

Analytics for Sandia Knowledge



A Survey of “Analytics for Sandia Knowledge (ASK)” Applications and Architecture

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Data Sciences



U.S. DEPARTMENT OF ENERGY



NLIT Abstract



Agenda: Analytics for Sandia Knowledge (ASK) was released in 2015 with the purpose of enabling timely, informed, and integrated decisions anytime, anywhere.

This exciting new capability has, as its core, an architecture that enables data collection, data federation, data blending, data transformation and data publishing, all within a data virtualization environment. In addition, a set of applications have been deployed, within a mobile-friendly framework, which uses this architecture to create actionable information using exciting visualizations, dashboards and interactive reports.

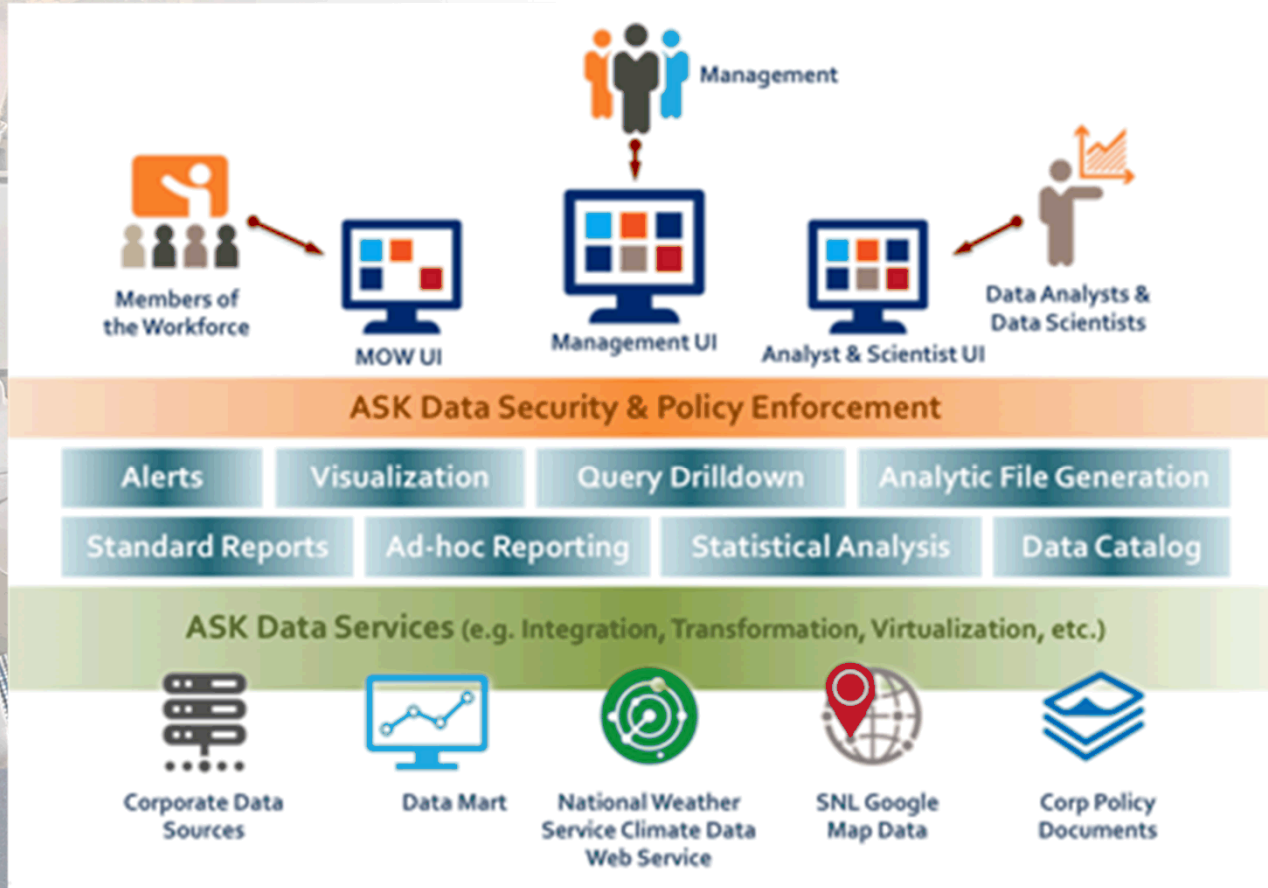
In this talk, we will describe the key components of the architecture and show how data is managed, and how it is transformed from original source to value-added information.



