

# Visualizing Data to Identify Actionable Solutions

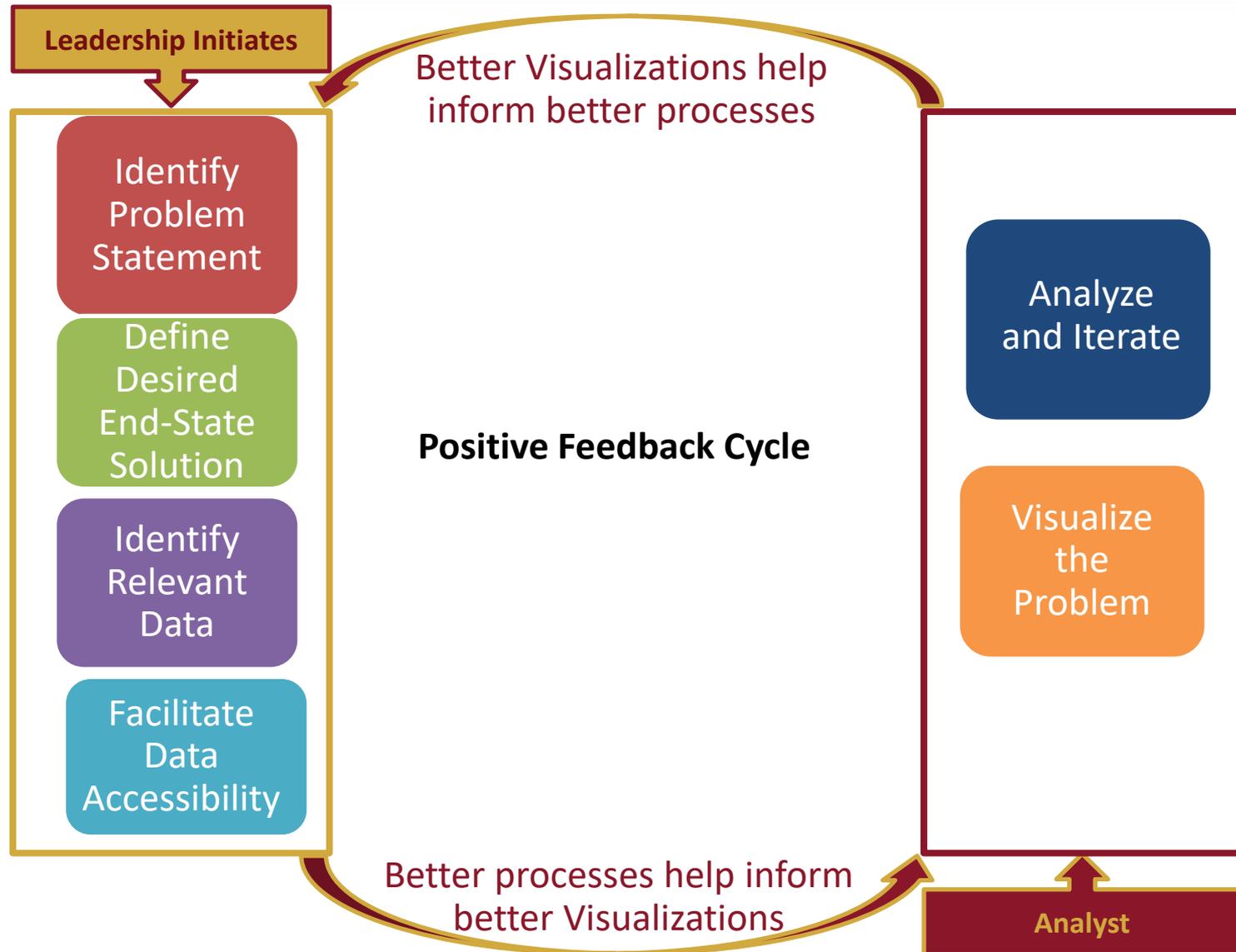
Tyler Duran & Alexander Garner

# Intent

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- Demonstrate a simple visualization process that can scale as needed, to include the resulting value-add; no step in this process is reliant upon a big data tool
- Identify why the absence of Big Data, AI, Machine Learning, or a brigade of Data Scientists should not deter you from injecting data into your decision-making process right now

# Visualization and Analysis



# Solution Visualization Life Cycle

## Does Not Require Access to Specialized Labor or Tools

### 1. Define question/problem statement

- Identify high level problem or existing solution in need of refinement
- Describe to your analytics team what you think needs to be known to address this problem
- **A strong problem statement enables a refined dashboard**

### 2. Define Desired End-State Solution

- Determine what a successful resolution to this problem looks like using resources on hand
- Identify acceptable short term and long-term solutions
- **Dashboards do not need to be perfect with the first iteration**
- Identify Relevant Data
- Which business unit maintains access control
- Is this data an output from an existing business system, or is it available today
- **What data is available today**

### 3. Foster culture of data accessibility

- Communicate to team members the importance of collecting and sharing data
- Manage hurdles connecting to outside organizations/getting system access approval
- **Free team to focus on data analysis**

## Use Existing Resources

# Data Visualization Project

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## Problem Statement & Question

- Problem: We have a growing backlog of invoices awaiting payment
- Our organization is not processing invoices at a rate consistent with the rate we receive them
- Question: What is changing this? Are we receiving more invoices than we used to? Are we working slower?

