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“Ctrl + Click” Quantech Logo on Any Slide to Return Here →



From Excel to Insights: The Power BI Evolution

• Why Transition from Excel to Power BI?

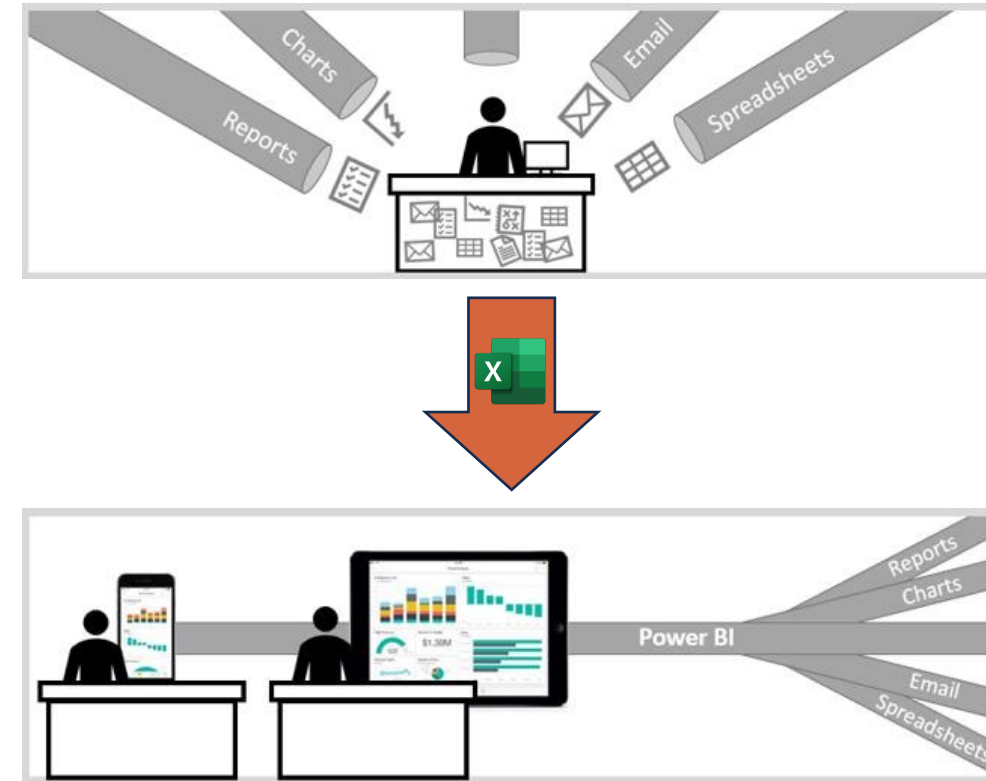
- While Excel has been a cornerstone for data entry and analysis since 1985, its limitations in handling dynamic data require a more modern approach.
- As analytical needs grow, transitioning to tools like Power BI allows for deeper insights, better collaboration, and real-time updates that Excel cannot natively provide.

• Power BI's Strengths for Advanced Analytics (2015):

- Designed to extend Excel's capabilities by introducing interactive dashboards and integrating seamlessly with Microsoft 365.
- Real-time updates and interactive tools improve data storytelling and decision-making, aligning with modern analytical demands.

• Why Power BI Was Chosen:

- Its ability to integrate multiple data sources into a single platform simplifies reporting and reduces manual data processing.
- Provides a balance between flexibility for small-scale projects and scalability for enterprise-wide initiatives.
- Enables accessible analytics across teams, fostering collaboration and informed decision-making.





