SUNPOWER™

Real-time Monitoring a Large Fleet of Solar PV Powerplants

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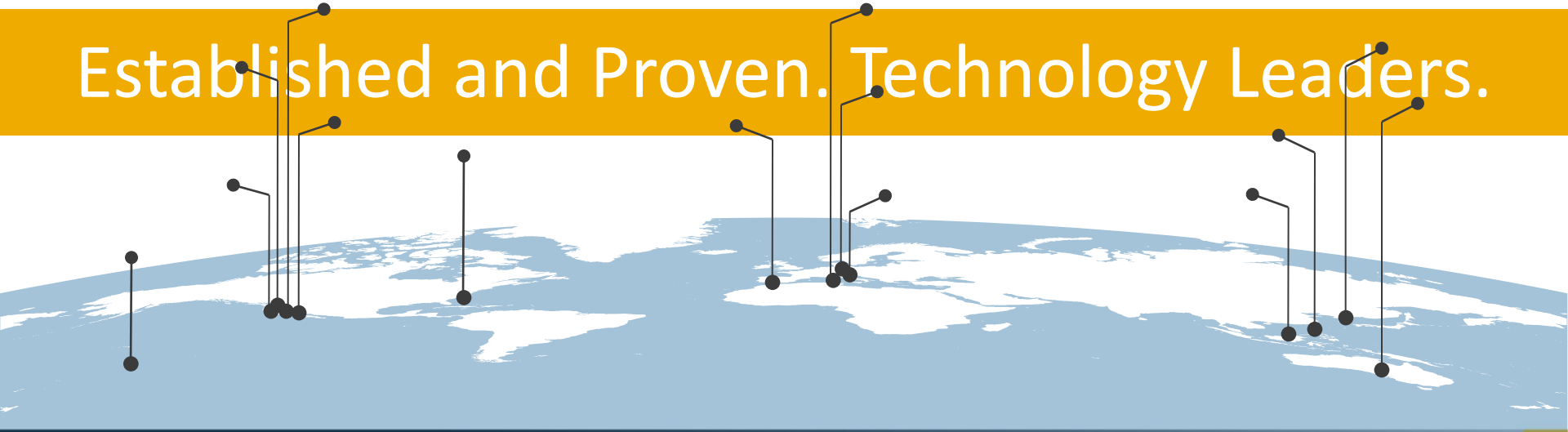
Agenda

- SunPower Overview
- SunPower O&M Overview
- Why Real-time Monitoring
- Why PI
- How we are Using PI
- Technical Roadmap
- Q&A

SunPower

- Worldwide footprint
- 5,100 Employees: All we do is solar
- Over a quarter century of experience
- Over 550 systems on 4 continents
- Over 500 MW installed
- Largest solar projects in North America
- World record solar cell efficiency = MORE POWER
- Over 85 patents and over 20 years of R&D
- Publicly traded (NASDAQ) and partnerships with top-tier financiers
- Energy efficiency expertise

Established and Proven. Technology Leaders.



SunPower can build
1 MW per day, from
factory to field

SunPower O&M Overview

SunPower O&M Overview

- > 500 MW monitored
- > 550 systems monitored
- > 95 power plants >1MW
- > 10 years of O&M experience
- Guaranteed performance

- 24/7/365 real-time plant monitoring
- Customer visibility of system performance via web portal
- Regional service centers

SunPower Utility Power Plant O&M Experience

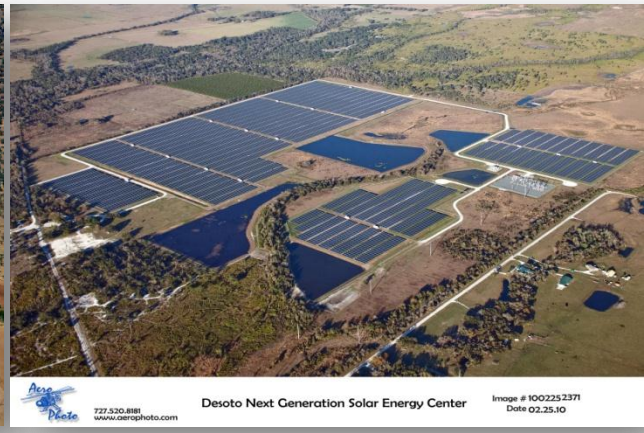
Nellis AFB, Las Vegas, NV
14 MW SunPower T0/T20 Tracker

