Greening an IT Cloud

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Agenda

- Current state/Challenges
- Operational Energy Management
- Solution
- IT load optimization
- VM Mobility
- Cooling optimization
- Automated energy savings
- Summary

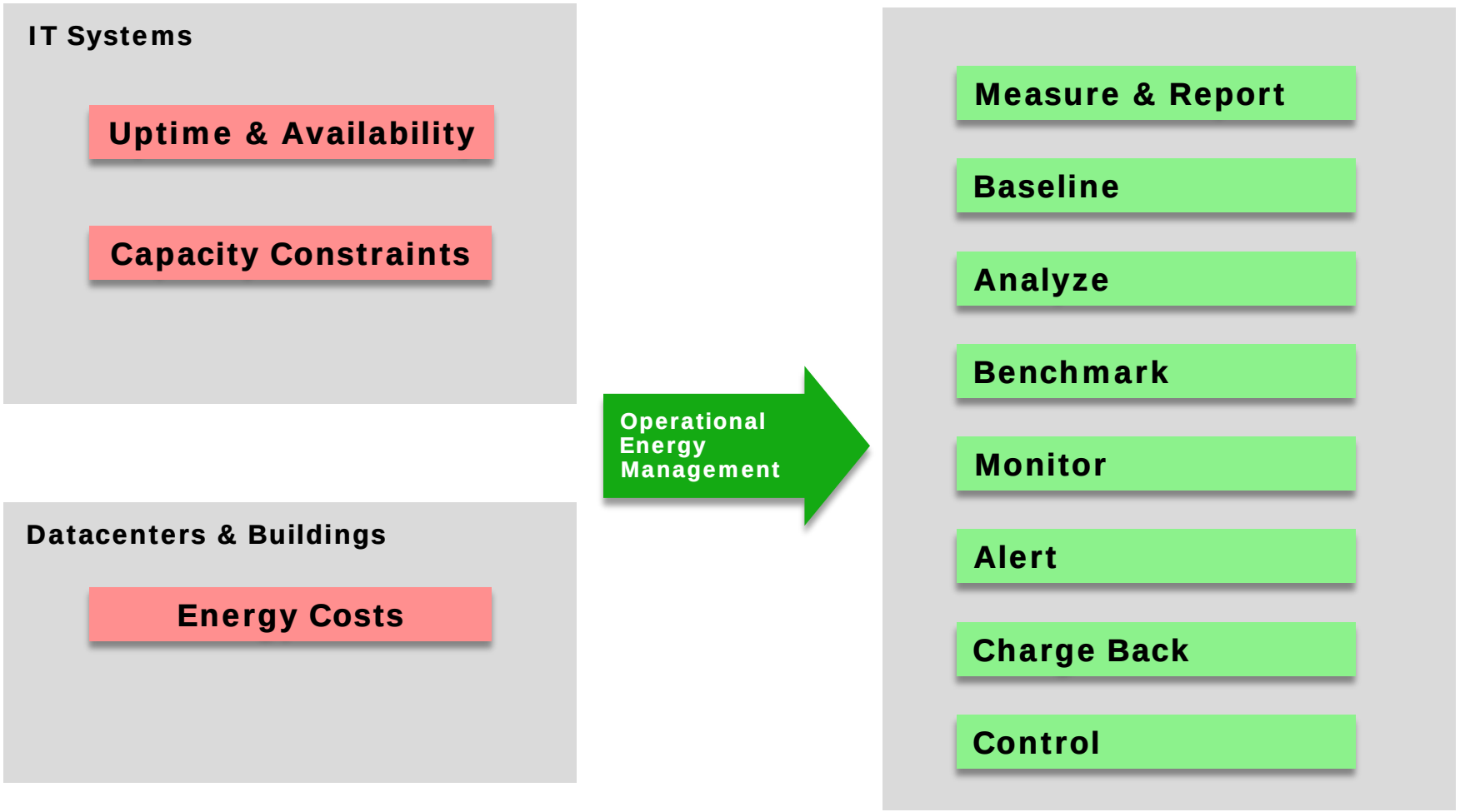
Current State / Challenges

Gathering consistent and timely data that allows both Facilities and IT to make judgments and decisions