ASK Vision

- Enable timely, informed, and integrated decisions ...anytime, anywhere.
- This is enabled by:
 - Removing access to data barriers through Governance (access to data in minutes vs. months)
 - Creating a Data Foundation that enables federation / mashups (heterogeneous)
 - Provide tools to support data-driven decision making (e.g., mining, virtualization, visualization, analytics)

ASK End-to-End Architecture

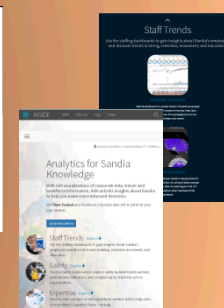
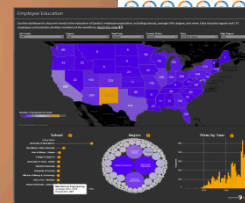
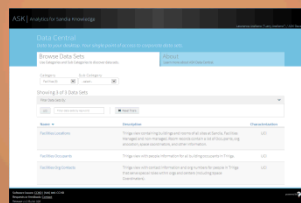
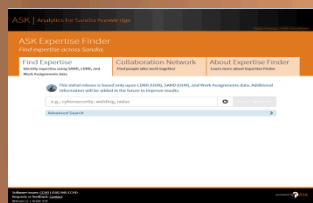
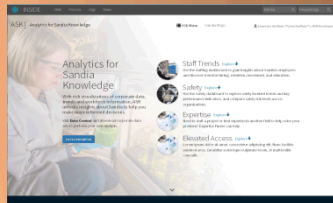




