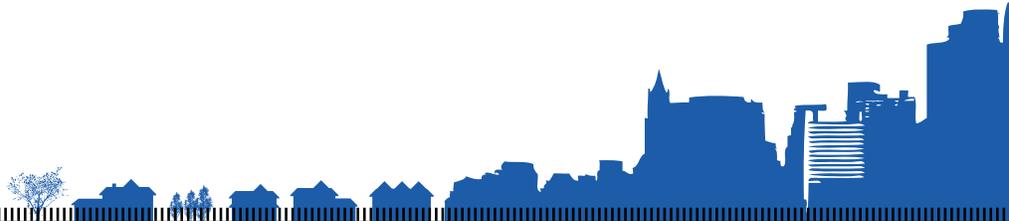


# Office of the Chief Data Officer

## Data Maturity Assessment Report



**U. S. Department of Housing and Urban Development  
Office of the Chief Data Officer  
Data Maturity Assessment Report**

**September 2023**

## Acknowledgments

The U.S. Department of Housing and Urban Development (HUD) thanks all the stakeholders and partners that supported the work of the Office of the Chief Data Officer (OCDO) on the Data Maturity Assessment project.

First, OCDO expresses gratitude to Rob King, the Chief Data Officer of the U.S. Social Security Administration (SSA), and Nirmala Ramprasad, Director of the SSA Analytics Center of Excellence. OCDO greatly appreciates their generosity in sharing the data maturity assessment model and meeting with OCDO, providing a comprehensive overview of the model, and addressing inquiries while offering valuable guidance. Drawing from the SSA Advanced Analytics Capability Maturity Model foundation, OCDO successfully developed a tailored version to suit HUD's needs.

In addition, OCDO extends their gratitude to the HUD Customer Experience (CX) team within OCFO for their exceptional collaboration as valued partners in the Data Maturity Assessment project. Through this collaboration, the team seized the opportunity to assess data maturity and customer experience within HUD program offices. This endeavor enriched HUD's assessment model with a distinctive element and furnished OCDO with invaluable insights into CX data, thereby deepening OCDO's understanding of the overall data capabilities of HUD.

Finally, OCDO extends their utmost appreciation to all the HUD program offices, with a special acknowledgment to the members of the Data Governance Council for their unwavering support and exceptional cooperation throughout the assessment process. Their contributions have been instrumental in successfully completing the assessment, and OCDO is grateful for their dedication and collaboration.

This report serves as a crucial reminder that the work of the OCDO cannot exist in isolation. HUD OCDO is committed to forging ongoing collaborations with peer agencies, partners, and stakeholders, both within and outside of the organization, with the shared goal of attaining HUD Data Program goals and objectives. By fostering these strategic partnerships, OCDO strives to maximize the effectiveness and effect of its efforts.

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## Executive Summary

The Office of Management and Budget established the Federal Data Strategy Action Plans for 2020 and 2021 to facilitate the implementation of the Federal Data Strategy during a 10-year period. The 2020 Action Plan identified six fundamental actions crucial for effectively harnessing data as a strategic asset. This report addresses the action “Assess Data and Related Infrastructure Maturity,” which appears as Action 3 in both the 2020 and 2021 Federal Data Strategy Action Plans.

The Office of the Chief Data Officer (OCDO) Data Governance Division (DGD) conducted its first Data Maturity Assessment across the agency in May 2023. Twelve HUD program offices participated and submitted self-assessments on four measurable attributes (Data, Technology, Analytics, and Data Culture) at five different levels of maturity (levels 1 to 5) in the selected Data Maturity Model (DMM). The DMM also incorporated Customer Experience (CX) assessment questions into three attributes to understand the CX-related data. All CX questions are qualitative; thus, no numerical scores are associated with the assessment results.

**HUD’s initial Data Maturity Assessment results reveal a maturity level of 2, accompanied by an overall score of 2.86 (Managed, Ad Hoc Capability) trending toward level 3 (Defined Formal Standardize Capability).** This assessed maturity level indicates that the data management and analytics capabilities are currently addressed in an ad hoc manner, needing more standardized and consistent processes and tools. However, it is noteworthy that exceptions exist for areas such as data protection, data access, and data privacy, where more structured approaches are already in place.

