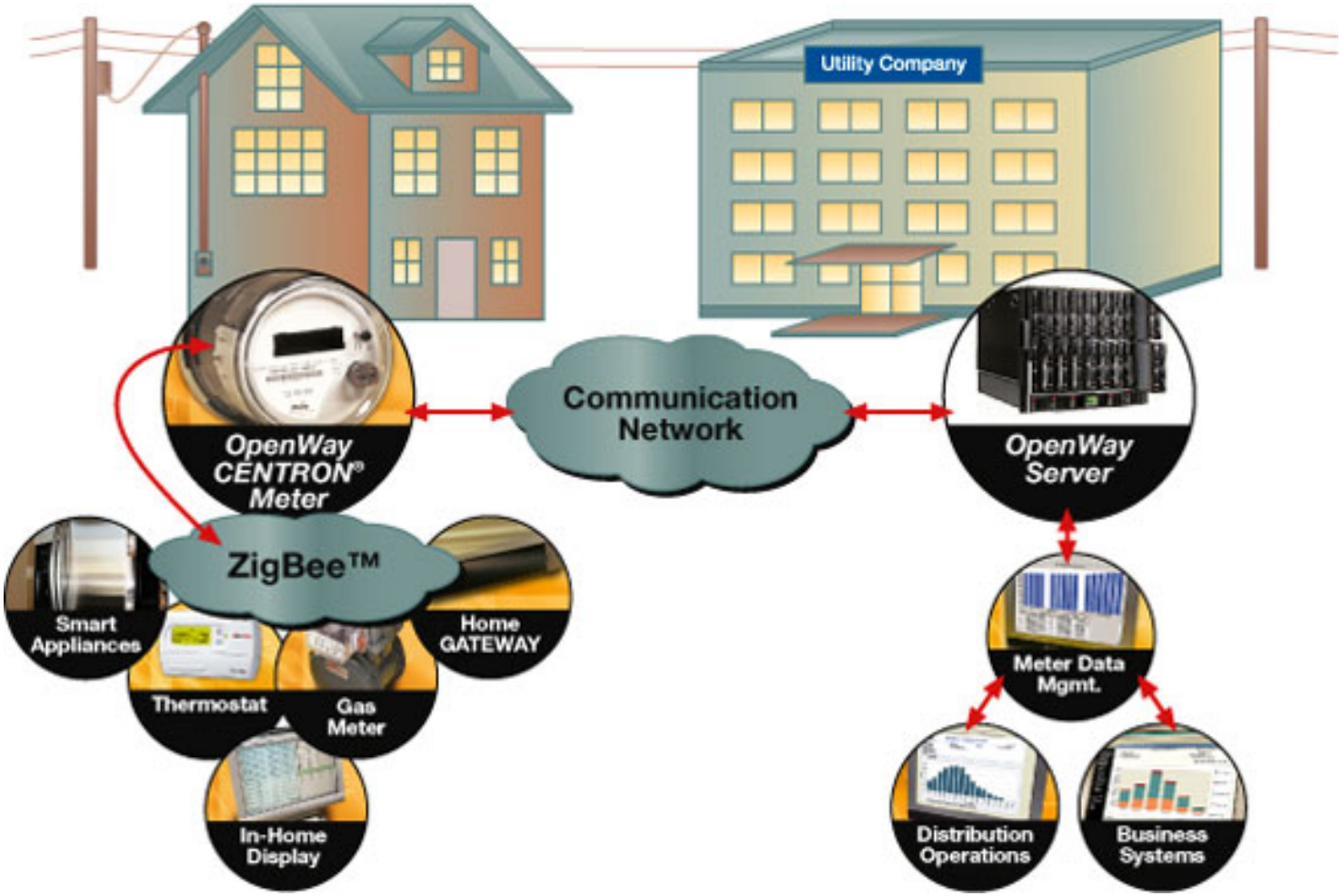
Itron OpenWay Meter & MDM System



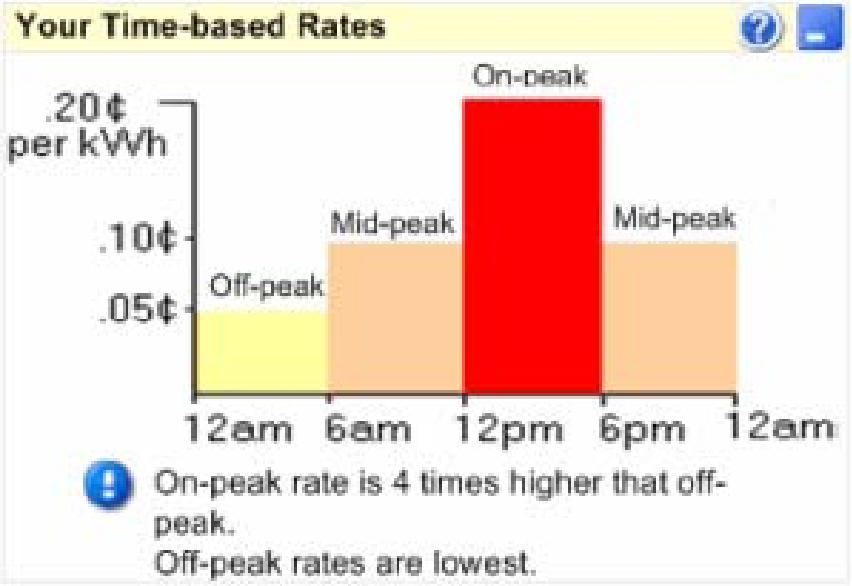
Next-generation Smart Meter Infrastructure:

- advanced, two-way communication technology
- enables utilities to empower ALL their customers to participate in demand response and energy conservation programs,
- supports the ongoing development and deployment of the "smart grid."

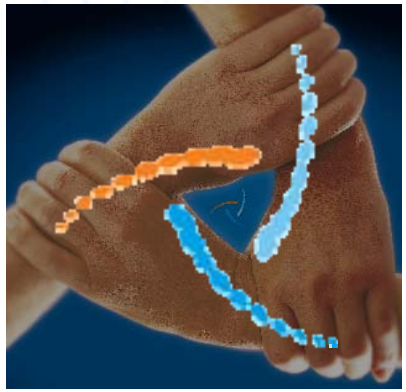
MDM, Open Standards, Bidirectional Communication to each Meter, Integriated Loadcontrol and Demand Management, High Functionality of the Meters

IEE – Customer Care Website-Portlets for Residential and Small Commercial Customers

To increase deployment flexibility, product configurability, and seamless website integration Itron delivers the analytics to the customer as individual web portlets that are embedded in the utility's existing web portal application.



This allows the utility to offer its customers and to seamlessly embed rich analytic functionality within its existing portal.



Thank you for your attention!

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