ASK Foundational Architecture

Looking inside we find a set of core capabilities that forms our ASK Foundation

Applications



Web Services

API

Data Visualization

Data Services

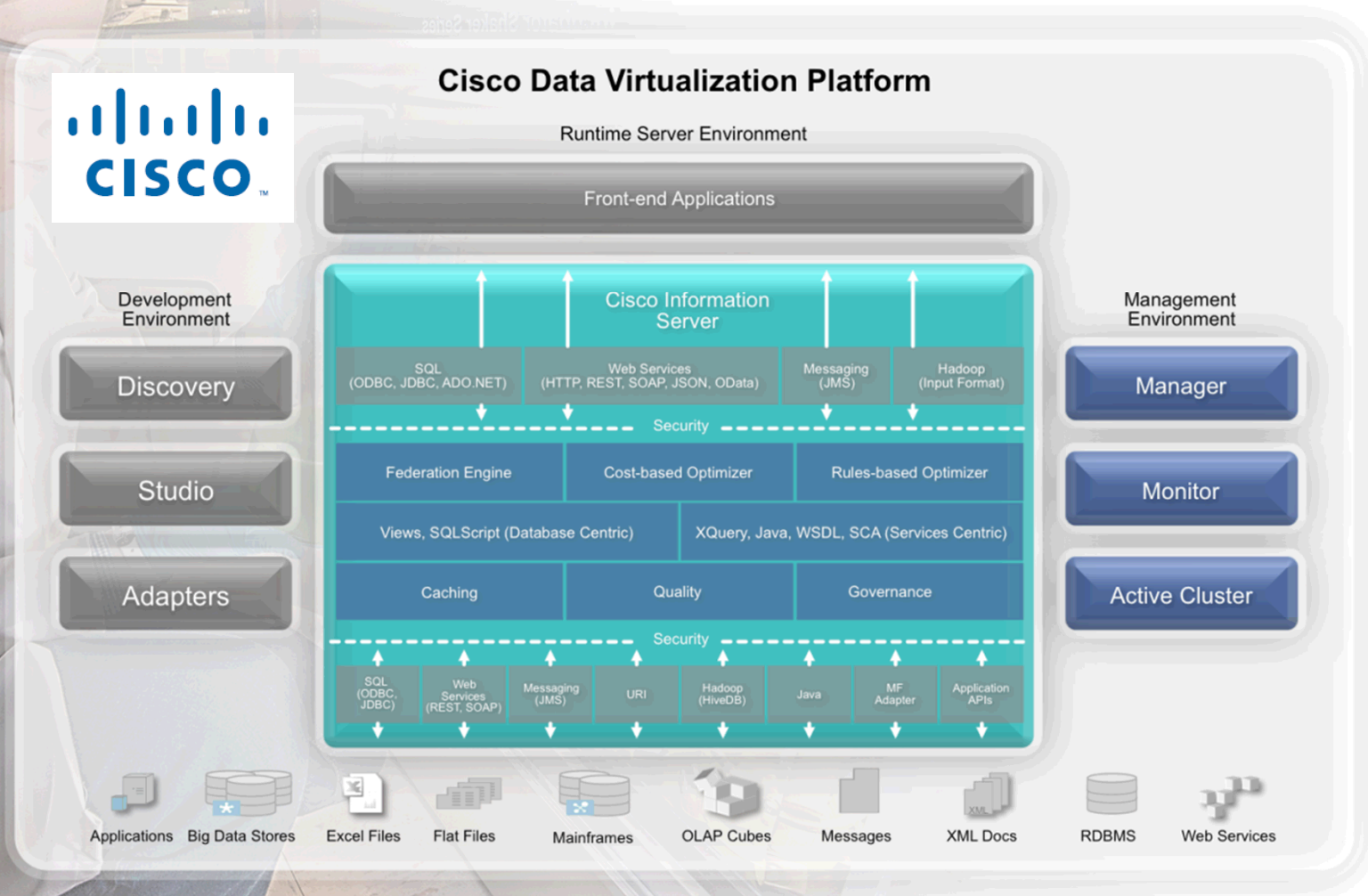
(Integration, Transformation, Federation, Virtualization)



Data Services

Enable timely, informed, and integrated decisions ...anytime, anywhere.

At the heart of our Data Services Layer is the Cisco Information Server

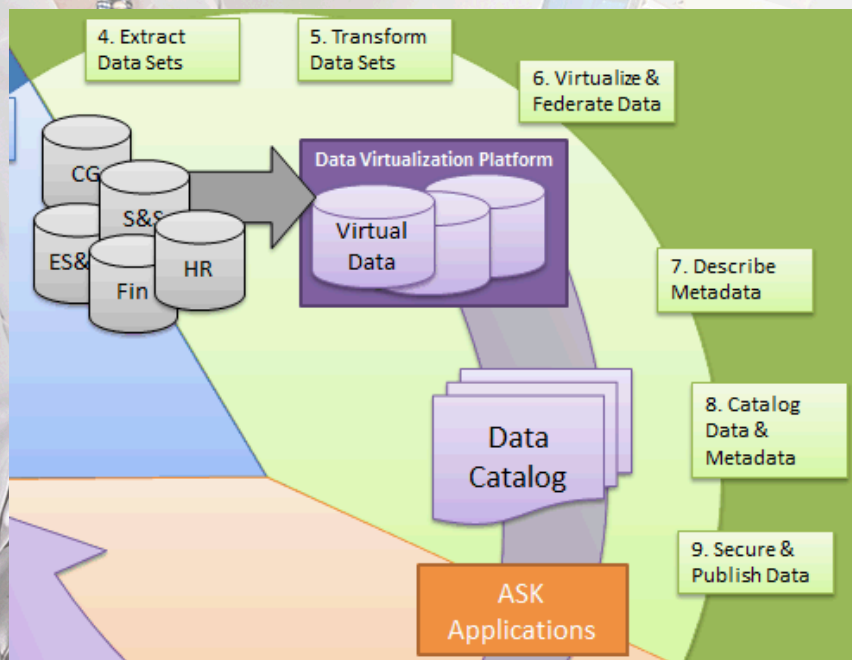




Data Services

Enable timely, informed, and integrated decisions ...anytime, *anywhere*.

