Energy in your Datacenters and Facilities

Increase Efficiency and Enhance Availability

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Agenda

- Energy Efficient Datacenters
- Infrastructure
- Monitoring
- IT Load
- Summary – Q&A

Energy Efficient Datacenters

Maximize Energy Efficiency

- Monitor and control energy utilization
- Identify and minimize wastage and inefficiencies
- Utilize energy efficiency metrics

Minimize other impacts

- Minimize footprint, reduce space
- Use of alternative energy technologies/sources
- Minimize overall consumption

Increase Energy Efficiency

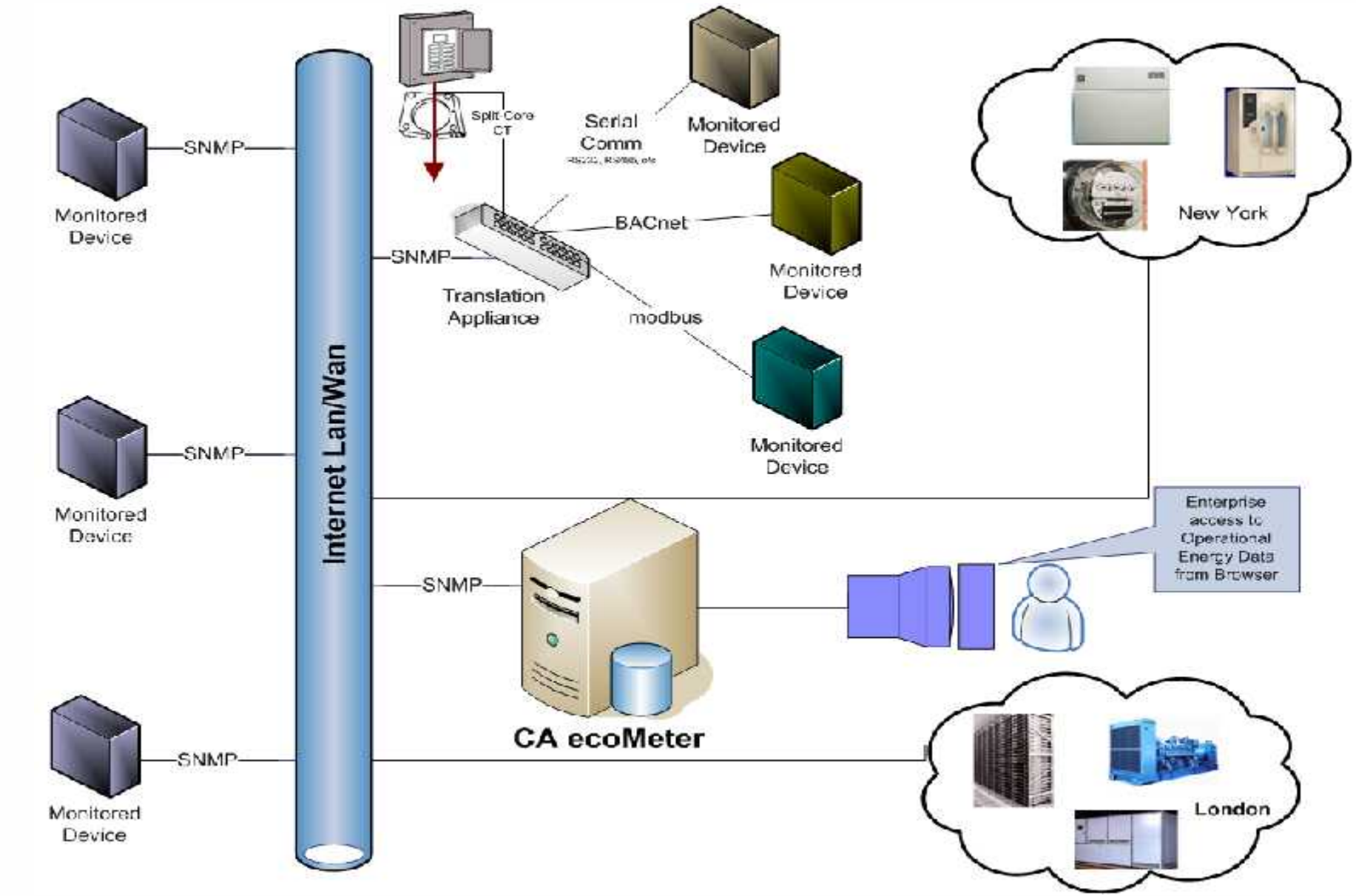
Continuous monitoring of energy utilization

- Sense, Store, Analyze, Report, Alert and Act
- Define and implement thresholds

Efficiency Metrics

- Green Grid
  - PUE (Power Usage Effectiveness)
  - DCiE (Data Center infrastructure Efficiency)
- Uptime Institute
  - SI-EER (Site Infrastructure Energy Efficiency Ratio)
  - IT-PEW (IT Productivity per Embedded Watt)

Infrastructure



Infrastructure – Data points

Cooling

- Temperature
- Humidity
- Air Flow
- Supply/Return
- Pressure
- Chilled Water
- Discharge Temp

Power

- Total power
- Input load
- Output load
- Power factor
- Panel data
- Breaker Current
- kVA, kW, kWh