Bavaria Solar I&II, Germany,
10 MW SunPower T0 Tracker

Tinajeros, Spain
12 MW SunPower T0 Tracker

Olivenza, Spain
18 MW SunPower T0/T20 Tracker

Serpa, Portugal
11 MW SunPower T0 Tracker

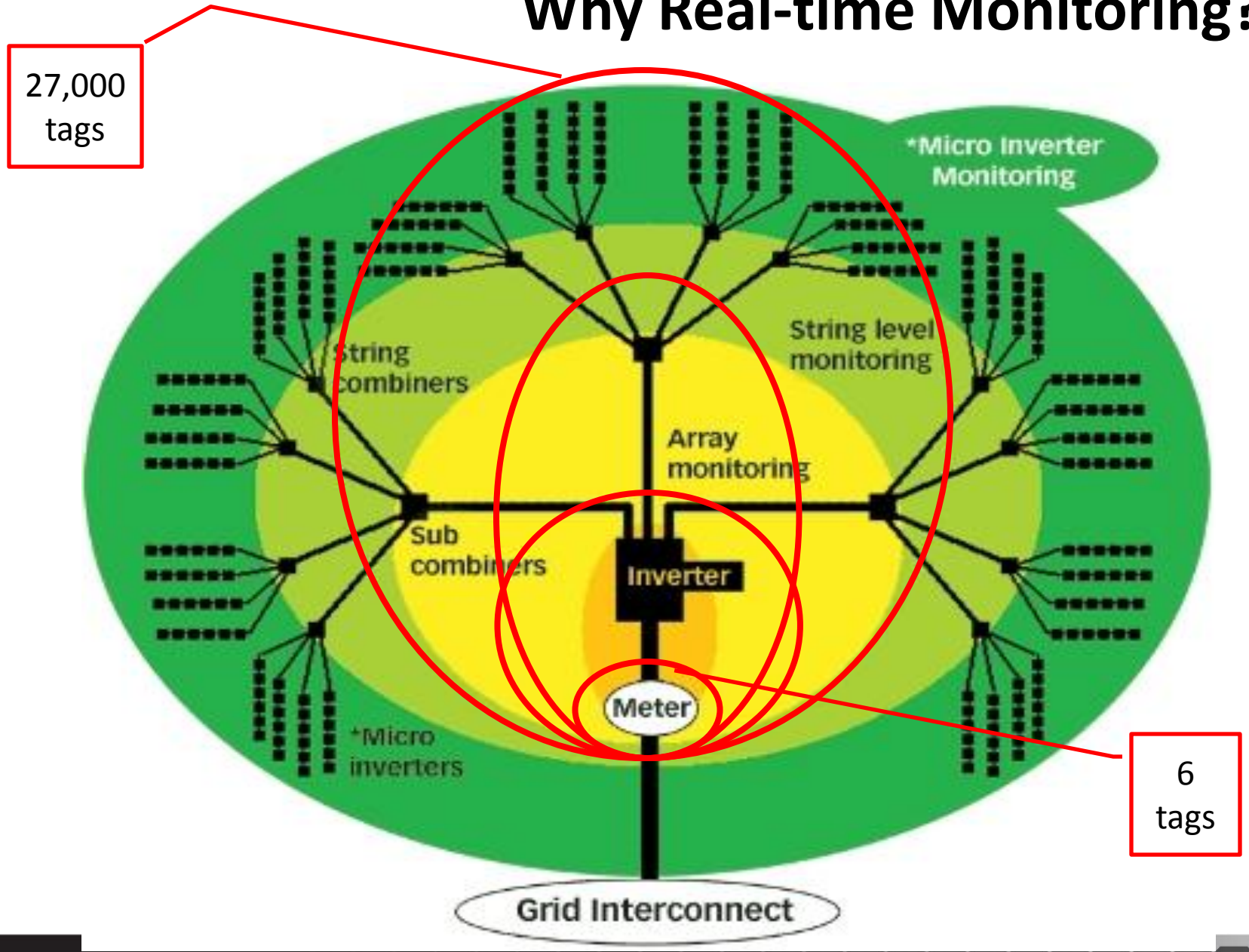


FPL Desoto, Florida,
25 MW SunPower T0 Tracker

Why Real-time Monitoring?