Across the agency, HUD program offices have consistently demonstrated strong performance in areas related to data protection, data access, and data privacy, thereby establishing a robust defense mechanism to ensure security, privacy, integrity, regulatory compliance, and data governance. However, opportunities still exist for improvement in fostering a data culture and enhancing analytics capabilities. OCDO, in collaboration with HUD’s program offices, is dedicated to cultivating a vibrant data culture by developing the necessary data skills and optimizing data management practices. These efforts aim to enhance the overall value of data in program operations. Exhibit 1 shows the assessment’s three highest and lowest scoring subcategories.

**Exhibit 1. Highest and Lowest Scoring Subcategories in the Data Maturity Assessment**

No.	Highest Scoring Subcategory	Lowest Scoring Subcategory
1.	Data Protection (3.83)	Data Skills (1.82)
2.	Data Access (3.83)	Data Analytics (2)
3.	Data Privacy (3.75)	Promotion and Awareness (2.25)

The CX portion of the data assessment responses revealed that HUD does not have a single process for customer data collection and management, which presents both opportunities and challenges for integrating CX into data practices.

Based on the assessment findings on data management and customer experience, four main areas have been identified for improvement across program areas at HUD.

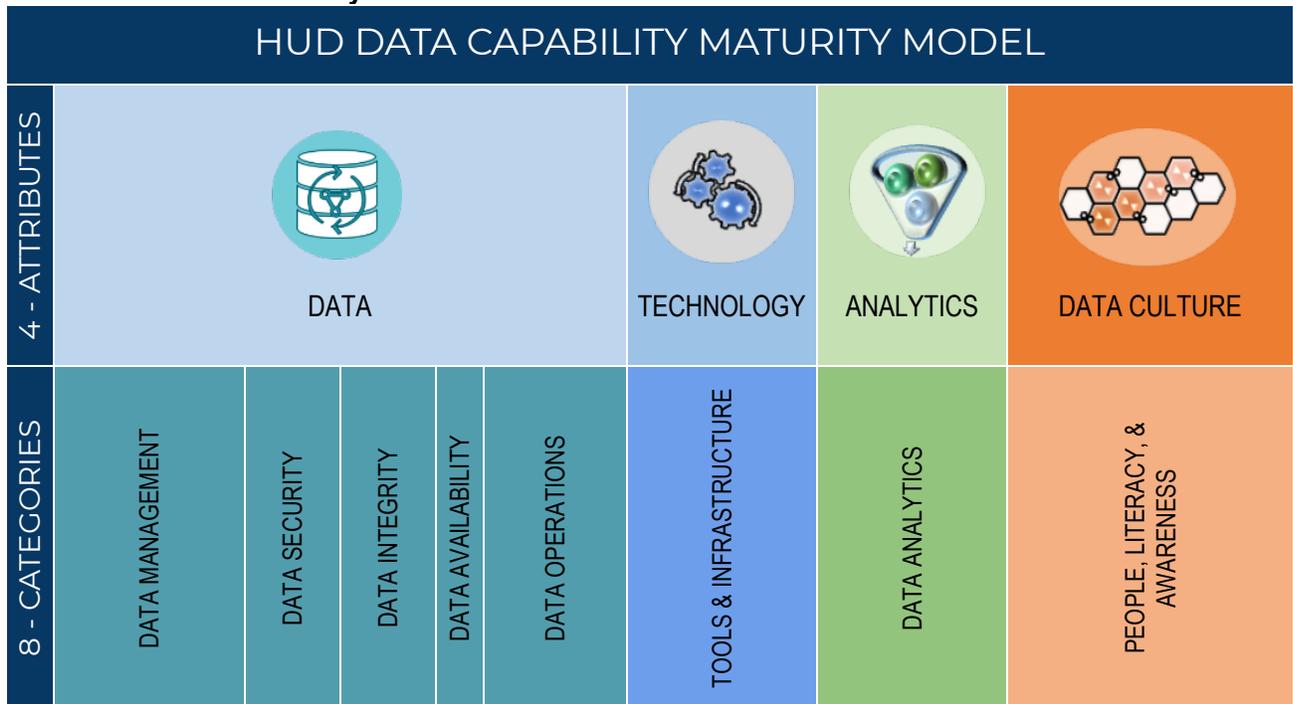
- Building community governance (for example, integrated collaboration across OCDO, the Office of the Chief Information Officer (OCIO), Program Offices, Privacy Office, and so on) within the agency to support data policies and standards.
- Strengthening metadata management by establishing an enterprise data inventory consisting of critical data elements, business processes, business, glossary, data lineage, and metadata.
- Enhancing data analytical tools and capabilities by (1) working with stakeholders across the agency to ensure agency data are trusted and accessible for reporting and analytics purposes and (2) working with OCIO to establish an enterprise analytics and reporting platform where data are centralized for this purpose.
- Assessing data skills and creating a data literacy training program to provide data literacy training annually across the organization.