- Data Extraction
- Data Transformation
- Data Federation
- Data Virtualization
- Data Catalog
- Data Publication



Visualization



Enable timely, [informed](#), and integrated decisions ...anytime, anywhere.

The screenshot displays the Tableau web interface. At the top, there is a navigation bar with the Tableau logo, a search bar, and utility icons. Below this is a menu with options like 'Content', 'Users', 'Groups', 'Schedules', 'Tasks', 'Status', and 'Settings'. The main content area shows a breadcrumb trail: 'Home > Tableau Samples > Regional'. The dashboard title 'Regional' is prominently displayed with a star icon and a 'Download' button. Below the title, there are tabs for 'Views' (6), 'Data Sources' (6), 'Subscriptions' (0), 'Permissions', and 'Details'. A sidebar on the left contains a search bar and 'General Filters' with a 'Tag' dropdown and two checkboxes: 'Only my favorites' and 'Only my recently viewed'. The main workspace shows a grid of six data visualizations, each with a title and a brief description:

- Obesity:** A map of the United States showing obesity prevalence by county.
- College:** A scatter plot showing college admissions data.
- Economy:** A bar chart showing GDP returns and economic indicators.
- Stocks:** A line chart showing stock tracking data.
- Storms:** A map showing storm tracking with wind speed and direction.
- Flights:** A bar chart showing flight delays at Seattle/Tacoma International Airport.



Web Services

Enable timely, informed, and integrated decisions ...anytime, anywhere.

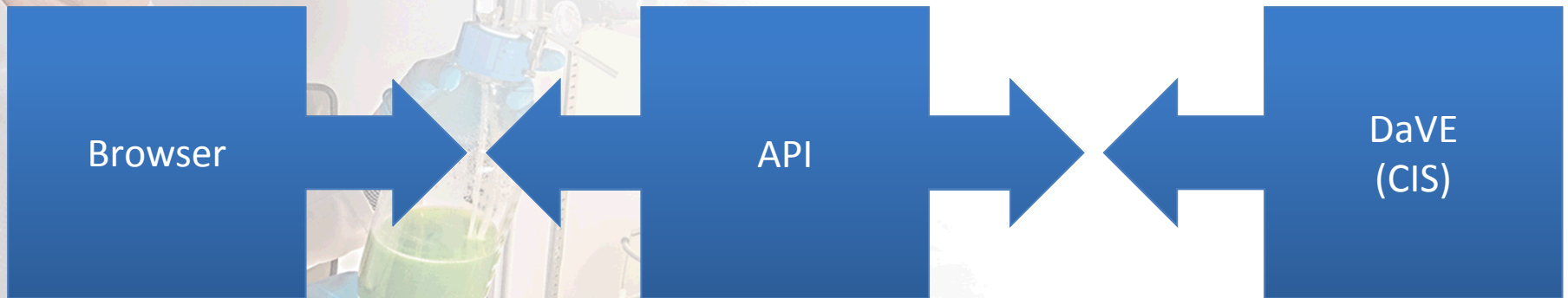
- RESTfull JSON Web Services
 - Wildfly
 - Java
 - JAX-RS
 - Hibernate
 - Log4j
 - Testing
 - JUnit
 - JMeter
 - SoapUI
- Tableau JS and REST API
- Security / Permissions
 - Authorization via MetaGroups
- Traceability
 - Logging who, what, when



Application Foundation



Enable timely, informed, and integrated decisions... anytime, anywhere.



Application Foundation



Enable timely, informed, and integrated decisions... anytime, anywhere.

- JS/HTML5/CSS3
- Suite Single Page Applications (SPA)
 - Angular
 - UI Router
- CSS Framework
 - Bootstrap
- Dependency Management
 - NPM & Bower
- Task Runner
 - Grunt
- Testing
 - Unit (Karma/Jasmine)
 - Coverage (Istanbul)
 - E2E Testing (Protractor/Selenium)
 - Burp Suite

Seamless Experience



Enable timely, informed, and integrated decisions... [anytime, anywhere.](#)

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Sandia People/Orgs

ASK | Analytics for Sandia Knowledge

ASK Menu Sandia Maps ASK Developer

Analytics for Sandia Knowledge

With rich visualizations of corporate data, trends and workforce information, ASK unlocks insights about Sandia to help you make more informed decisions.