Power BI in the DoD: A Secure, Scalable Solution

- **Microsoft's DoD Integration:**

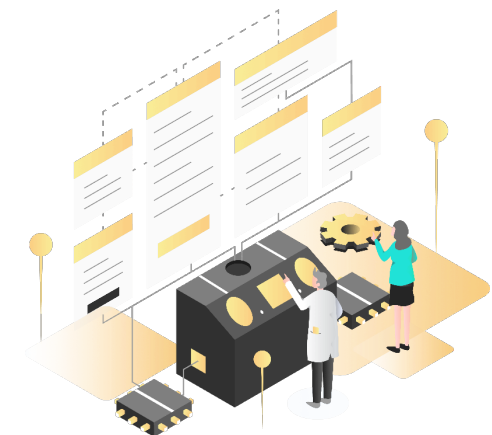
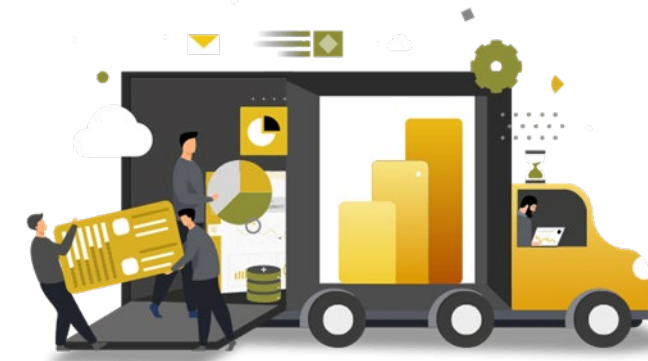
- Microsoft has long supported DoD operations with secure, scalable solutions across its platforms, with a growing focus on cloud services and data security to meet DoD needs.

- **Power BI as Part of the Microsoft Suite:**

- As a key component of the Microsoft 365 suite, Power BI integrates seamlessly with familiar tools like Excel, SharePoint, and Teams.
- Power BI leverages the DoD's investment in Microsoft products, enabling intuitive data sharing and collaboration across secure networks.

- **Power BI Service for Real-Time Intelligence:**

- Power BI Service, the cloud-based extension of Power BI, provides DoD analysts with real-time insights, allowing on-the-fly decision-making.
- Built with security compliance in mind, Power BI service aligns with DoD security protocols.





HN Labor Rate Database 10,000ft Overview

- The **primary function of this database** is to assist in the pricing/negotiation of incoming individual Labor Category (LCAT) Labor Rates for reasonability versus other data points.
- Labor rate database originated in HNCN and utilized 345 data points from HNCP, HNCX, HNCJ, and HNCB.
 - All labor rates are fully loaded/burdened with fees from various contract documentation (Actuals, B-Tables, Proposal Negotiation Memorandums).
 - “LCAT Subcategory” was assigned to all contract LCAT titles using a standard mapping (meant to be customizable).
 - 3600 Raw Indices were used for normalization calculations.
- After this database was briefed to all of HN, 566 additional data points were obtained from HNAA, HNAB, & HNI.
- Anonymization & Rate Obfuscation
 - Vendor names, program names, branch names, and vendor-specific labor categories were abstracted to protect the identities of all involved parties.
 - To further ensure no actual dollar values were tied to any data shown, all labor rates were obfuscated by taking each rate's percent delta from the average and multiplying by \$100.

A special thank you to all HN Analysts who assisted with this database creation and labor rate population.





HN Labor Rate Power BI Snapshots: ToC & Data Fields

File Home Insert Modeling View Optimize Help

Paste Copy Format painter Clipboard

Get data Excel workbook OneLake data hub SQL Server Enter data Datasource Recent sources Transform Refresh data Queries

New visual Text box More visuals Insert

New visual calculation New Quick measure measure Calculations

Sensitivity Publish Copilot

Share Copilot

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Decomposition Tree - Interesting Visualization Depicting the Robustness of the Dataset

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Ctr Labor Rates - Name of Table in "HNC Labor Rate Database 26Aug24" Excel File

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PowerBI 101: The Ribbon, Linking, Visualizations, & Sharing

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- **Home Tab:** This is where you can find the most commonly used features, like importing data, creating new visualizations, and refreshing your data.
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- **View Tab:** Adjust your view, including themes, and toggle visibility for certain features like gridlines and snap to grid.
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Power BI integrates seamlessly with Excel, allowing you to import and link data for analysis.

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PowerBI 201: One-to Many Relationships (LCAT Key)

1. Understanding Relationships in Power BI

In Power BI, relationships define how data from different tables are connected. These relationships allow you to pull in data from multiple tables into a single report or visualization.

- **One-to-Many Relationship:** This is one of the most common types of relationships. It connects a single record from one table (the "one" side) to multiple records in another table (the "many" side).
- **Example:** Imagine you have two tables: Orders and Customers. Each customer can place multiple orders, so the relationship between Customers (one) and Orders (many) is a one-to-many relationship.

2. Replacing VLOOKUP with a One-to-Many Relationship

In Excel, VLOOKUP is often used to pull data from one table into another based on a matching value.

