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# Harnessing Sustainability with Open Source BI

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VP Engineering
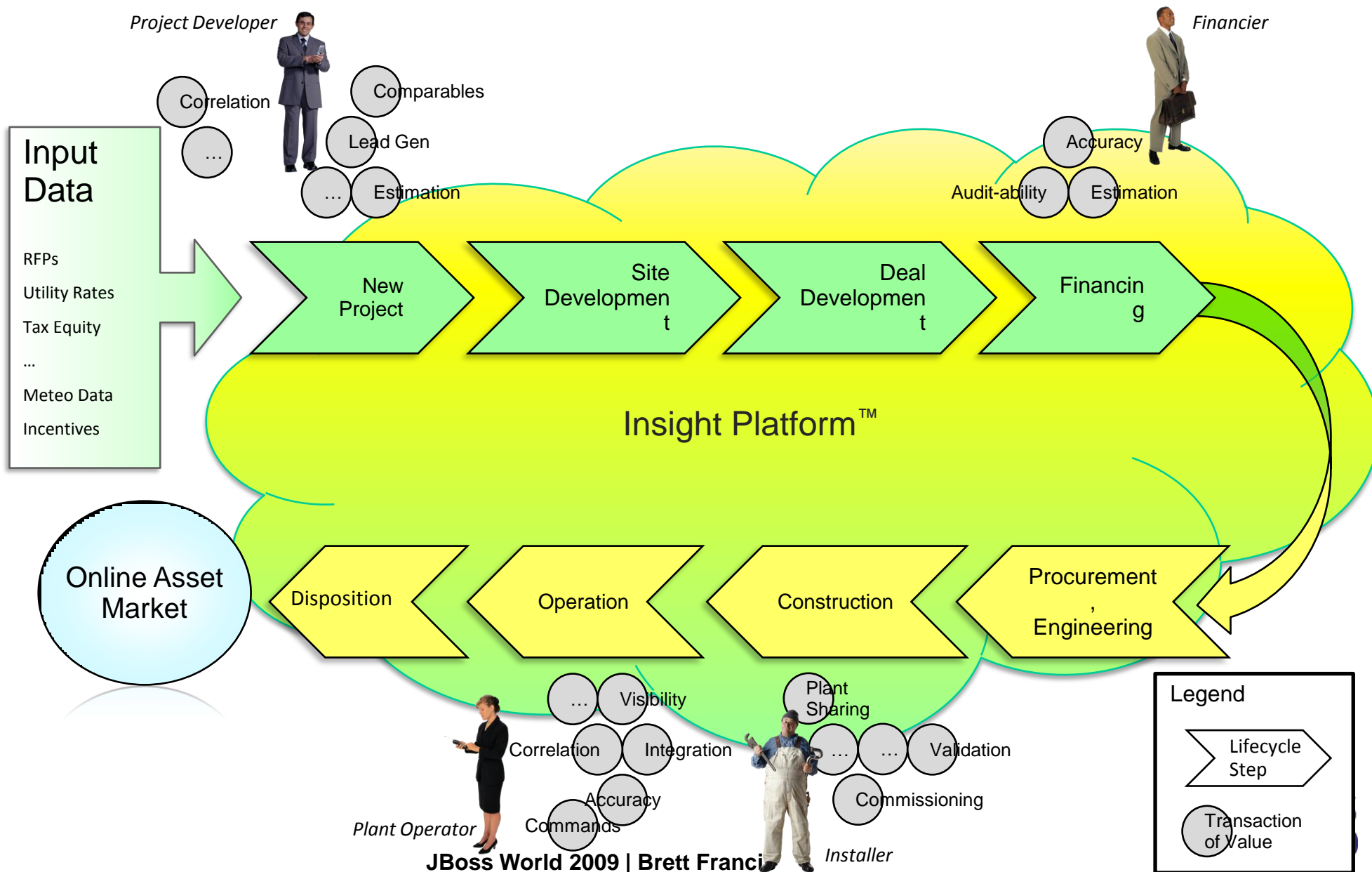Fat Spaniel Technologies, Inc.