- Solar PV Power – same & different
  - Traditional Power: large fuel / small labor
  - Solar Power: small fuel / large labor
  - Traditional Power: high complexity / few generators
  - Solar Power: low complexity / many generators
- Point?
  - To compete, we need to effectively manage and optimize the large labor/many generators cost structure

Why Real-time Monitoring?



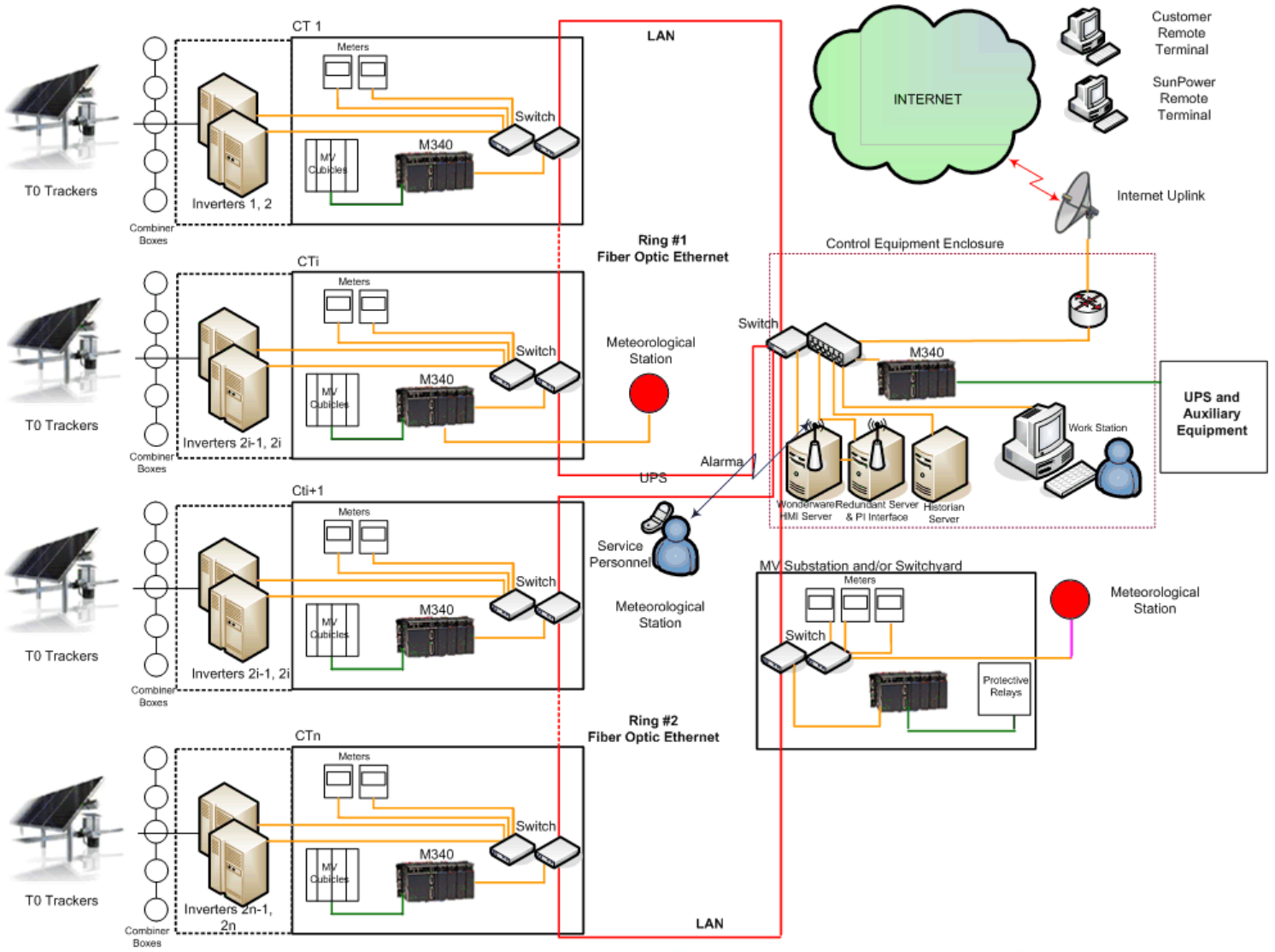
Why Real-time Monitoring?