Backup/Other

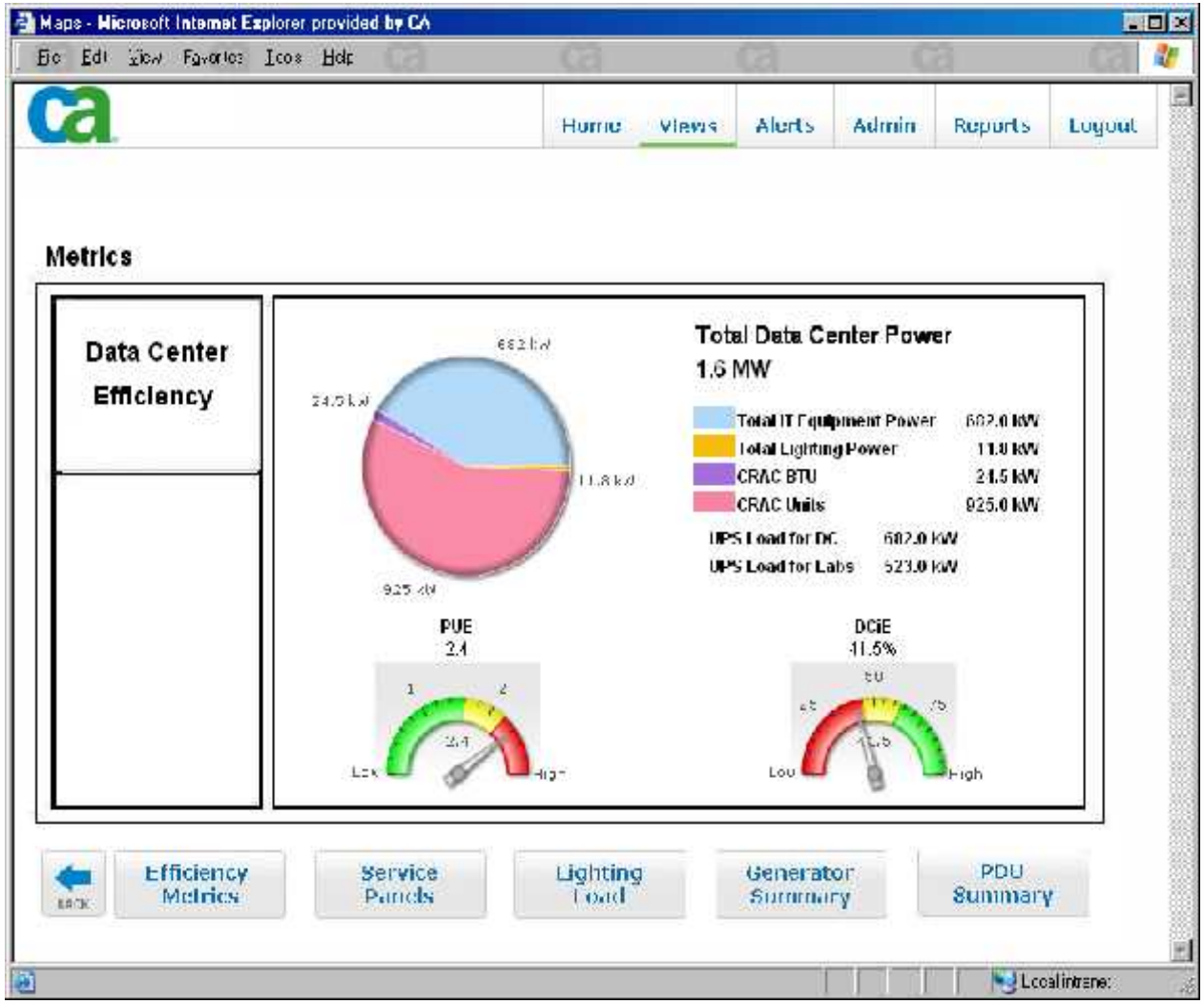
- Generator Fuel
- Generator load
- Battery data
- Natural gas
- Water
- UPS load
- Battery data
- Bypass Module

Monitoring

- Load distribution
- Top offenders
- Total IT Load
- Drill down options
- Critical Alarms

Monitoring

- PUE and DCiE
- Total DC Load
- Total IT Load
- Total Cooling Load
- Energy Distribution



IT Load

Efficient IT

- Virtualization
- Automated provisioning
- Active Power Management – policy based

Reduce server power and heat generated

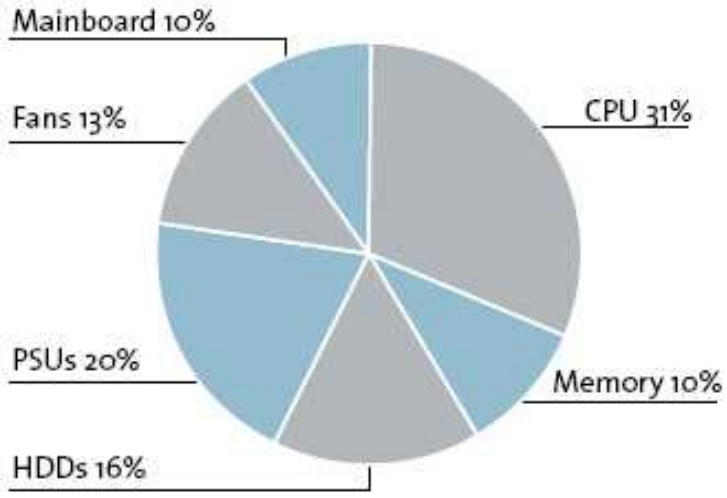
Dynamic frequency scaling
(CPU throttling)

Dynamic power = $C.V^2.f$

C – Capacitance per clock cycle

V - Voltage

f - Switching frequency



Summary

Increase Energy Efficiency by

- Deploying a monitoring system
- Real time monitoring and trending
- Reducing the total facility power
- Automated provisioning/de-provisioning of servers
- Advanced server power management techniques
- Efficient cooling mechanisms
- Inclusion of energy data points in IT processes

Thank you!