# Fat Spaniel Overview



- **Plant Lifecycle Management Market Leader**
  - Global operations
  - 2,500+ PV plants under management
  - World-class Software-as-a-Service suite
  - Broad interoperability
    - Devices
      - Inverters
      - Meters
      - Sensors
    - Regulatory agencies
    - Applications
      - Solar Electric Generation
      - Solar Hot Water Generation
      - Wind Generation
      - Demand Monitoring

# What do Fat Spaniel's product do?

- Deliver value to a plant lifecycle network

- Enable different site-related actors to execute tasks within and across lifecycle steps


- What the heck is a plant lifecycle network?

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# Insight Platform: Supporting a Plant Lifecycle Network



*Project Developer*

*Financier*

Correlation

Comparables

Lead Gen

...

...

Estimation

Accuracy

Audit-ability

Estimation

## Input Data

RFPs

Utility Rates

Tax Equity

...

Meteo Data

Incentives

New Project

Site Development

Deal Development

Financing

### Insight Platform™

Online Asset Market

Disposition

Operation

Construction

Procurement, Engineering

...

Visibility

Plant Sharing

Correlation

Integration

...

...

Validation

Accuracy

Commissioning

Commands

*Plant Operator*

*Installer*

### Legend

Lifecycle Step

Transaction of Value

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# What is an Energy Intelligence Platform?

- The need for distributed energy generation creates an information, integration, and controls challenge.
- Different audiences need access to information when the source of that information is from heterogeneous devices across a highly distributed set of locations.
- An Energy Intelligence Platform addresses these challenges by possessing key characteristics:
    - device agnostic
    - energy application agnostic
    - distributed asset management
    - cross-domain benefits - audiences spanning energy generation and market concerns
    - conforms with information technology concerns

# Energy Information: What and Why

- High-volume time-series data coming from a distributed, heterogeneous set of measurement devices

- Processing of energy data needs to meet the information needs of different parties across a plant's lifecycle

  - Different renewable energy generation types also have different lifecycle needs

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# Insight Platform: Energy Intelligence Platform

- Insight Platform's existing operations already possess the key characteristics of an energy intelligence platform
    - device agnostic
    - energy application agnostic
    - distributed asset management
    - cross-domain benefits - audiences spanning energy generation and market concerns
    - conforms with information technology concerns
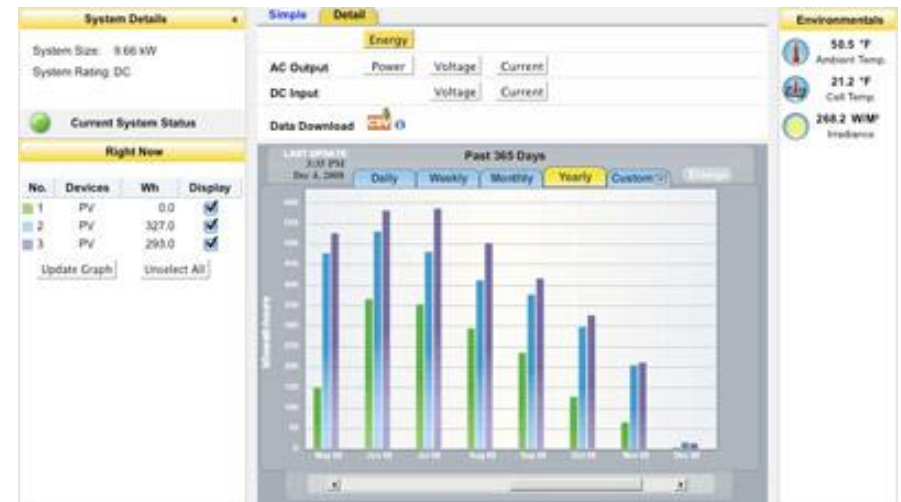
# Insight Platform Operations