## Desired Outcome

- Our organization needs to be more efficient with the resources we have, introduce additional resources, or identify opportunities to adjust the business process that results in a decrease of invoice volume
- Develop a tool or process to track backlog and find bottlenecks

## Relevant Data

- Our organization uses XYZ software to receive, track, report, and submit invoices for payment to DFAS

## Data Accessibility

- Team assigned to remediate this problem requires access to the XYZ payment records

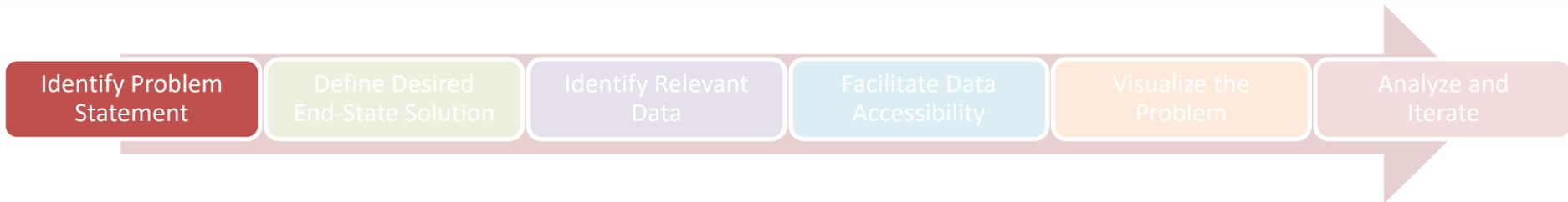


**Dashboard Demonstration**

# DASHBOARD DEMONSTRATION

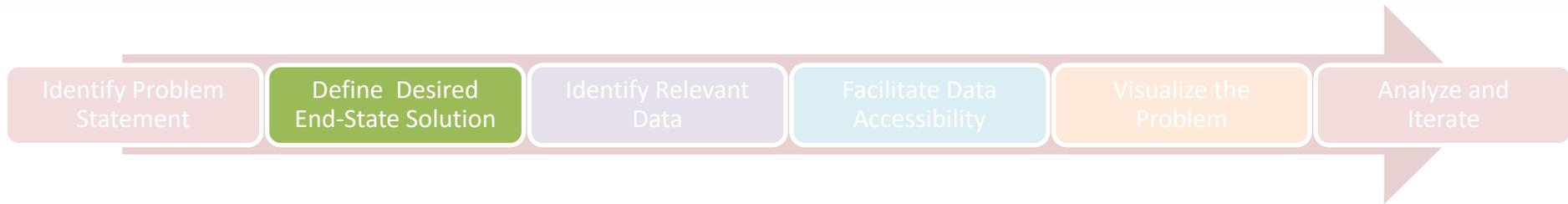
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# Identify the Question



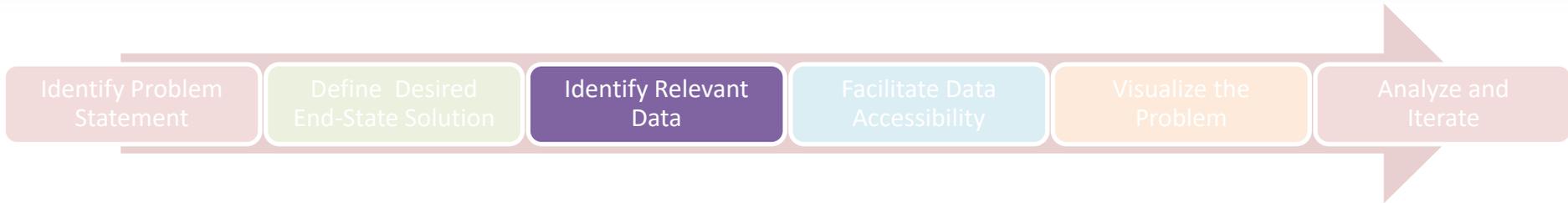
- In order to be useful, a visualization should address a discrete problem
  - You've likely seen pretty dashboards full of data that does not tell you anything you need to know
- Questions can be broad or narrow; narrower questions enable quicker solutions
- What you think is the problem may not be the whole of the problem; pivot as you iterate