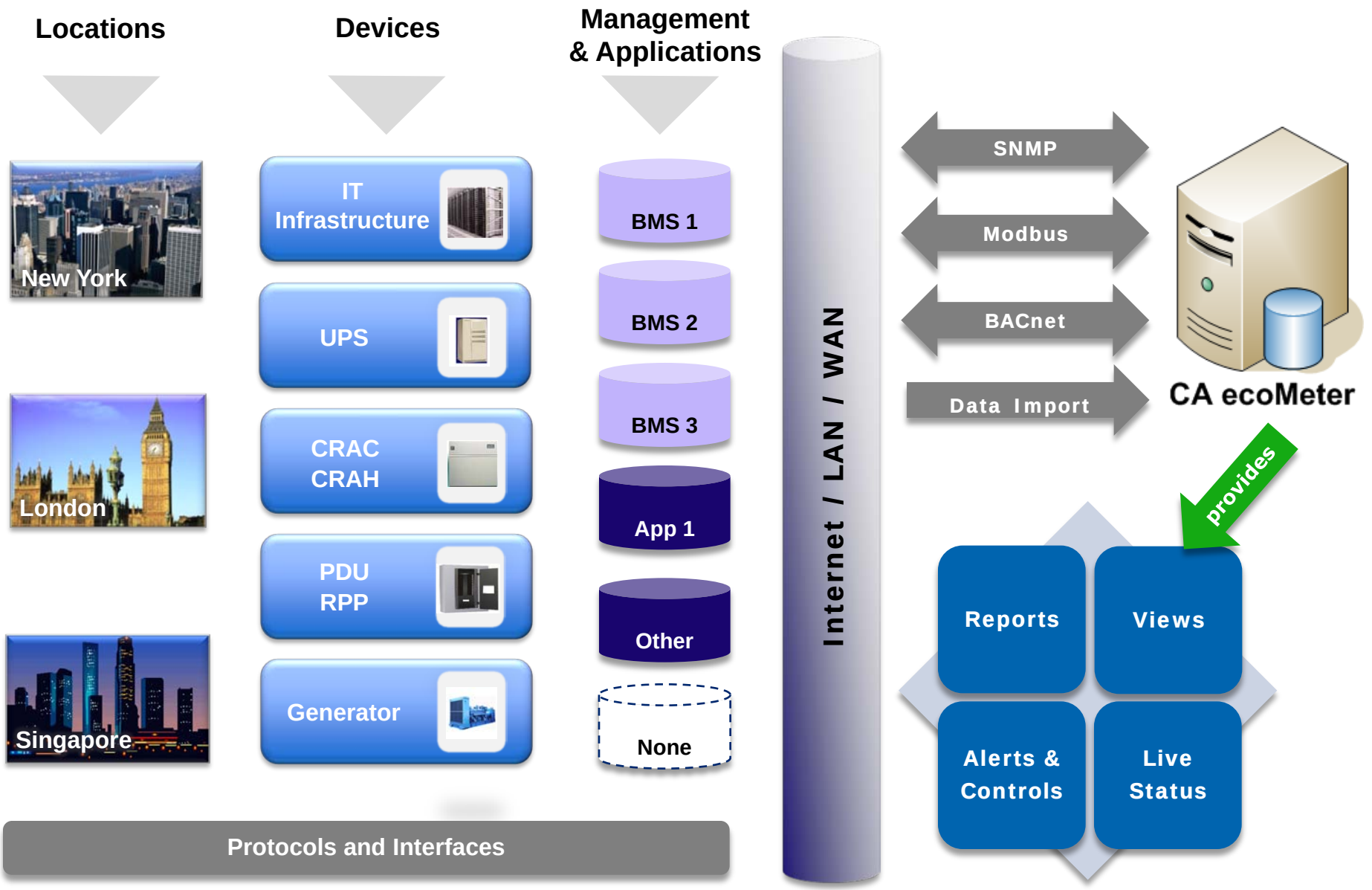
Why?