## Background and Model Selection

To help federal agencies meet a wide array of legislative and administrative requirements, including the Foundations for Evidence-Based Policymaking Act of 2018 (hereafter, Evidence Act),<sup>1</sup> the Federal Data Strategy published Agency Actions to guide federal agencies in conducting foundational activities to leverage its data as strategic assets. “Assess Data and Related Infrastructure Maturity” and “Data and Infrastructure Maturity” were listed as Action 3 in the Federal Data Strategy 2020 Action Plan and 2021 Action Plan, respectively (FDS, 2020: 25; FDS, 2021: 9). Like other federal agencies, HUD is required to conduct an initial maturity assessment focusing on data and related data infrastructure to set a baseline for future improvements. The maturity assessment should be repeated periodically to measure progress and prioritize the next steps.

HUD’s data maturity assessment model builds on the U.S. Social Security Administration’s (SSA) Advanced Analytics Capability Maturity Model, which was developed to incorporate people, processes, technology, data, analytics, and culture (SSA, 2020). The model provides a comprehensive view of organizational capabilities. HUD leveraged and customized the SSA model into 4 attributes, 8 categories, and 26 subcategories. In the meantime, HUD’s Customer Experience (CX) team also planned to assess the CX capabilities across HUD. The Office of the Chief Data Officer (OCDO) Data Governance Division (DGD) and CX teams decided to collaborate on the maturity assessment project to integrate the CX questions into the data maturity assessment model, adding a unique layer to the overall model that went to all HUD program offices. Exhibit 2 shows the layout of the final maturity assessment model.

**Exhibit 2. HUD Data Maturity Assessment Model Overview**



<sup>1</sup> Congress. Gov, H.R.4174 - Foundations for Evidence-Based Policymaking Act of 2018, <https://www.congress.gov/bill/115th-congress/house-bill/4174/text>.

<b>26 - SUBCATEGORIES</b>
DATA MANAGEMENT STRATEGY
DATA GOVERNANCE MODEL
DATA POLICIES & PROCESSES
DATA STANDARDS & PROCEDURES
DATA PROTECTION
DATA PRIVACY
DATA QUALITY FRAMEWORK
DATA QUALITY ASSURANCE
DATA ACCESS
METADATA MANAGEMENT
DATA COLLECTION
CUSTOMER EXPERIENCE
DATA INTEGRATION
DATA ANALYTICS TOOLS
VISUALIZATION & REPORTING TOOLS
CUSTOMER EXPERIENCE
DATA ANALYTICS
DATA VISUALIZATION
REPORTING & DISTRIBUTION
CUSTOMER EXPERIENCE
DATA SKILLS
LEARNING OPPORTUNITIES
COMMUNICATION
LEADERSHIP ENGAGEMENT
PROMOTION & AWARENESS
STAFF RECOGNITION

