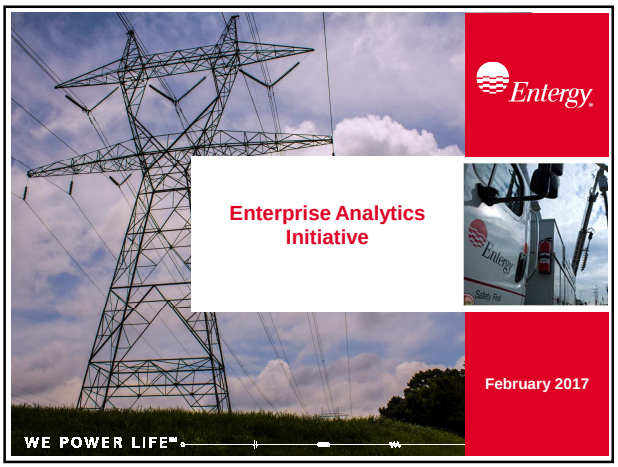

About the Presenter

Raiford Smith
Vice President, Energy Technology and Analytics

- 26 years of experience in the electric/gas utility industry
- Advisory board member for Intel, SAS, NEST Labs, and Tendril
- BS in computer science from the University of Georgia
- MBA from the University of Virginia
- JD from the Charlotte School of Law
- Licensed attorney and member of the North Carolina Bar Association
- Holds several patents on grid optimization and electric grid technologies
- Has published many papers on the future of the smart grid, energy efficiency, asset optimization, and price forecasting

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Poll Question

What level of analytics is your company pursuing?

About Entergy

- Employs more than 13,000 people.
- Owns and operates ~30,000 MW of electric generating capacity, including nearly 10,000 MW of nuclear power.
- Delivers electricity to 2.8 million utility customers in Arkansas, Louisiana, Mississippi and Texas.
- Supplies natural gas to approximately 199,000 customers in Baton Rouge and New Orleans.
- Operates an electric grid composed of approximately 15,500 miles of transmission lines and approximately 1,500 substations across a 114,000 square mile area.
- Fortune 500 company with revenues of approximately $11.5 billion.

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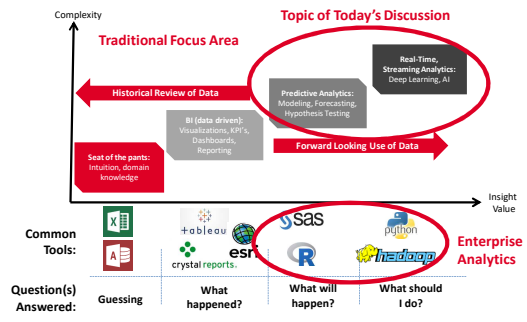
Outline of Today's Talk

- What is Analytics?
- Analytics Vision and Core Beliefs
- Core Beliefs Explained
- Roadmap Deliverables and Structure
- Lessons Learned

Analytics Defined

Analytics is more than reporting *what happened*
Analytics is **proactively creating valuable insights from data**



Entergy's Enterprise Analytics Vision and Core Beliefs

Our Vision:

- Analytics will provide financial and operational insights for our business and customers

Our Core Beliefs:

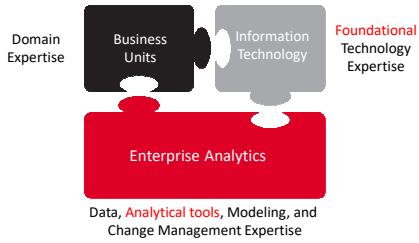
- Analytics (e.g. strategy) is a **core-competency** and shouldn't be outsourced
- Empower business units to **self-serve analytics**
- Analytics is fundamentally about **change management**, not a technology experiment
- Successful analytics implementations **shun silos and proprietary solutions**. It should be flexible, enterprise-wide, and standards-based
- Analytics development tools must be **widely-accepted and standards-based** (e.g. SAS, R, SPSS, Java, Hadoop, etc.,.) from outside the utility industry
- **Data is our most critical asset**
- A common, standards-based, flexible architecture that is not designed around specific use cases or specific systems of record can **save Entergy significant future headaches**

Our Program Goal:

- Shine a light **on the latent value in our data - much of it is held** in transactional systems which become dark after initial use. Analytics will resurrect the value of this data to the enterprise.