- login
  - provide valid credentials and acquire access
- getAssetInfo
  - Discovery-oriented queries of plant assets and their properties
- getMonitoredInfo
  - Obtain processed, granular energy information for a plant asset or assets over a period of time
- getEventInfo
  - Determine the status of an individual asset and an asset's descendants
- addMonitoredData
  - With this operation add heterogeneous data for processing. The more, the finer… the better

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# Insight Platform: Example Uses

- Chart Photovoltaic Power
  - Use getMonitoredInfo to get the average monthly PV Power generated at a site, for the last six months
- Show a distributed generation plant portfolio on a map
  - Use getAssetInfo to get the list of plant sites within the portfolio
    - with latitude and longitude coordinates in result
  - Add each plant's site to a map based upon coordinates
- Find the status of your plant sites north of South Lake Tahoe
  - Use getAssetInfo to get a list of sites with `location.latitude > 39`
  - Send list of sites to getEventInfo to obtain theirasset status
- Compare expected energy generation performance to actual
  - Use getMonitoredInfo to get the expected PV energy and the actual PV energy for a plant site or many plants distributed across a portfolio
  - Compare expected vs. actual PV energy at different granularities

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# Our Challenge: Deliver Seamless BI

- SaaS product delivery model

- Product solution highly-stylized and effectively one-third reporting

- Competitive pressures

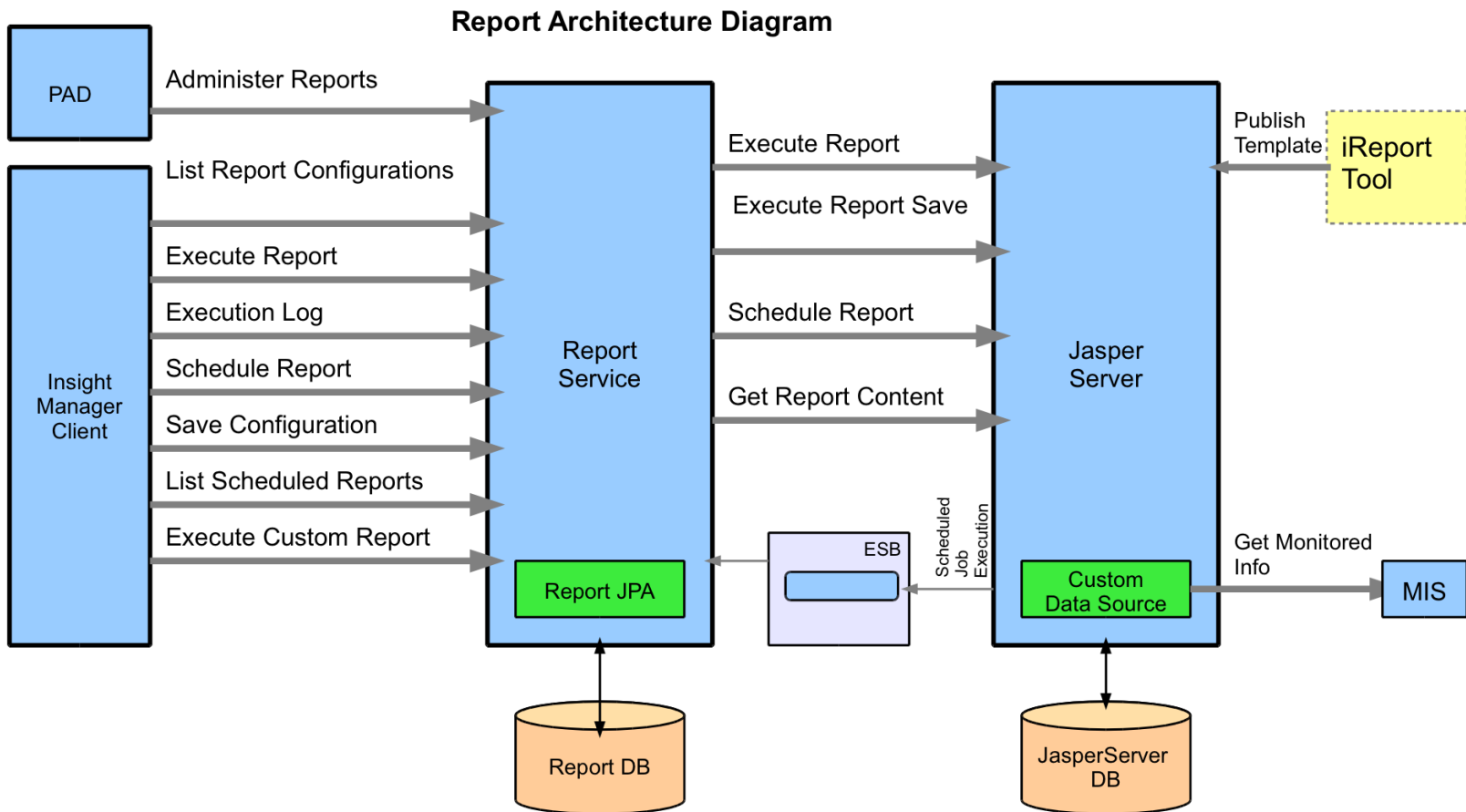- Commitment to open source

- Build or Buy BI

# Challenge Decision: Implement Seamless BI

- With all this data, BI capabilities are fundamental; building a BI framework is not
- Selection Criteria
    - Open source option with bootstrap to higher service offering
    - Red Hat Linux a preference
    - Web-centric, fully optimized
    - Modern UI, leading-edge capabilities
    - Best-in-class BI, committed to rapid innovation

# Challenge Met: Implement Seamless BI

- Results
  - Connected Fat Spaniel's Insight Platform with JasperServer v3
    - Monitored Info Custom Data Source
