Department of the Air Force

Integrity - Service - Excellence

Bridging the Gap between Data Science and Cost Analysis

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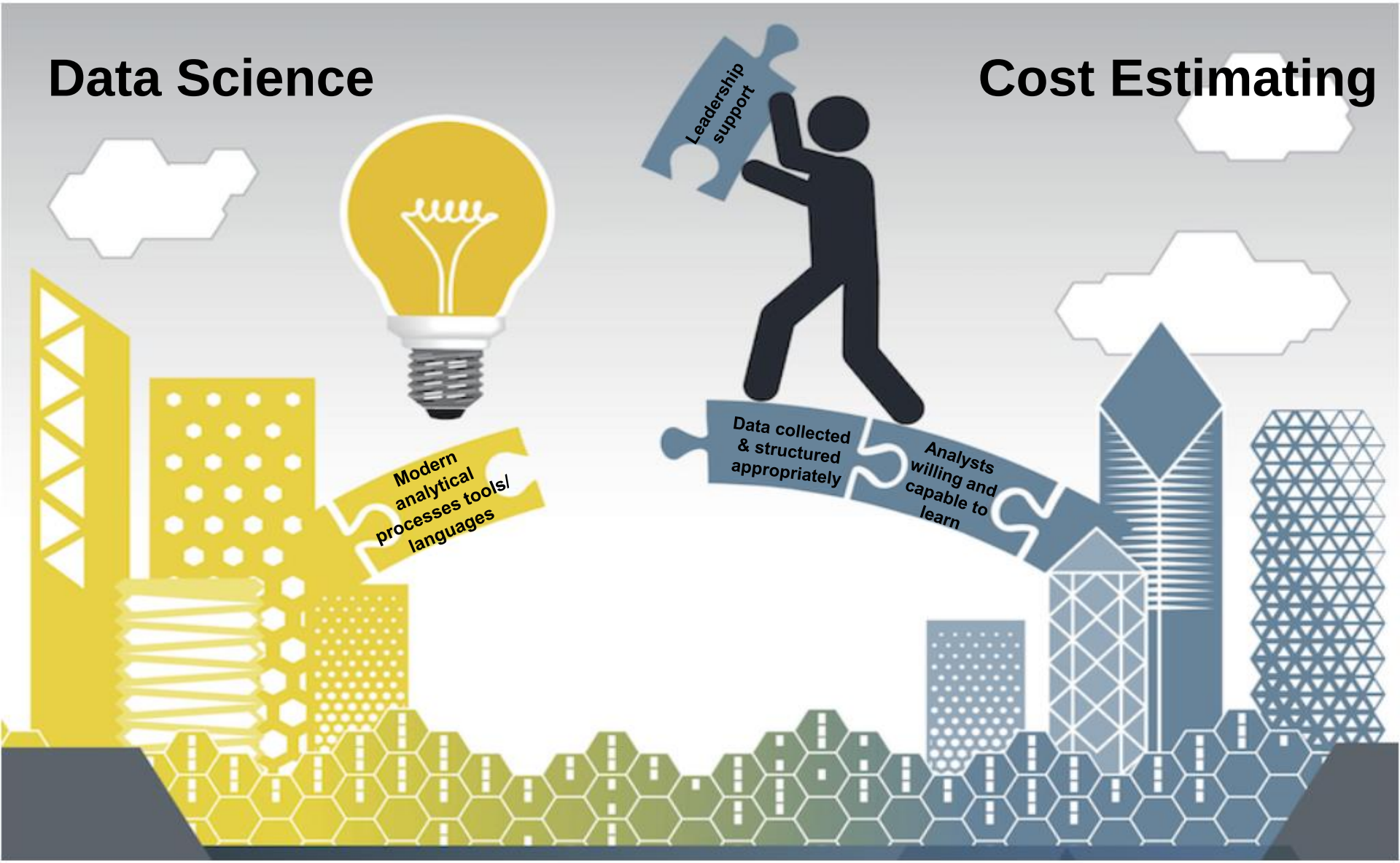
Bad News

- ***Generally speaking*, the cost community is way behind the curve from an data science perspective vs. current state-of-the-art**
  - Our **PROCESSES** are outdated
    - Often, each analyst/team of analysts separately pulls down data from various sources which is repetitive & monotonous
    - Lack of "flattened" structure/format for data, lack of consistent methods/ analysis
    - Result is inconsistent, compartmentalized and unstructured datasets and "ad-hoc"/ stove-pipped analysis
  - Depending on the organization, modern **TOOLSETS** are either non-existent or under-utilized
    - Even with forward-thinking organizations that have adopted some of the industry's best tools and nearly unlimited/free online training, we are years behind the curve
    - CAPE-lead Data Tools Tiger Team Survey to be released soon
      - Hypothesis is that IT/security concerns and adoption are likely the top issues facing the community
  - **PRESENTATIONS** to leadership are often static vs. dynamic