PowerBI 301: Creating Groups Within Existing Fields

In Power BI, you can create **custom groups or categories** within an existing field to better segment and analyze your data. This feature is particularly useful when you want to **group certain values** together for reporting purposes, **without modifying the underlying data**.

1. Why Create Groups?

Creating user-identified groups allows you to:

Table of Contents & Instructions Demographics & Counts Labor Rate Dashboard Decomposition Tree

Approved for Release by 66th ABG/Public Affairs Office - #66ABG-2025-009





Power BI 101: The Ribbon, Linking, Visualizations, & Sharing

The screenshot displays the Microsoft Power BI Desktop application. The top ribbon includes tabs for File, Home, Insert, Modeling, View, Optimize, and Help. The Home tab is active, showing various tool groups like Clipboard, Data, Queries, Insert, Calculations, Sensitivity, Share, and Copilot.

The main content area is divided into two panes. The left pane contains a **Table of Contents** with sections for Demographics & Counts, Labor Rate Dashboard, and Decomposition Tree. The right pane displays detailed notes for **PowerBI 101: The Ribbon, Linking, Visualizations, & Sharing**.

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Demographics & Counts Power BI Tab

Program #	Sub-Program #	# of Rates	HN Branch	# of Rates	Contractor #	# of Rates
Program 1	Sub-Program 1	67	HNAA	41	Contractor 1	67
Program 10	Sub-Program 24	17	HNAB	33	Contractor 10	2
Program 11	Sub-Program 23	23	HNCD	102	Contractor 11	5
Program 12	Sub-Program 23	19	HNCJ	56	Contractor 12	4
Program 13	Sub-Program 23	20	HNCP	102	Contractor 13	5
Program 14	Sub-Program 25	12	HNCX	85	Contractor 14	6
Program 15	Sub-Program 26	29	HNI	76	Contractor 15	6
Program 16	Sub-Program 27	33	HNIB	38	Contractor 16	7
Program 17	Sub-Program 28	39	HNII	124	Contractor 17	12
Program 18	Sub-Program 29	37	HNIT	254	Contractor 18	11
Program 2	Sub-Program 2	4	Total	911	Total	911
Program 3	Sub-Program 3	19	Calculated Labor Category # of Rates		Level # of Rates	
Program 3	Sub-Program 5	11	Cybersecurity	54	Journeyman	220
Program 3	Sub-Program 6	11	Data Science	60	Junior	136
Program 3	Sub-Program 7	11	Design	30	Senior	303
Program 4	Sub-Program 4	35	FM, Contracting & Analysis	39	SME	221
Program 5	Sub-Program 10	20	IT/Day 2 Operations	75	UNK	31
Program 5	Sub-Program 11	11	Management	170	Total	911
Program 5	Sub-Program 12	3	Platform Development	114	Zone # of Rates	
Program 5	Sub-Program 13	10	SW/Product Development	336	Hardship Duty Zone	20
Program 5	Sub-Program 8	17	Technical Writing	21	Hostile Zone	20
Program 5	Sub-Program 9	24	Test	12	N/A	871
Program 6	Sub-Program 14	23	Total	911	Total	911
Program 6	Sub-Program 15	12	Obfuscated Labor Rate		Obfuscated Labor Rate	
Program 6	Sub-Program 16	7				
Program 6	Sub-Program 17	30	Ctrl+Click to Clear All Filters On This Page ->		Clear all Filters	
Program 6	Sub-Program 18	6				
Program 6	Sub-Program 19	17				
Program 6	Sub-Program 20	7				
Program 7	Sub-Program 21	124				
Program 8	Sub-Program 22	38				
Program 9	Sub-Program 23	175				
Total		911				

- First of 2 primary tabs created for utilization.
 - This tab was created to highlight data distributions.
 - The other Labor Rate Dashboard tab was created for quick subset retrieval and analysis.
- Use Cases focus on how Labor Rate data and Dashboard Tab should be used in Pricing vs. Estimation.
- Note, due to current data limitations, there are some ways this data should **not** be used:
 - Grouped LCAT Averages applied to FTEs (average highly influenced/skewed by high/low data points).
 - Labor Rates applied to estimated FTEs (labor rate analogy should be applied to similarly scoped effort).