- Key to our Strategy of…
  - Driving labor costs down
  - Managing performance of our many generators

Why PI?

- Proven
- Robust
- Scalable
- Event Detection & Notification (AF technology)

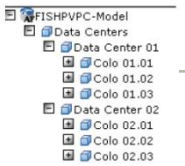
How we are Using PI



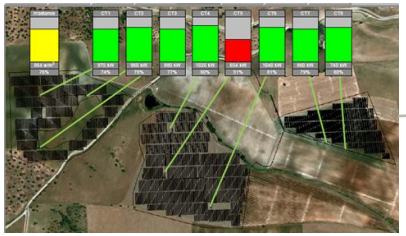
How we are Using PI

- SunPower O&M Monitoring
  - Solar Alarm Management System (SAMS)
  - Performance engineer deep-dive
- Customer Visibility
  - Web portal
  - Direct PI-to-PI API

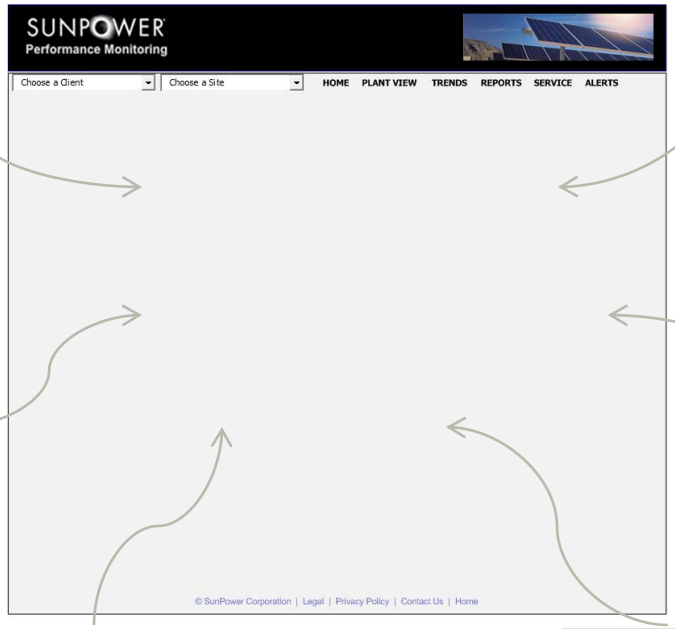