Good News

- **We have more data than ever before**
  - For DoD- Complete overhaul of CSDRs with “FlexFiles”
    - Cost data
    - Software data
    - Technical data
    - Programmatic data
  - Advana +750 data sources
  - Sites like DACIMS, PMRT, EVM-CR etc.
- **As a community (generally speaking) we have the necessary building blocks to succeed in the field of data science**
  - Mathematicians, engineers, as well as a variety of other technical backgrounds
  - Many of our job responsibilities already overlap with those in the data science field

Bridging the Gap



Bridging the Gap – Leadership

- **Specifically what Leadership can do:**
  - Invest in the resources to shift towards data science
    - Free up your current staff and dedicate/train them in data science OR hire data scientists and train them in cost estimating (pros/cons)
    - Surge support is an option but not necessarily recommended since data science is absolutely here to stay
    - The resources you invest in advancing data science will pay off many times over with both efficiencies and improved quality of estimates
    - In many if not all cases of data-driven organizations, data science divisions are being stood up as stand-along entities
  - Ensure access to modern tools & investigate cloud based solutions
  - Incentivize analysts to learn data science principles, methods, languages, tools etc.
  - Plan ahead- what is the 1-5 year plan from a personnel/tools perspective?

Bridging the Gap – Analysts

- **Specifically what Analysts can do:**
  - Be proactive and get trained
    - No matter what your career trajectory learning data science principles and tools WILL benefit you longer term!!
    - If you can meet the technical expectations for a cost analyst then you can master data science principles and tools
    - ALL the training you will ever need on data science is available via open source/ virtual although more traditional classes are an option as well
  - "Flatten" your data tables- this is essential
    - See Adam James' (award winning) ICEAA presentation here for details on how to execute
  - Visualization tools (Tableau/Power BI) have a high payoff and are very intuitive/ easy to learn – do the work & take the training!
  - Liaise and Collaborate with larger cost community to share knowledge and leverage methods/tools currently existing
    - Data Tools & Analytics User group (more on this later)

Benefits

Current

- Traceability is dependent on documentation & process used by analyst (rare to have transparency)
- Only saved versions are kept- can lose trace to data in certain versions of models if not properly handled
- Often have issues with compatibility of desktop versions
- Mostly manual steps – not easily repeatable and often not well documented
- Extremely difficult to get desktop tools approved on high side

Vault

- Complete step by step traceability to original, raw data
- “Time Capsule” - can tell exactly who made change & when – and can revert back to a previous version at any time.
- No compatibility issues with different versions of desktop software once in the cloud
- Automated steps from raw data to final product so that it’s repeatable on new data that’s received
- Can replicate environment on the high side (SIPR now, JWICS 2022)