Labor Rate Dashboard Power BI Tab & Drill-Downs

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Program # | Sub-Program # | Branch # | Labor Rate by Category & Program

Calculated Labor Category: Management (\$123.20), Platform Development (\$120.70), Data Science (\$100.12), SW/Product Development (\$95.70), Cybersecurity (\$84.90), IT/Day 2 Operations (\$83.45), Design (\$78.13), Test (\$77.09), FM, Contracting & Analysis (\$72.27), Technical Writing (\$62.05)

Average of Obfuscated Labor Rate: \$100.00

Labor Rate by Vendor

Contractor #	Labor Rate
Contractor 29	\$226.10
Contractor 14	\$197.64
Contractor 17	\$192.54
Contractor 31	\$152.95
Contractor 5	\$132.53
Contractor 20	\$129.22
Contractor 18	\$127.67
Contractor 6	\$127.14
Contractor 15	\$125.95
Contractor 3	\$125.90
Contractor 7	\$125.50

Obfuscated Labor Rate: \$20.66 to \$325.49

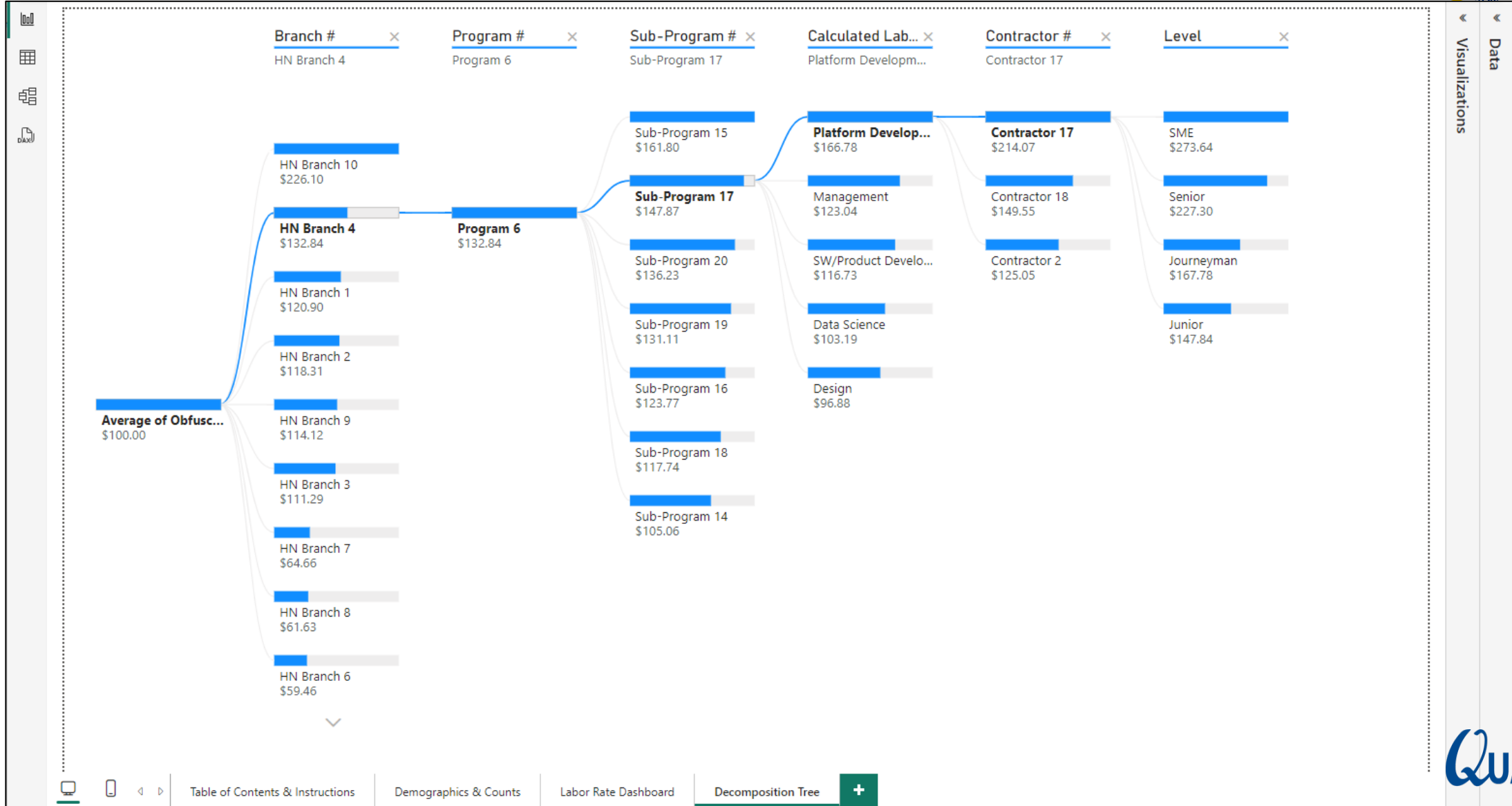
911 # of Rates, Median of Obfuscated Lab...: \$89.12, Standard deviation of Obfuscated La...: \$57.69