Source: HUD Data Maturity Assessment Model

### Assessment Design

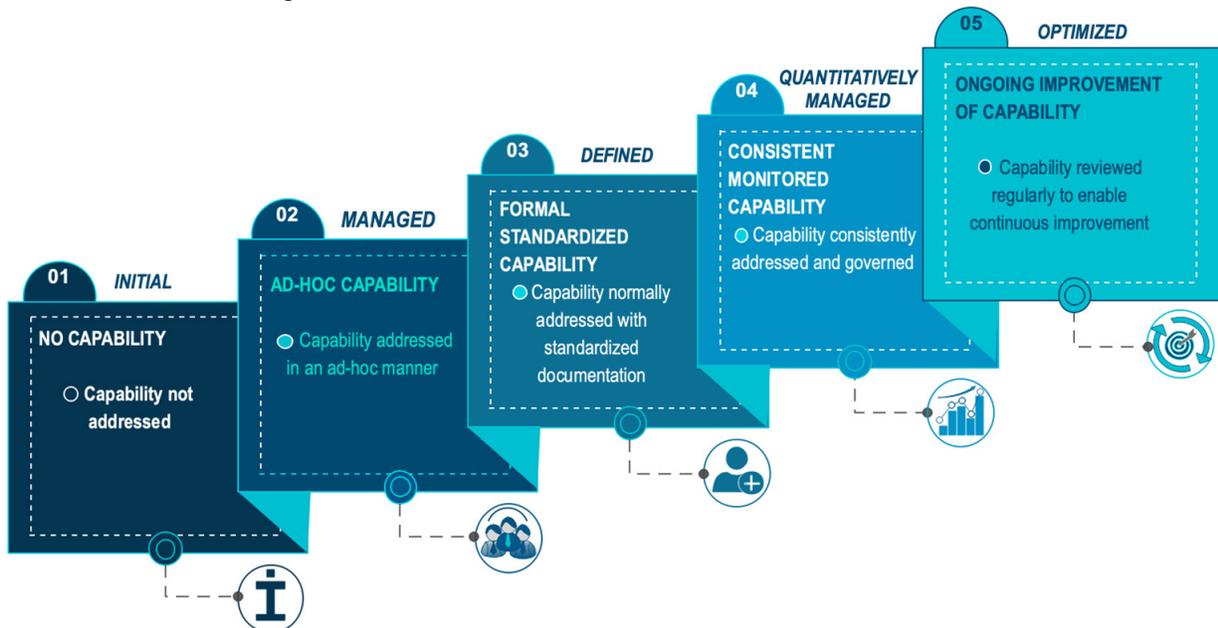
The four attributes HUD decided on to measure the maturity level across the agency are data, technology, analytics, and data culture. They were chosen after consolidating the assessment requirements from the Evidence Act and an Office of Management and Budget memo (OMB, 2019), with seven core enabling aspects: (1) Data Governance; (2) Data Strategy; (3) Privacy and Security; (4) Data Architecture; (5) Data Quality; (6) Metadata Management; and (7) Records Management. The Federal Data Strategy recommended that a first-time data maturity assessment focus on the first five core enabling aspects, or the enabling practices cited in the Evidence Act.

In addition, the Federal Data Strategy also provided six lanes of the federal Data Maturity Model: (1) Analytics Capability; (2) Data Culture; (3) Data Management; (4) Data Personnel; (5) Data Systems and Technology; and (6) Data Governance.

Combining both guidance, OCDO decided to create four attributes to cover the entire data management life cycle—data governance, data strategy, privacy and security, data quality, metadata management in the data attribute; data architecture in the technology attribute; analytics capability is under the analytics attribute; and the data culture attribute covers both data culture and data personnel.

The assessment model embedded a scoring system to measure each subcategory numerically using five maturity levels ranging from 1 (no capability) to 5 (continuous improvement) and weighted equally. Exhibit 3 shows the five levels of maturity.