Benefits, continued

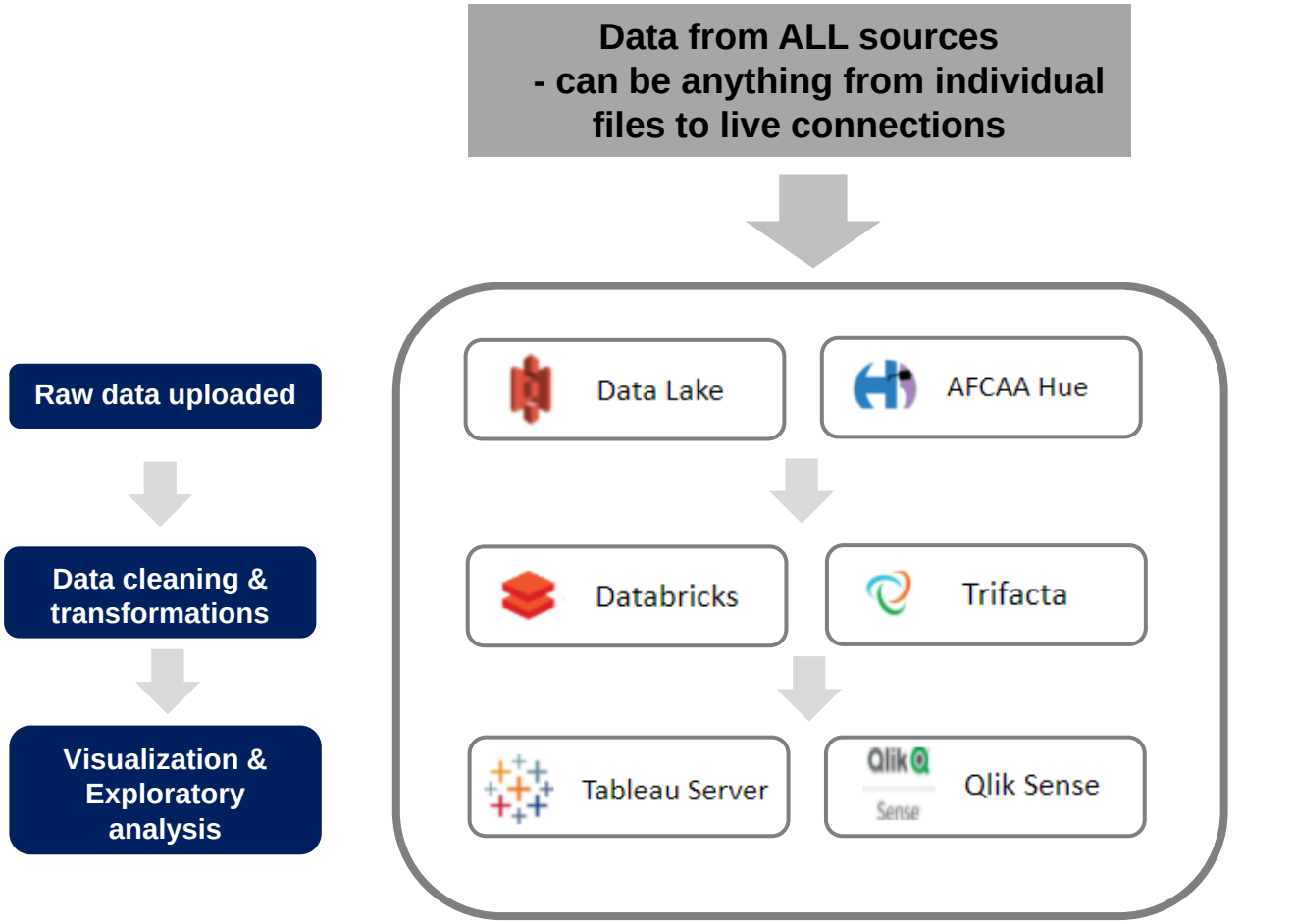
Current

- Performance limited to desktop compute
- Analysts download CSDR data and build relational models on their own
- Mostly access to files is controlled by access to folders in file structures and passwords
- Power of languages like R/ Python extremely limited bc of desktop versioning issues and most importantly the lack of ability of most analysts to learn
- **Analysts need to apply processes/methods independently**

Vault

- Performance will scale based on compute available in “cluster”- equivalent of groups of machines
- Capability to build centralized relational models that will be able to ingest data form
- Access can be controlled and managed easily for each
- For languages like R/Python almost any tools developed can be leveraged in the Vault with one-time set up/debugging effort
- **One analyst, one time= entire organization benefits**

Vault: Proposed Process



AFCAA only Vault "Tenant" Space

Vault Demo

- **Live Demo of Vault capabilities (randomly generated data)**
  - Demo will demonstrate results currently prototyped with multiple tools and our proposed process going forward

User Group Overview

- **What this User Group IS**
  - Analysts from a wide spectrum of different government organizations that are **CURRENT users of advanced data analytic tools** and can represent their organization by talking specifically about them and ideally be able to demonstrate exactly how they are using those tools
  - Liaising with Data Tools Tiger Team (whose mission is to better inform leadership on what is needed to identify, procure and adopt the right tools for the cost community)
  - Government civilians
  - Contractors directly supporting a government organization
  - Meets regularly every 3 weeks
- **What this User Group IS NOT**
  - Providing training for novice users
  - Making authoritative decisions about which tools should be used
  - Industry contractors

Goals of User Group

- **Short term Goals :**
  - Create a community of analysts using data analytics tools to collaborate
  - Discuss each tool in detail to include the different ways that each organization is using the tools to their advantage
  - Demonstrate and share results with the group so we can consolidate best practices and lessons learned
  - Collaborate in order to avoid duplicative data analytic efforts and leverage work that has already been done to the greatest extent possible
  - More widespread outreach to the cost community to help with adoption of tools
- **Potential longer-term goals:**
  - Collaboration on products to be eventually hosted in the DTM Hub

Email me for more information or to request to join: sarah.green.10@us.af.mil

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