Obfuscated Labor Rate: \$20.66 to \$325.49

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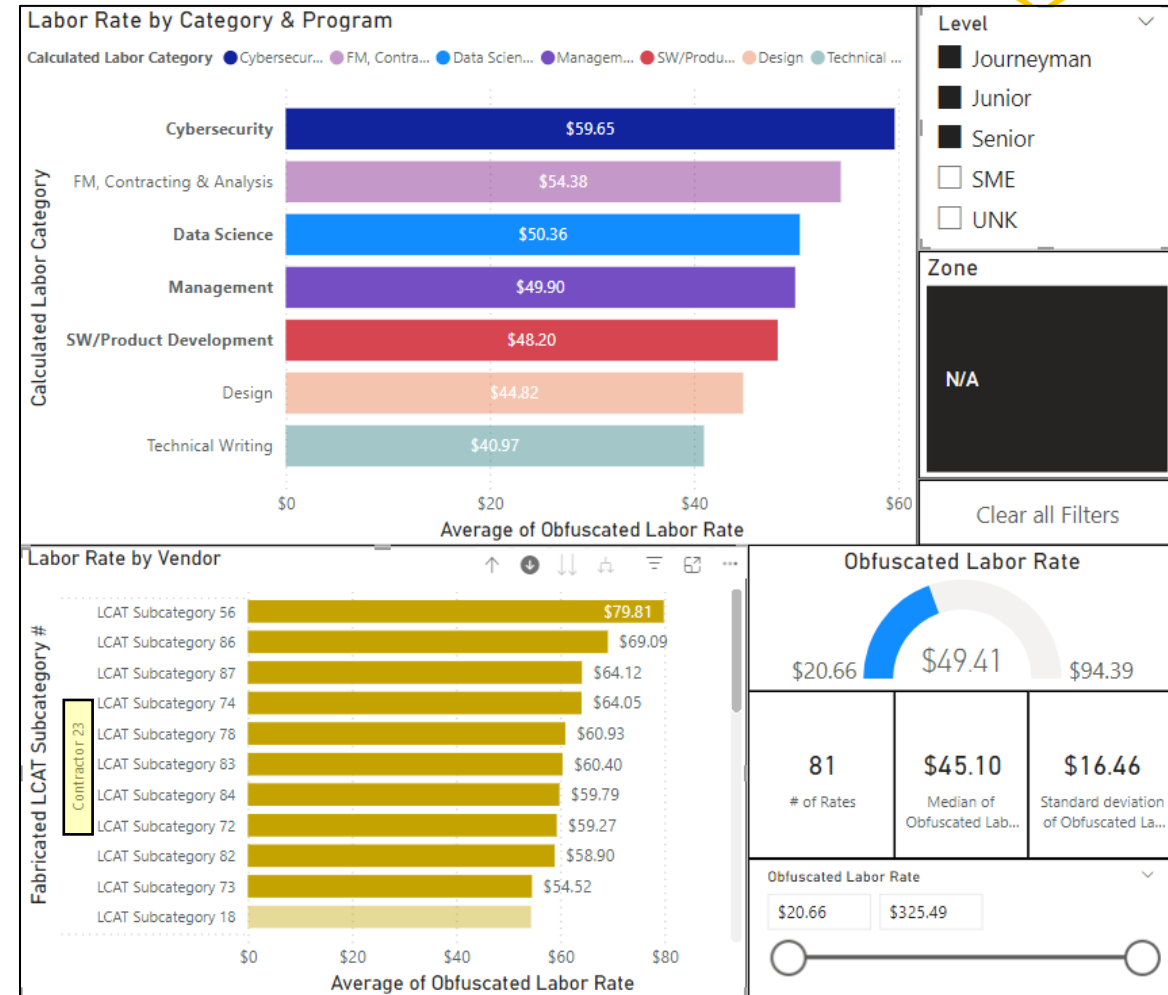
Decomposition Tree Visualization