### Exhibit 3. HUD Maturity Assessment Levels



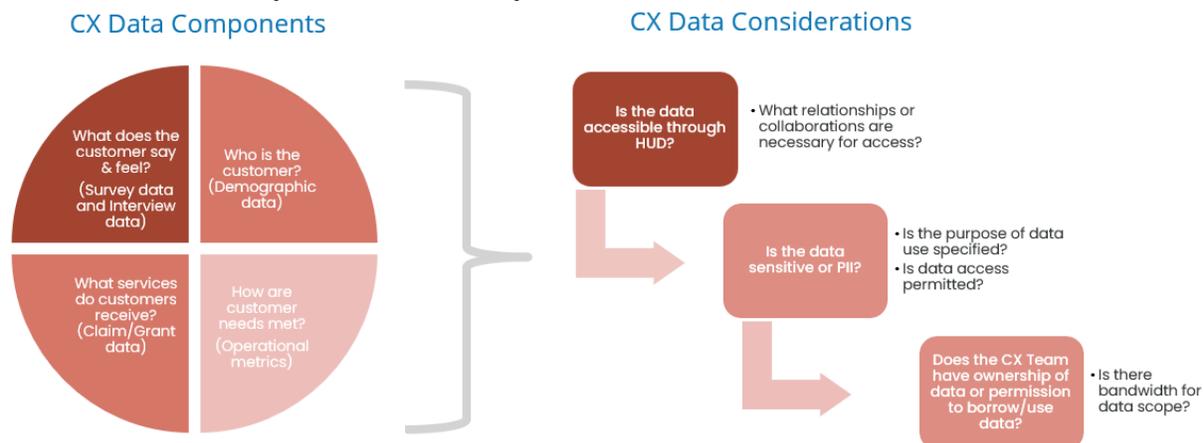
Source: HUD Data Maturity Assessment Model

### Customer Experience Questions

Following Executive Order 14058 and other federal mandates, delivering excellent, equitable, and secure federal services and customer experience, especially for those who have been historically underserved, has been critical for the federal government to transform the federal government programs, processes, and services and rebuild trust from citizens (GSA, n.d.; OMB, 2020; The White House, 2021). The HUD CX team under the Office of the Chief Financial Officer partnered with OCDO on the maturity assessment by integrating CX-related questions into the data management assessment process in three attributes—data, technology, and analytics.

All the CX questions are open-ended and aim to understand HUD program offices’ current capabilities in collecting, managing, and applying CX data. The questions are grouped into data collection, data privacy, equity, data management tools, analytics management, and analytics capabilities. Exhibit 4 illustrates what constitutes CX data and how the CX data are categorized.

**Exhibit 4. Customer Experience Data Components and Data Considerations**



CX = customer experience.

Source: CX Data Strategy 2022, page 3

For all subcategories and definitions on the HUD Data Maturity Assessment Model, see appendix A.

**Implementation**

The Office of the Chief Data Officer (OCDO) launched its first Data Maturity Assessment across HUD program offices in May 2023. It plans to conduct the assessment annually with modified categories and questions to document the progress and align with the agency’s changing goals, program priorities, and new laws and requirements. To establish the baseline understanding of data infrastructure, including all aspects of policies, procedures, and operations related to data, 12 program offices across five lines of business at HUD submitted self-assessments. Exhibit 5 lists participating program offices in the initial Data Maturity Assessment.

**Exhibit 5. HUD Program Offices That Participated in the 2023 Data Maturity Assessment**

No.	Program Office
1.	Office of the Chief Financial Officer
2.	Office of the Chief Information Officer
3.	Office of Policy Development and Research
4.	Office of Public and Indian Housing
5.	Office of Multifamily Housing
6.	Office of Single-Family Housing
7.	Office of Community Planning and Development
8.	Office of Fair Housing and Equal Opportunity
9.	Office of Lead Hazard Control and Healthy Homes
10.	Office of Field Policy and Management

No.	Program Office
11.	Government National Mortgage Association
12.	Real Estate Assessment Center

The monthly Data Governance Council meeting served as the vehicle for coordinating and implementing OCDO activities and projects. The Data Governance Council members, senior management representing program offices across HUD, played an essential role in ensuring that each program office’s requisite and pertinent staff completed the maturity assessment. The Data Governance Division of OCDO provided office hours to assist program offices during the assessment period.

### Enterprise-Level Assessment Results

After receiving all 12 program offices’ self-assessment submissions, the Data Governance Division conducted the analysis based on the score in each subcategory, excluding the Customer Experience (CX) subcategory, and calculated a mean score for each attribute and the overall organization. This mean score serves as a measure of the average performance and maturity level for each attribute and provides an overall assessment of the organization’s data management capabilities. Exhibit 6 shows the breakdown of scores in attributes and subcategories.