- ❑Multiple BMS [Building Management Systems]
- ❑Multiple Internal and external IT tools and databases
- ❑Multiple data management systems
- ❑No correlation of data from different tools
- ❑No consistent work methodology or site processes

Operational Energy Management - The Challenges



Solution



IT Load optimization

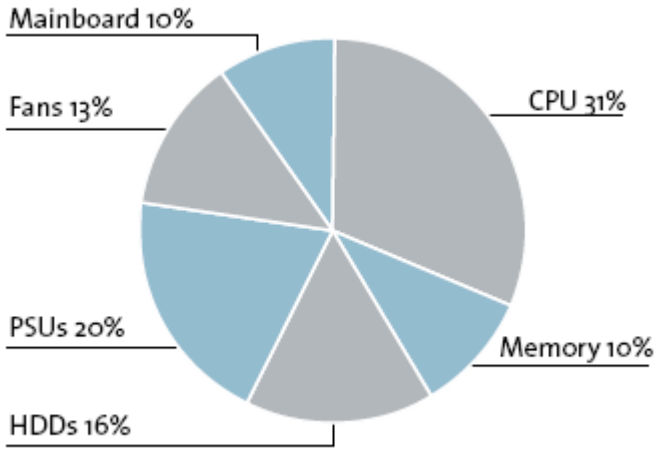
Efficient IT

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

Reduce server power and heat generated

Dynamic frequency scaling
(CPU throttling)

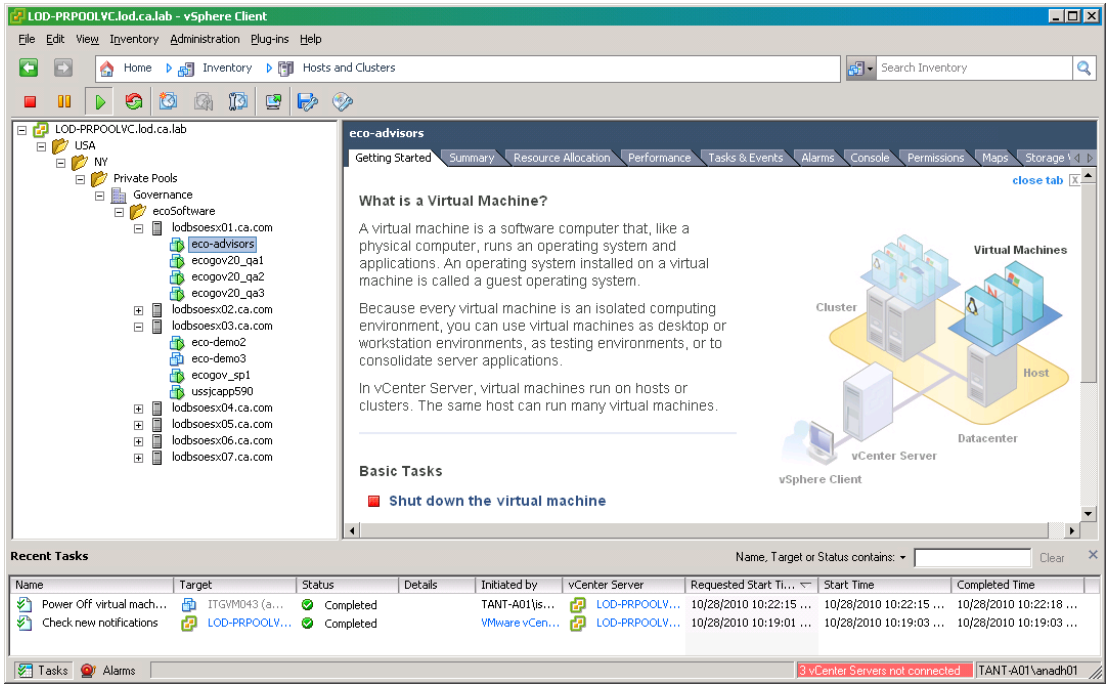
Dynamic power = $C.V^2.f$
C – Capacitance per clock cycle
V - Voltage
f - Switching frequency