Use Case 1 - Technical Evaluation Assistance

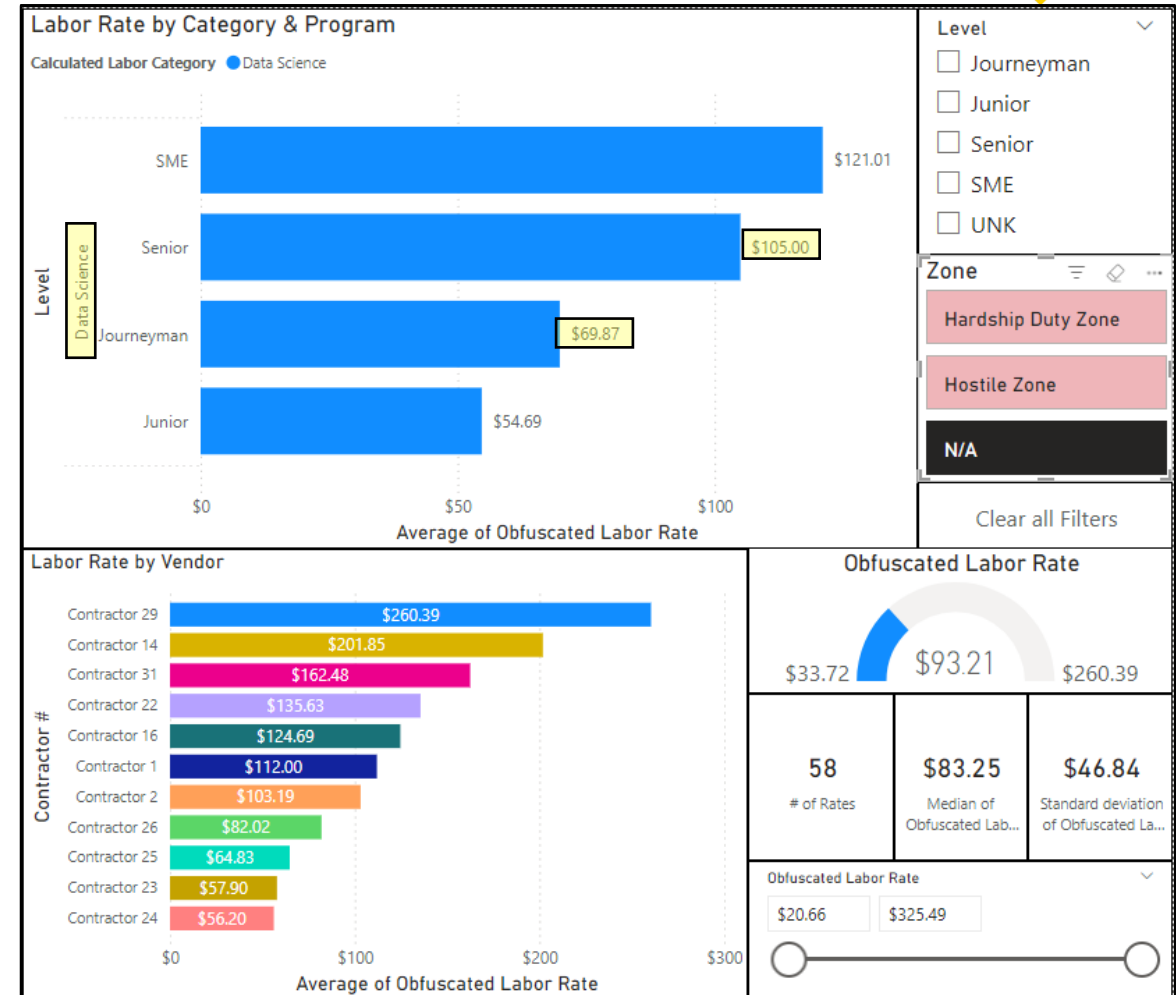
- Use Case 1 represents the most impactful application of the HN Labor Rate Database in its current state.
- Use Case 1 assumes the following:
 - The program is in source selection and wants to determine if the rates proposed are fair and reasonable.
 - Contractor 23 is the most likely candidate.
 - The program has stated no SMEs are required.
 - Program requirements are for Cybersecurity, Data Science, Management, SW/Product, & Design support.
- Proposed LCAT/Level combinations can now be compared to the historical database's 87 relevant rates.
 - This process aligns closely with FAR 15.404-1, which emphasizes price reasonableness determinations based on cost or price analysis.
- Beyond identifying rate discrepancies, this use case encourages deeper exploration into underlying factors.