PI content conversion for SharePoint

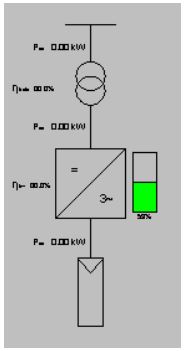


PI tree view web part



Integrated maps

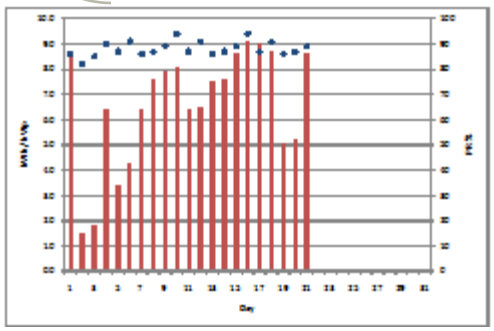




PI graphic web part

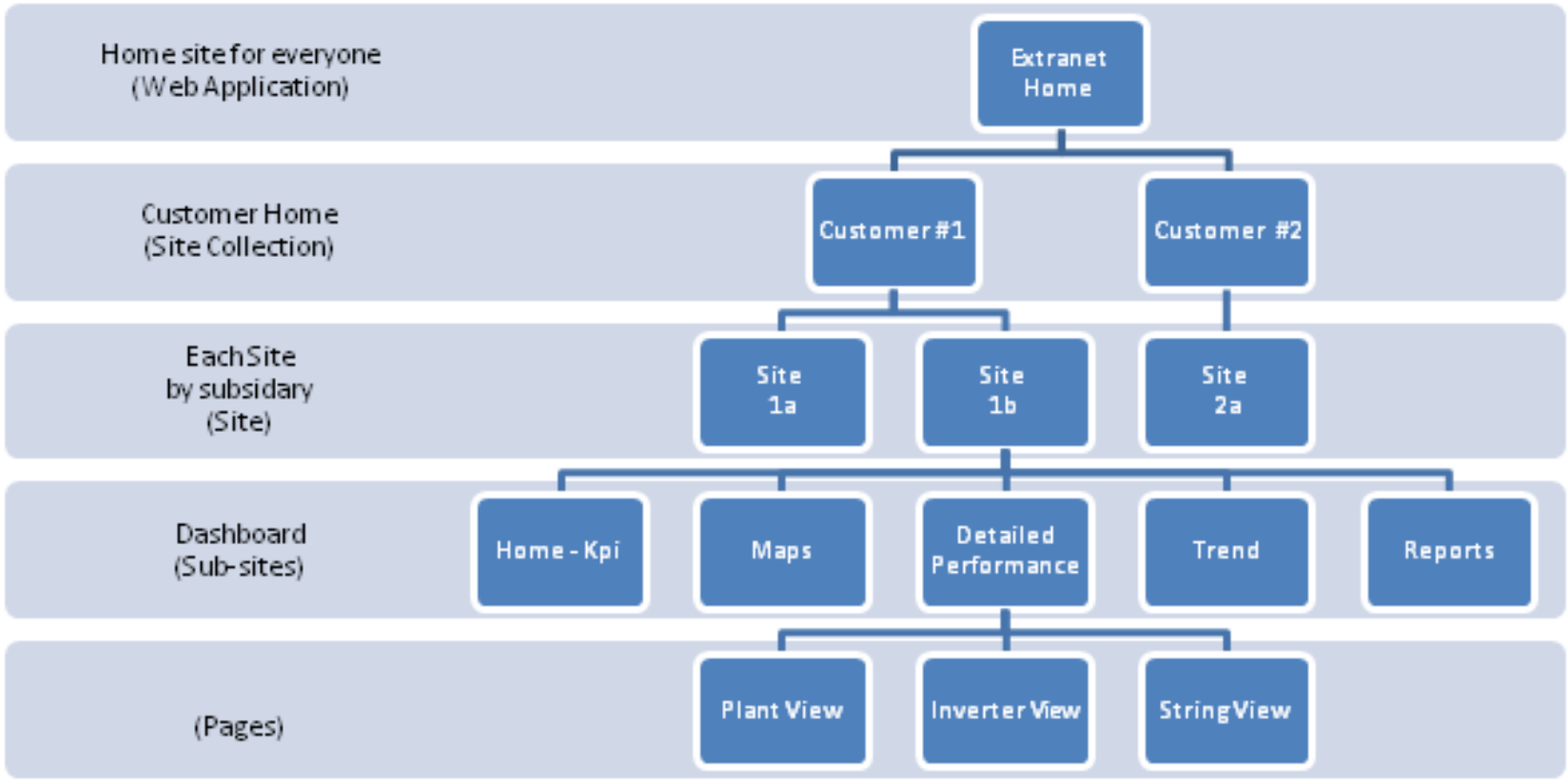
PI data link for excel services

SharePoint KPI web part



Excel services web part (PI OLE-DB)

SharePoint site Collection Hierarchy



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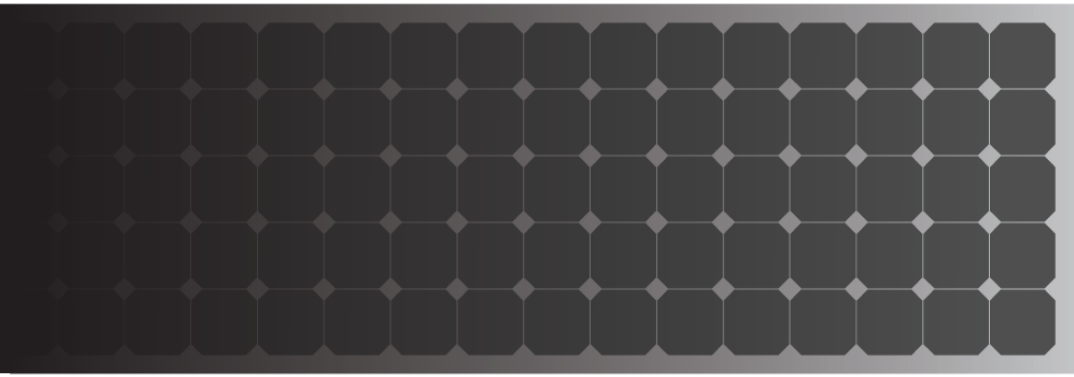
QUESTIONS?

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