    - Report Service façade for product interaction
    - All services run on JBoss Application Server
  - Multi-lingual, Standard & Custom, Distributed Energy Reports supporting
    - Thousands of plant sites
    - Hundreds of customers
    - Over 135 MWs of renewable energy generation
    - Millions of new packets of Energy Intelligence information daily

# Insight Platform + BI Architecture



**Report Architecture Diagram**

PAD — Administer Reports → Report Service

Insight Manager Client:
- List Report Configurations
- Execute Report
- Execution Log
- Schedule Report
- Save Configuration
- List Scheduled Reports
- Execute Custom Report

Report Service → Jasper Server:
- Execute Report
- Execute Report Save
- Schedule Report
- Get Report Content

iReport Tool — Publish Template → Jasper Server

Report JPA

ESB — Scheduled Job Execution

Custom Data Source — Get Monitored Info → MIS

Report DB

JasperServer DB

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# Harnessing Sustainability Results

- By focusing on the creation of an Energy Intelligence Platform and leaving BI frameworks to BI experts, Fat Spaniel has been scaling rapidly
- By scaling rapidly we have been able to keep up with the aggressive global growth of distributed energy generation
- As an extension of our plant lifecycle abilities, the ROI of renewable energy has been increasingly attractive for our customers

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# Contacts and More Info

- We're looking for renewable energy intelligence developers
  - Submit your request here:
    - http://www.fatspaniel.com/products/insight-platform/
- How do I learn more…
  - about Fat Spaniel?
    - On Twitter
      - follow **Fat_Spaniel**for general insights
      - Follow **fstdev**for observations from acleantech development perspective
    - On Facebook – join the **Fat Spaniel Technologies Forum**
    - …or on our Dog Blog – http://www.fatspaniel.com/news-events/blog/
  - about the industry?
    - Earth2Tech – http://earth2tech.com/
    - GreenTech – http://cleantech.com/
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- What's with the name?
  - Come ask me ☺

# QUESTIONS?

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