Use Case 2 – LCAT Level Delta Analysis

- Use Case 2 explores the strategic implications of labor category transitions, offering insights into the cost dynamics of adjusting workforce compositions.
 - The program has stated that they want to replace all Data Science Journeyman FTEs with Senior FTEs.
 - No one is in a Hardship/Hostile Zone.
- If the Data Science team consists of multiple vendors, the average labor rate could increase by 50%.
- If the vendor is known, then the average labor rate could be expected to increase by approximately 56%.
- This analysis enables decision-makers to anticipate the financial impact of such transitions, accounting for vendor-specific labor rates, project requirements, and potential cost increases.





Use Case 3 – Projected LCATs + FTE Hours per Year

- The last use case assumes a small contract with a defined LCAT labor breakout is up for renewal.
 - The PM/PK team has provided you with the period of performance, the current (and future via a sole-source J&A) vendor information, and the following contract FTE breakout:

LCAT Category	LCAT Subcategory	Level	FTEs Required	Obfuscated \$/Hr.
Data Science	Subcategory 189	SME	0.25	\$260.39
SW/Product Dev	Subcategory 204	Senior	2	\$216.76
Management	Subcategory 187	Journeyman	2	\$201.99
Management	Subcategory 188	Junior	3	\$184.21

- Using the HN Labor Rate Dashboard, we can obtain the corresponding labor rates.
- We can now compute costs [FTEs * Hours per Year * Labor Rate] using appropriate risk factors and inflation.
- Companion paper outlines many concerns to LCAT + FTE estimation based on PM/EN input.
 - Validity of Program Analogy, Fidelity of Labor Breakout, Etc.



Future Actions, Advanced Analysis & Enhancements

- **Adding New Data Points:**

- Continual addition of relevant data points enhances analysis depth and insight.
- Expanding with fresh information supports evolving needs and maintains dashboard relevance over time.

- **Annual Inflation Updates:**

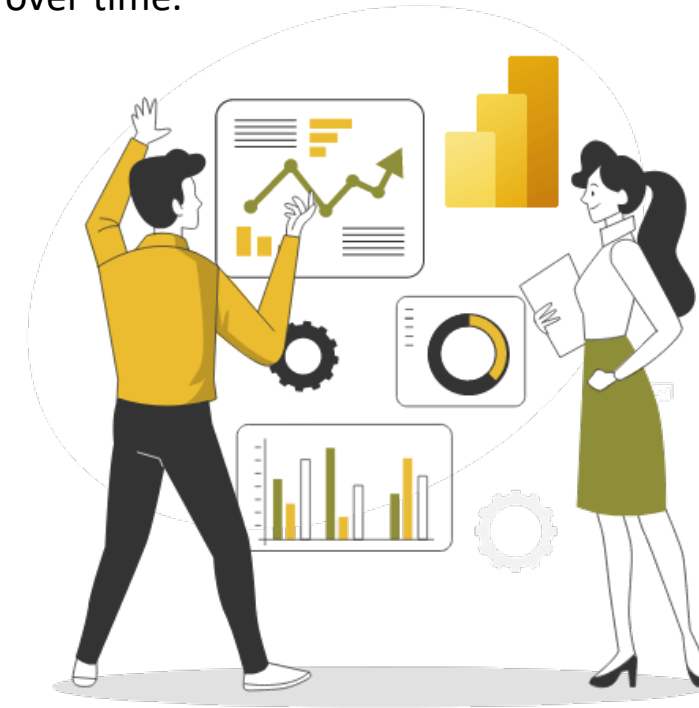
- Adjusting for inflation each year ensures rate comparisons remain accurate and reflect economic conditions.
- Automating inflation adjustments could streamline updates and maintain consistency.

- **Obtaining New Data Fields:**

- Pursue new fields, such as FTE allocation per year, to enable weighted average calculations, providing more precise labor cost estimates.
- Access to enriched data fields allows for granular analysis, increasing dashboard versatility.