Visit **Data Central** and download corporate data sets to perform your own analysis.

[Go to Data Central](#)

- Staff Trends** [Explore](#) ↓
Use the staffing dashboards to gain insights about Sandia's employees and discover trends in hiring, retention, movement, and education.
- Safety** [Explore](#) ↓
Use the Safety dashboard to explore safety incident trends and key performance indicators, and compare safety risk levels across organizations.
- Expertise** [Explore](#) ↓
Need to staff a project or find expertise in another field to help solve your problem? Expertise Finder can help.
- Elevated Access** [Explore](#) ↓
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Mobile

Enable timely, informed, and integrated decisions ...[anytime, anywhere.](#)

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ASK Developer

Analytics for Sandia Knowledge

With rich visualizations of corporate data, trends and workforce information, ASK unlocks insights about Sandia to help you make more informed decisions.

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[Go to Data Central](#)

Staff Trends [Explore](#)

Use the staffing dashboards to gain insights about Sandia's employees and discover trends in hiring, retention, movement, and education.

Safety [Explore](#)

Use the Safety dashboard to explore safety incident trends and key performance indicators, and compare safety risk levels across organizations.

Expertise [Explore](#)

Need to staff a project or find expertise in another field to help solve your problem? Expertise Finder can help.

Staff Trends

Use the staffing dashboards to gain insights about Sandia's employees and discover trends in hiring, retention, movement, and education.

Employee Retention

Use this dashboard to uncover trends in Sandia's employee retention, including the number of monthly hires. Data includes only regular and LTE employees and can be filtered by division and month.

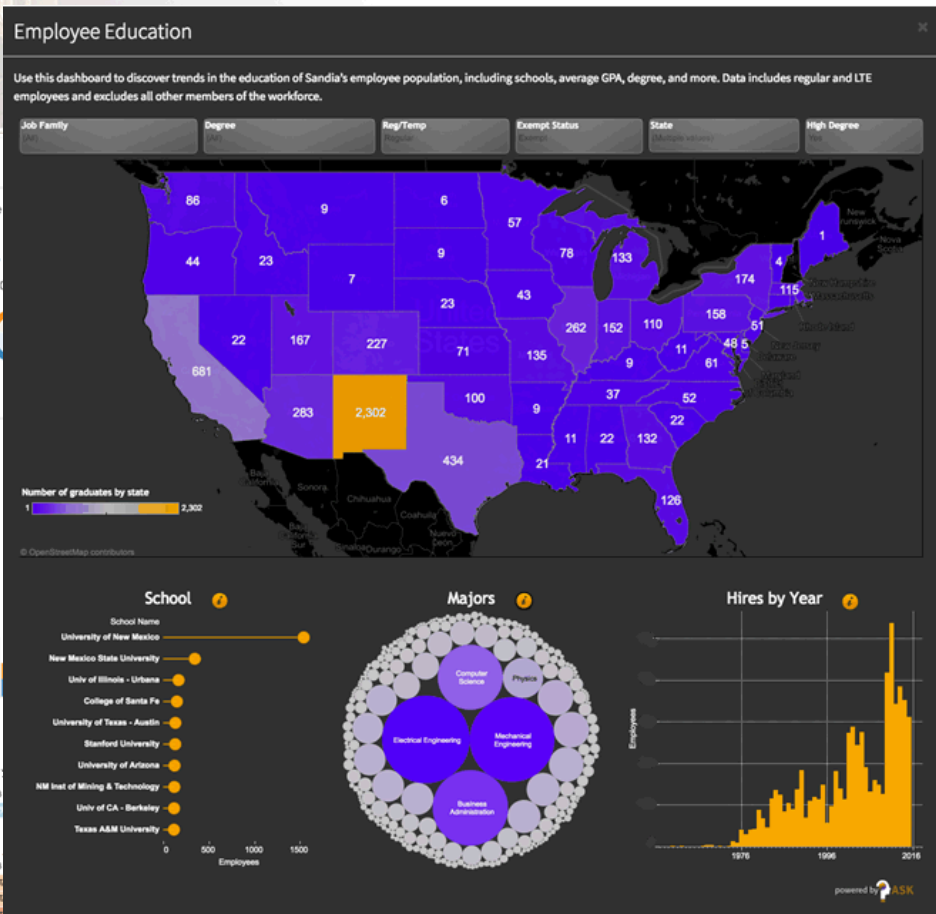
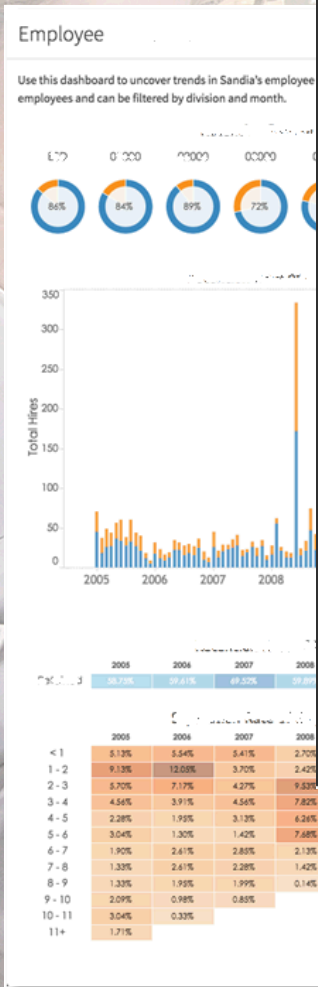
Employee Education