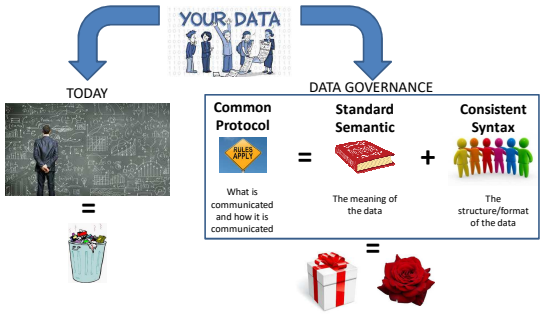
Core Beliefs of an Enterprise Analytics Initiative

Enterprise Analytics Program: Complementary Alignment



Effective delivery of an enterprise analytics platform requires a **partnership of business units, information technology, and the enterprise analytics organization**.

Components of an Analytics Program: Data Governance



Analytics requires a continual assessment of the quality, quantity, and velocity (among other things) of the data. Without **strong data governance**, potential analytics results always will be hampered.

Components of an Analytics Program: Exploration vs Optimization

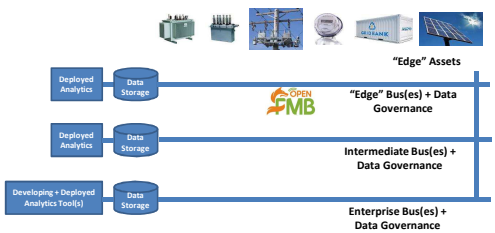
- Structured
- Relational
- Rigid
- Mature
- Stable
- Fast
- Optimized for day-to-day tasks
- Production

- Un- or semi-structured
- Object-oriented
- Flexible
- Emerging
- Scalable
- Slow
- Optimized for exploration
- Development

Analytics problems can vary significantly. Thus, our data architecture for developing new analytical capabilities **favors flexibility and scalability over speed and stability**.

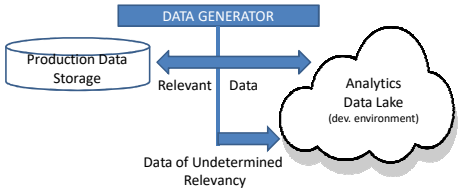
Similarly, analytics capabilities should be developed in a test environment, not in production.

Components of an Analytics Program: Enabling Ubiquitous Analytics



The optimal location for analytics and data storage (relative to the problem) is almost as important as the analytics itself. Thus, our architecture **favors implementing data governance protocols at each level of our network** rather than (only) deep in our data center.

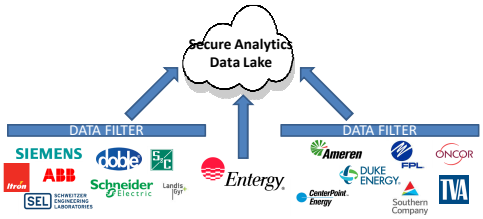
Components of an Analytics Program: Data Relevance



Whether or not a company should keep data depends on the problem that's being solved. We assume analytics problems will continually evolve over time.

Thus, our architecture favors **keeping data with undetermined relevancy in the analytics data store** and data with known relevancy stored in both production and development systems.

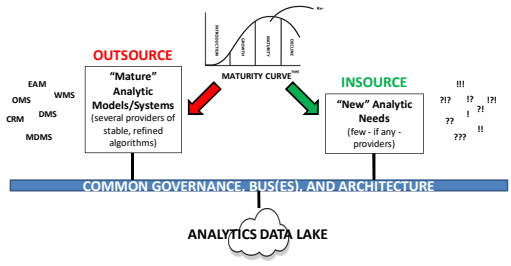
Components of an Analytics Program: The Value of Third-Party Data



Data is the company's greatest asset. However, if we can share data safely and securely with third parties, the benefits to all parties can grow significantly.