- **Implementing a Delta Analysis Tool:**

- A Delta Analysis tool would track changes in labor rates over time, flagging significant shifts.
- This function helps monitor budget impacts and contract adjustments, which is essential for proactive cost management.





Power BI Pitfalls: Key Cautions for Sustainable Dashboards

• Dashboard Aging & Maintenance:

- Regular updates are essential; outdated data or visuals lead to diminishing accuracy and relevance.
- Set a review cadence to keep data connections and insights current, ensuring continued reliability.

• Column Names & Data Mapping:

- Avoid renaming columns within the dataset without updating in Power BI; mismatched names cause errors and disrupt visualizations.
- Consistent column names and data hierarchies improve model stability and help maintain clarity for future users.

• Documentation & Naming Standards:

- Comprehensive documentation makes dashboards easier to update and troubleshoot, especially when transitioning between analysts.
- Consistent file naming and storage locations are critical for keeping models linked and accessible, avoiding broken data connections.

• Data Source Permissions & Access Controls:

- Ensure permissions are updated as teams evolve; unexpected access changes can lead to broken links or missing data.
- Implement robust access controls to safeguard sensitive information and maintain compliance.



Conclusion & Access Guidance

• Power BI: Transforming Cost Analysis

- Power BI has proven essential in turning complex data into clear, actionable insights. From basic to advanced functions, it enables users to dive deep into data, enhancing cost analysis capabilities.
- Our journey covered everything from Power BI basics (Power BI 101) to advanced techniques (Power BI 301), demonstrating the power of a well-structured, intuitive dashboard.

• HN Database & Dashboard in Action

- The HN Labor Rate Database and Power BI Dashboard are live and actively supporting HN Leadership in data-driven decision-making.
- This tool is maintained with consistent updates, including inflation adjustments and efforts to add new data fields, ensuring continued accuracy and relevance.



• Requesting Access

- Those interested in exploring this dashboard can reach out through proper channels to request access.
- Due to the proprietary nature of the data, access is limited and may be restricted based on clearance, network access, and other security protocols.



Bonus/Optional - DAX & Power Query: Enhancing Power BI's Analytical Power

• DAX:

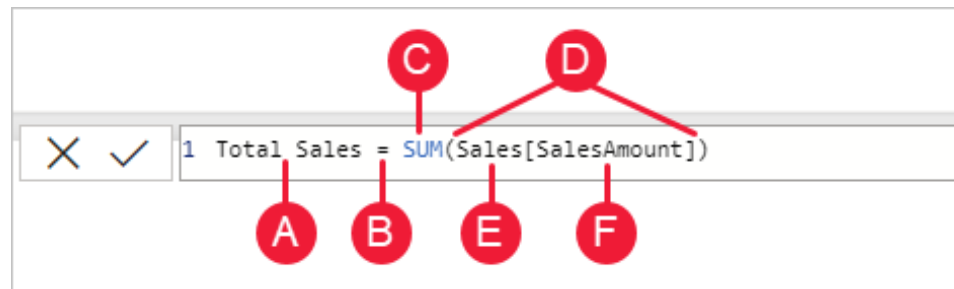
- DAX (Data Analysis Expressions) is a powerful formula language exclusive to Power BI, enabling complex calculations and data manipulations.
- Common uses include creating calculated columns, measures, and custom aggregations, which are essential for dynamic reporting.

• Power Query:

- Power Query provides a robust ETL (Extract, Transform, Load) tool within Power BI, allowing users to clean, transform, and reshape data before analysis.
- Key features include merging queries, unpivoting data, and appending tables from various sources, which is crucial for creating consistent, reliable datasets.

• Synergy of DAX & Power Query:

- Power Query prepares data, ensuring it's clean and structured; DAX then enables complex analysis, making the two tools highly complementary.
- Leveraging both tools optimizes Power BI dashboards, transforming raw data into meaningful, interactive insights.



- A. The measure name, Total Sales.
- B. The equals sign operator (=) indicates the formula's beginning.
- C. The DAX function SUM adds up all of the numbers in the Sales[SalesAmount] column.
- D. Parenthesis () surrounds an expression containing one or more arguments.
- E. The referenced table, Sales.
- F. The referenced column, [SalesAmount], is in the Sales table.