Use this dashboard to discover trends in the education of Sandia's employee population, including schools, average GPA, degree, and more. Data includes regular and LTE employees and excludes all other members of the workforce.



Visualize

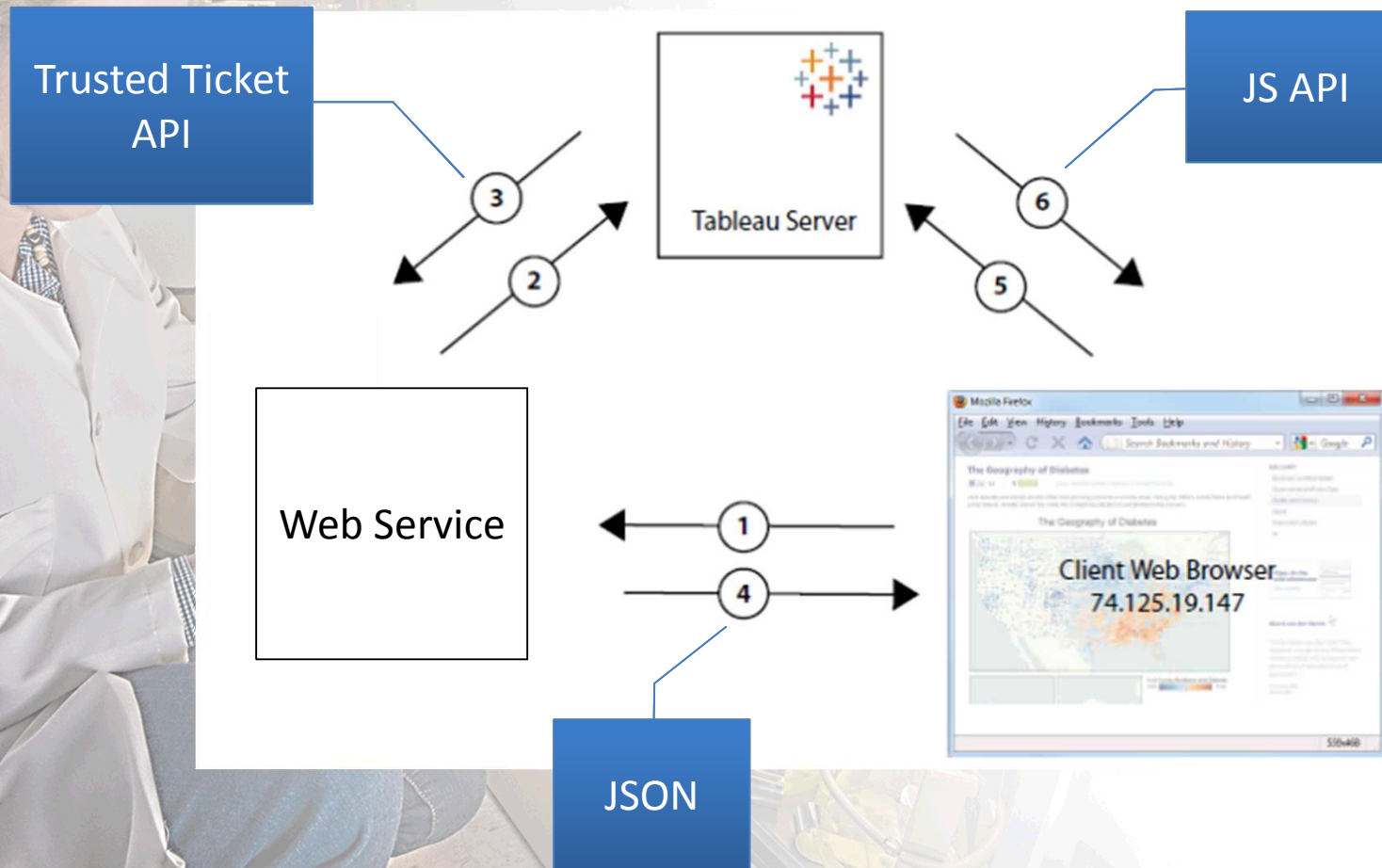
Enable timely, informed, and integrated decisions ...anytime, anywhere.