Thus, our architecture favors a **multi-tenant, secure platform that allows easy data ingestion** from 3rd parties.

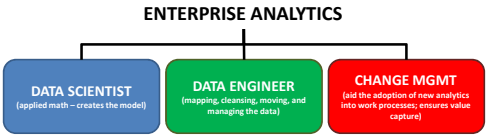
Components of an Analytics Program: Insource vs Outsource



Use cases will naturally migrate from home-grown to mature models. **New models** (where there are no/few commercial solutions) **will be the focus** of the enterprise analytics function.

Regardless of where analytics functions are on the maturity curve, **all analytics components must utilize a common, standards-based architecture** to link capabilities with the company's data stores.

Components of an Analytics Program: Enterprise Analytics Roles

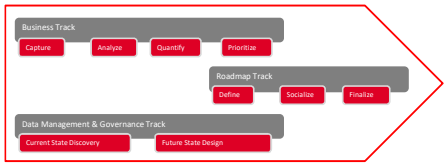


The enterprise analytics function consists of three distinct roles:

- **Data scientists** to create and train the models
- **Data engineers** to get and manage the data for the models
- **Change management** experts to aid in the adoption of new analytics and documentation of value capture

Roadmap Deliverables and Structure

Enterprise Analytics Program: Roadmap Phase



To develop an effective strategy for enterprise analytics, our analytics roadmap activities developed through workshops include:

Business Unit Track

- **Documented, prioritized use cases and cost-to-benefit analysis** to justify future spend and the benefits

Data Management & Governance Track:

- **Foundational technical tools, architecture, and data governance** to enable the right analytical capabilities to achieve the desired results

Business Track Expectations

- All day off-site workshops to be facilitated by 3rd Party
  - Some workshop pre-reading required
  - Workshop dedicated to each business unit
- Ideal composition of BU attendees
  - Director/Managers to identify analytical deficiencies/gaps
  - Analysts & IT resources who know the data and current analytic processes/technology
- Outcomes:
  - List of anticipated uses for analytics
  - Improved business unit understanding of analytics value and techniques
  - Expected outcomes and related business value for expected analytics uses

Data Management & Governance Track Expectations

- Series of interviews, one-on-one and group sessions
  - Surveys for assessments will be targeted at a broader audience using SurveyMonkey
- Ideal composition of interviews is based on five major initiatives and selected functional groups
  - Business representation
  - Technical representation
- Outcomes:
  - Current state of enterprise analytics capabilities
  - Future state of enterprise analytics capabilities
  - Gap analysis and maturity assessment

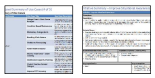
Roadmap Track Expectations

- Consolidate & analyze findings & recommendations
  - Use case inputs from Business Track
  - Future state inputs from Data Management & Governance track
  - Analytics demand profile
  - Program/roadmap considerations and alignment
- Define & socialize enterprise analytics roadmap
  - Transformational view & Implementation view
  - Includes multiple Implementation Layers
- Outcomes:
  - Analytics demand profile
  - Executive readout and summary
  - Enterprise analytics roadmap

Examples of Business Track Deliverables

- Workshop Summary

- Use Case Inventory



- Cost/Benefit Analysis

Examples of Data Management Track Deliverables

- Gap and Maturity Report

- Current and Future State Report

Examples of Roadmap Track Deliverables

- Analytics Demand Profile

- Executive Readout & Summary

- Enterprise Analytics Roadmap

Lessons Learned

- Without comprehensive executive support, the project won't take off.
- Start small and produce results (quickly) or it'll be a short flight.
- Don't focus only on cost-savings – there are a lot of other areas that generate value.
- Remember: this is a change management exercise, not a technology experiment.
- Analytics isn't an IT function.
- Getting the data (and having it properly governed) is always more challenging than it appears.