VM Mobility

VMs can be moved between racks or locations

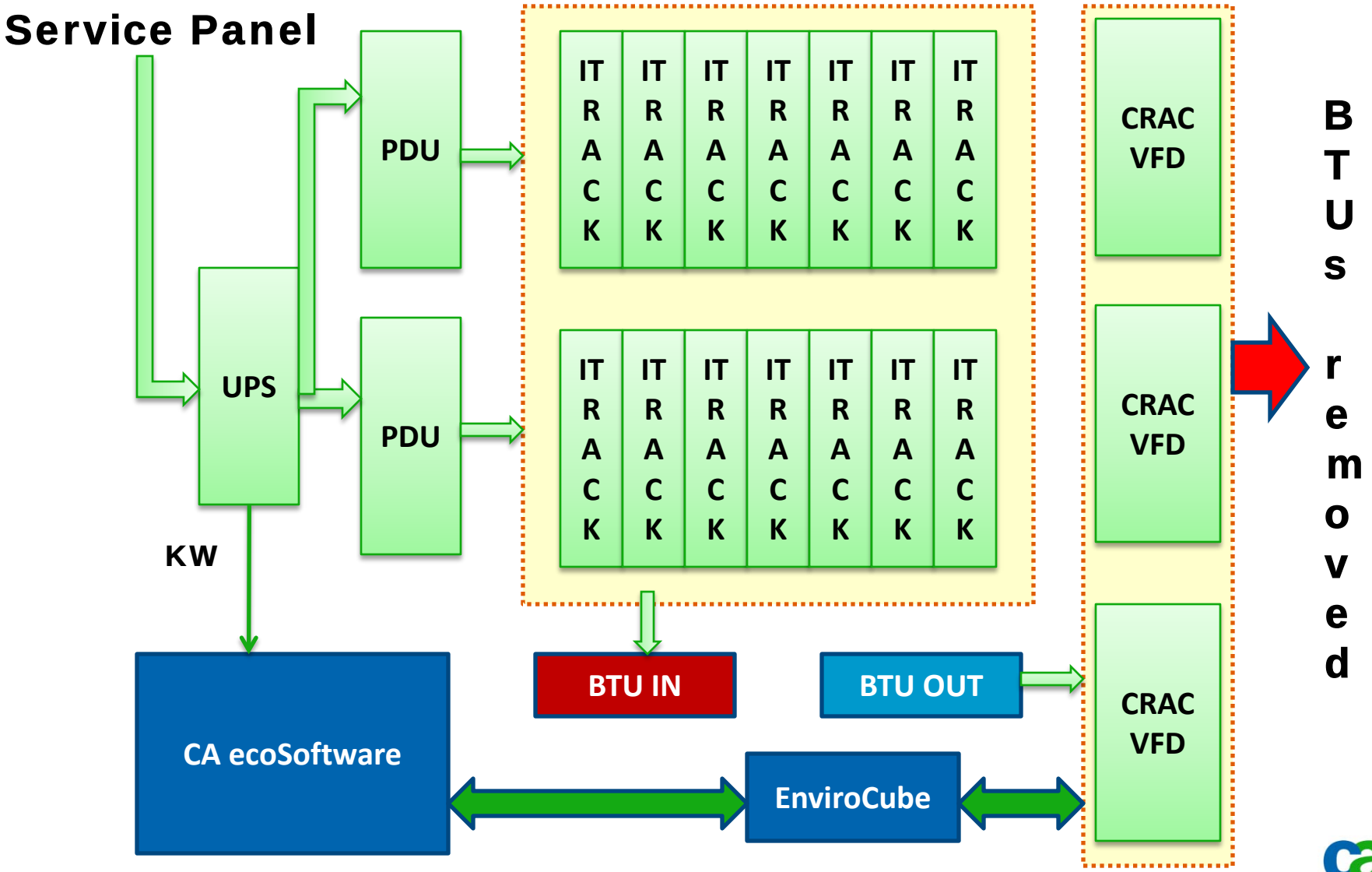
- Power capping racks
- Active Power Management – policy based
- Utilize alert engines and VM tools



Automate Energy Saving – Cooling

- Collect/calculate the following
  - Total KW for IT Load
  - BTU's of heat generated by IT Load
    - BTUs generated depends on KW consumed (X 3412) and loss factor
  - BTU's removed by each CRAC Unit
    - BTUs removed depends on Delta T, Air speed and Grill area
  - Golden Ratio of BTU IN to BTU OUT
- Generate and act on exceptions
  - Exception Rules are created for golden ratio thresholds
  - SNMP/Modbus SET commands are sent
  - Devices change the speed of VFD based on the SET value

Control/Automation



Summary

Cloud energy efficiency can be increased by

- Deploying a monitoring and control system
- Real time monitoring and trending
- Optimization of IT load saves up to 20% on
- Automated provisioning/de-provisioning of servers
- Advanced server power management techniques
- Efficient cooling mechanisms
- Automation of cooling in relation to IT power saves up to 30%
- Inclusion of energy data points in IT processes

Optimization of energy utilization within an IT Cloud enables "Greening an IT Cloud"

Thank you!