# Define End-State Solution



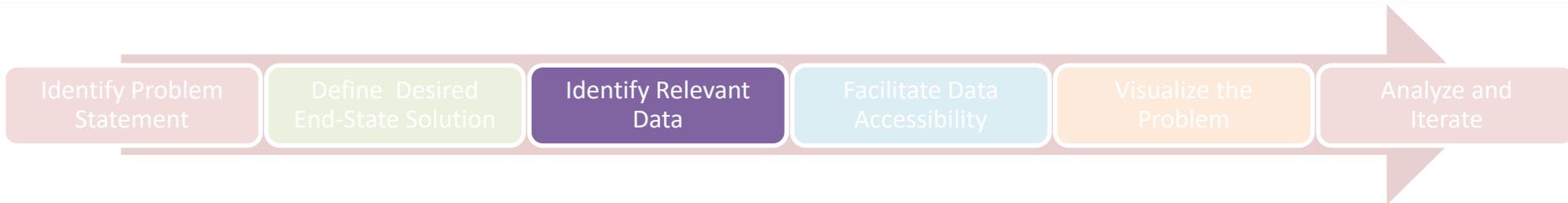
- Identify the level of detail needed to take actionable steps
- If possible, describe ideal output visuals (charts, tables, etc.) without being prescriptive
- Anticipate audience follow up questions
  - May require additional problem statements & data collection
- What you think you need to know to address the problem may not give a complete picture of the problem

# Identify Relevant Data



- Collecting, storing, and managing data requires time and resources
  - Host data where it can be leveraged by multi-discipline teams; one-off spreadsheets stored on someone's desktop can not be leveraged for organizational value
- Where possible, migrate data to a common environment to be leveraged by multiple teams pursuing different goals
  - Structuring the data environment in a way that facilitates accessibility for those with access needs will save time and money
  - Accessibility can be controlled through user access personas
- Publish an internal catalog of available data
  - Cost team obtains access to test event schedule
  - Schedule team obtains access to Tech Refresh Maintenance Plan
  - Business Manager obtains access to invoice processing database
- A good catalogue means data only needs to be discovered once

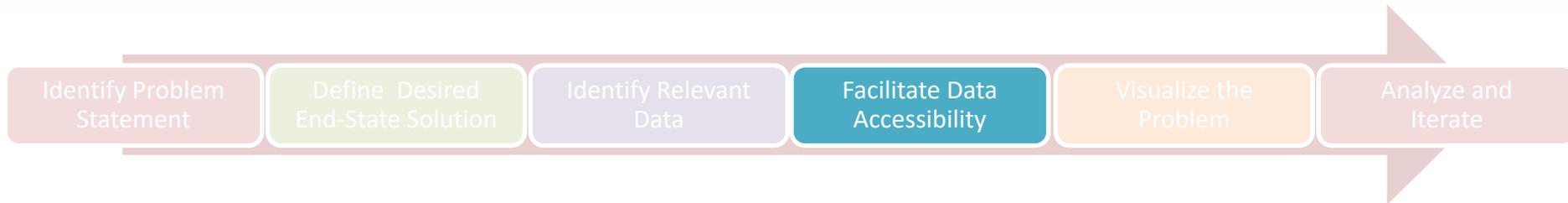
# Identify Relevant Data



## 2020 DoD Data Strategy: Goals

1. Make Data Visible – Consumers can locate the needed data.
2. Make Data Accessible – Consumers can retrieve the data.
3. Make Data Understandable – Consumers can recognize the content, context, and applicability.
4. Make Data Linked – Consumers can exploit data elements through innate relationships.
5. Make Data Trustworthy – Consumers can be confident in all aspects of data for decision-making.
6. Make Data Interoperable – Consumers have a common representation/ comprehension of data.
7. Make Data Secure – Consumers know that data is protected from unauthorized use/manipulation.