**Exhibit 6. HUD Data Maturity Assessment Score by Attributes and Subcategory**



Source: 2023 Data Maturity Assessment Results

**Based on the initial Data Maturity Assessment, HUD’s maturity level is currently rated at 2 out of 5, with an overall score of 2.86, indicating a Managed, Ad Hoc Capability leaning toward level 3 (Defined Formal Standardize Capability).** These results mean that significant opportunities exist for the agency to enhance its data management and analytics capabilities that are currently addressed in an ad hoc manner.

## Enterprise-Level Data Maturity Assessment

Across the agency, HUD program offices, on average, scored much better in areas that pertain to data protection, data access, and data privacy, demonstrating a solid data defense ensuring data security, privacy, integrity, regulatory compliance, and governance.

The three highest scoring subcategories in the assessment are all under the Data attribute.

- **Data Protection** (3.83 out of 5)  
The Data Protection subcategory received the highest score and was measured at level 3 on maturity. It shows that on the enterprise level, HUD has formal data protection processes and procedures to protect data from internal and external threats, which are implemented across the agency.
- **Data Access** (3.83 out of 5)  
The Data Access subcategory also received the highest score of 3.83 and was measured as level 3 on maturity. It shows that HUD program offices, on average, have formal processes and policies in place for data access requests from information consumers.
- **Data Privacy** (3.75 out of 5)  
The data privacy subcategory scored 3.75 and was measured as level 3 on maturity. It shows that HUD, on the enterprise level, has formalized processes and procedures to identify and protect data related to an individual's privacy, and they are consistently monitored, governed, and reported periodically across the agency.

The areas that provide opportunities for improvement are primarily in the data culture and analytics attribute, demonstrating that HUD program offices should build a robust data culture with needed data skills and optimize data analytics to leverage the value of data in program operations.

Enhancing the data culture necessitates cultivating a mindset and environment that prioritize data as strategic assets. This objective can be accomplished by implementing various initiatives, including promoting data literacy, offering comprehensive training and resources for developing data-related skills, and fostering a collaborative work environment that embraces data-driven decisionmaking. HUD can establish a robust foundation for a data-centric culture to thrive by undertaking these measures.

Moreover, maximizing the potential value of data in program operations necessitates the optimization of data analytics. This entails strengthening capabilities and capacity for effective data analysis, leveraging advanced analytics techniques to extract meaningful insights from data, and applying those insights to drive informed decisionmaking and enhance program outcomes. By prioritizing these efforts, HUD can harness the power of data analytics to unlock new opportunities and drive continuous improvement in program performance.

The three lowest scoring subcategories in the assessment are—

- **Data Skills** (1.83 out of 5)  
The Data Skills subcategory scored 1.83 and was measured at level 1 on maturity. This subcategory is the lowest scoring in the assessment. It shows that HUD program offices, on average, need formal processes in place to identify data skills required for data governance and life-cycle management.

- **Data Analytics** (2 out of 5)  
The Data Analytics subcategory scored 2 and was measured at level 2 on maturity. It shows that HUD program offices, on average, can use basic data analytical methods, including descriptive analytics, basic methods of discovery, and unsophisticated explanatory analytics.
- **Promotion and Awareness** (2.25 out of 5)  
The Promotion and Awareness subcategory scored 2.25 and was measured at level 2 on maturity. It shows that HUD program offices, on average, have some ad hoc structures in place to support the adoption and use of data management policies and standards within the program office and promote awareness of the data resources.

For the complete list of subcategories' scores from the highest to the lowest, see appendix B.

## Customer Experience Assessment

The CX portion of the assessment consists of open-ended questions for program offices to fill in and explain how they collect and use CX data.