Embedding Visualizations

Enable timely, *informed*, and integrated decisions ...anytime, anywhere.



Data to Your Desktop



Enable *timely*, informed, and integrated *decisions*... anytime, anywhere.

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Data Central

Data to your desktop. Your single point of access to corporate data sets.

Browse Data Sets

Use Categories and Sub Categories to discover data sets.

About

Learn more about ASK Data Central.

Category: Facilities (3) Sub Category: - select -

Showing 3 of 3 Data Sets

Filter Data Sets By: UCI Filter data sets by keyword Reset filters

Name	Description	Characterization
Facilities Locations	Tririga view containing buildings and rooms of all sites at Sandia, Facilities Managed and non-managed. Room records contain a list of Occupants, org allocation, space coordinators, and other information.	UCI
Facilities Occupants	Tririga view with people information for all building occupants in Tririga.	UCI
Facilities Org Contacts	Tririga view with contact information and org numbers for people in Tririga that serve special roles within orgs and centers (including Space Coordinators).	UCI

Requests or feedback: [Contact](#)
Release v1.1.0 Build: 030

powered by ASK

Find Expertise



Enable timely, [informed](#), and integrated [decisions](#)... anytime, anywhere.

ASK | Analytics for Sandia Knowledge

Data Scientist

ASK Expertise Finder

Find expertise across Sandia.

Find Expertise

About Expertise Finder

Learn more about Expertise Finder



This initial release is based only upon LDRD (UUR), SAND (UUR), Patent, and Work Assignments data. Additional information will be added in the future to improve results.

e.g., cybersecurity, welding, radar.



Find Expertise

Requests or feedback: [Contact](#)
Release v1.1 Build: 040

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ASK Architectural Drivers



1. **Privacy** – permissions, governance, privacy (PII)
2. **Security** – authentication / authorization
3. **Usability** – variety of computing devices (meet users where they are)
4. **Performance** – responsive interface, minimizes process and wait times
5. **Accuracy** – not provide misleading, mischaracterized, or inaccurate data
6. **Flexibility** – provide and display data in multiple ways
7. **Availability** – hours of operations, monitored and tiered support.





Future of ASK

- Self-Service Analytics
- External data
- Additional data sources
- Mobile visualizations
- Big data analytics
- More predictive analytics
- Knowledge-as-a-Service (KaaS)





Questions?