# Facilitate Data Accessibility

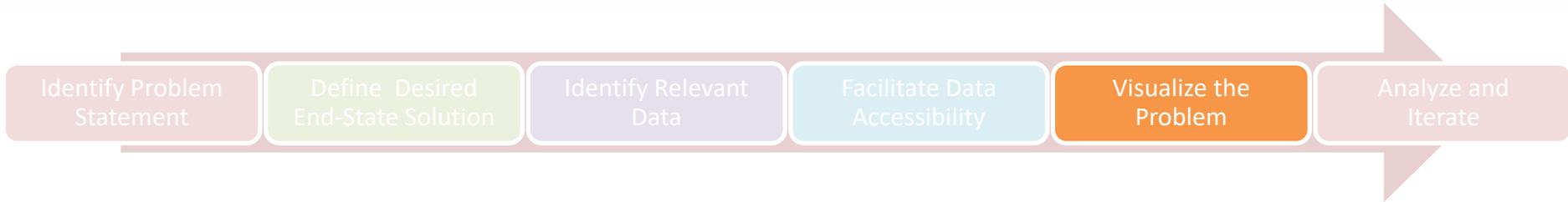


*[...] DoD is making the cultural shift from the need to know (i.e., information withholding) to the responsibility to provide (i.e., information sharing)."*

*- 2020 DoD Data Strategy*

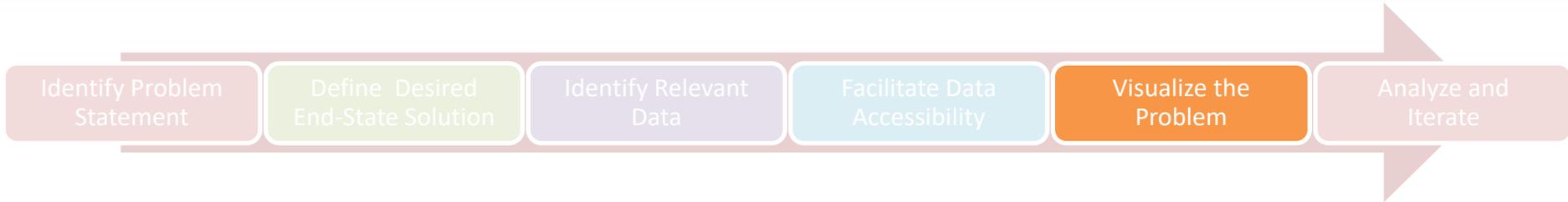
- Increasing internal data availability requires a cultural shift
- Mitigate security concerns by consolidating organizational data into a common environment, governed by access controls
- Time spent obtaining access is wasted time; in many organizations we have the skill sets required to solve our problems on hand, but these people don't have the data

# Visualize the Problem



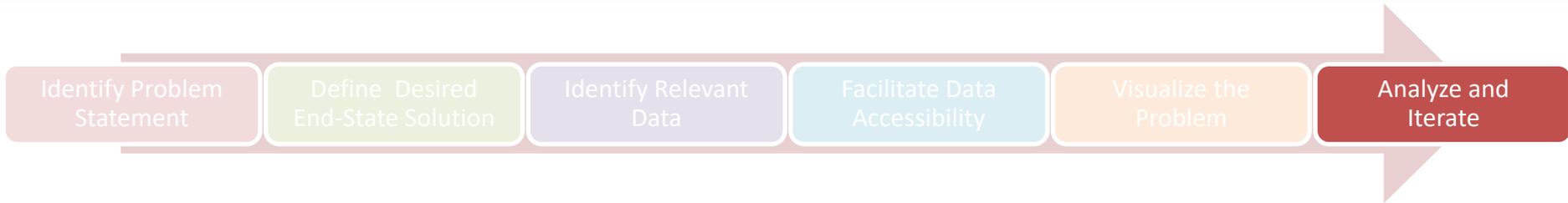
- Tools do not solve problems; processes do!
- Dashboards are not solutions, they facilitate solutions
  - Final product is a decision, not a dashboard
- Dashboards should summarize data that directly addresses problem
  - Avoid generating dashboards just because you have data
- Carefully evaluate visualization capability before purchasing a new tool
  - Many tools are quality products, but will not add value to our mission until we have quality data

# Visualize the Problem



- Models and visualizations are only as good as the underlying data
  - Garbage In = Garbage Out
- Where possible, use data that already exists
  - Derivation > Generation
- If new data is needed, focus on efficiently capturing only necessary information
  - Time spent collecting data is time not spent executing mission
- Precision of data should reflect scope of problem

# Analyze & Iterate



- Analysis as an iterative process
  - Questions beget questions
  - Interrogating data can lead to more or different data
- As analysis matures, team can refine initial questions by refining initial assumptions
- Look for opportunities to automate as you iterate
  - Gets actionable data to leadership faster
  - Eliminates burdensome reporting processes

# Key Takeaways

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- We can start using data to solve problems today
  - Data, expertise, and tools all exist within the enterprise
  - Not necessarily needed to depend on outside experts or technical solutions
- Clear communication is paramount
  - Identify business or execution problems
  - Share data necessary to complete analysis
  - Visualizations are iterative; feedback is essential for refinement

**Many opportunities exist to better leverage data that already exists, with tools that are already accessible.**

# Questions?

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