### *What Was Learned*

- Tools and Technology
  - ✓ HUD uses a great diversity of data tools and techniques throughout. MicroStrategy, Excel, Structured Query Language (various implementations), and Customer Relationship Management systems are popular data management and analysis tools.<sup>2,3</sup>
  - ✓ Some program offices use more modern technologies, such as data warehouses, data lakes, and Extract, Transform, Load pipelines.<sup>4</sup>
  - ✓ The variety of tools in use presents opportunities for a flexible approach to CX data management and analysis maturation as it moves beyond the basic Voice of the Customer tooling.<sup>5</sup>
- Data
  - ✓ Every office uses and, therefore, manages and protects Personally Identifiable Information differently.
  - ✓ The U.S. Department of Veterans Affairs, the U.S. Census Bureau, and state and local governments are the most common data collection partners.
  - ✓ Large variations exist in what and how Operational Data are collected, generally dependent on the line of business's subject matter.
- Analytics
  - ✓ Almost all offices have some Microsoft Power BI or MicroStrategy visualizations, which can serve as a baseline to build from.
  - ✓ The understanding of the analytics landscape at HUD is still incomplete.

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<sup>2</sup> Structured Query Language, or SQL, is a programming language used when working with relational databases and is sometimes used as a stand-in descriptor for the databases.

<sup>3</sup> Customer Relationship Management systems are technologies for managing an organization's relationships and interactions with customers, including storing large amounts of customer data.

<sup>4</sup> Extract, Transform, Load is the process of transforming raw data into useable formats, then loading them into storage for use in analytics and operations.

<sup>5</sup> Voice of the Customer tools are software and applications that can gather and consolidate customer feedback from a customer base.

- ✓ Future CX analytics partnerships can build on both internal and external analytic partnerships.

### *What's Still Needed*

- Specificity
  - ✓ A more granular understanding of what data could advance CX at HUD is needed. It is not easy to be both expansive and specific about datasets on a survey response, so further conversations with program offices will be valuable to understanding where CX fits into the overall data landscape at HUD.
- Data Products
  - ✓ A complete understanding of data products, visualizations, and projects is needed to determine where CX data could be layered to build greater customer understanding.

### **Recommendations**

Based on the assessment findings, four main areas of improvement have been identified across program areas at HUD.

- **Building Community Governance.** Establishing the Data Governance Board at HUD provides opportunities to manage the agency's data holistically and consistently. The Office of the Chief Data Officer (OCDO) will continue to work with program offices to build a community of governance, with regular meetings with the Data Governance Council members and other working groups to set rules on how to manage data, how to resolve data issues, protect data, and serve the data needs of various functions across the agency.
- **Strengthening Metadata Management.** Building an enterprise-level data catalog and metadata at HUD is critical for understanding the current data inventory and providing data governance for managing other data. OCDO will work with program offices to integrate their existing program-level metadata, moving from program silos to building an enterprise-level technical taxonomy.

OCDO will partner with the CX team on the data catalog project to understand the current landscape, including identifying available data sources and assessing the visualizations and ongoing data products and projects within HUD, all which can guide the initial stages of the CX research process, leading to refined CX project selection and improved robustness of projects, along with providing insight into where CX may layer into ongoing analytics and visualizations.

- **Enhancing Data Analytical Tools and Capabilities.** Given the substantial volume of data that program offices collect and the growing need to harness it as a strategic asset, HUD must continuously strengthen its analytical capabilities, enabling valuable insights to drive more efficient program operation and decisionmaking processes. OCDO will collaborate with the Office of the Chief Information Officer to assess the current state of technology and tooling and choose analytical tools that align with the agency's strategic goals while considering the program office's unique requirements for advanced analytics.

As HUD's CX and data practices mature, the CX team will collaborate with program offices on analytical projects, particularly leveraging data visualization tools such as Power BI and others to integrate CX into HUD's daily operations more seamlessly.

- **Assessing Data Skills and Providing Data Literacy Training.** To move the agency to the next maturity level in data management, the appropriate data skills are the centerpiece to support HUD’s different mission-critical activities. OCDO will conduct a data skill gap analysis throughout the agency to understand the gaps in the data skills and the training needed to support program operations effectively and to use data as strategic assets. OCDO will create a Data Literacy Program and provide opportunities for continuous learning to support enhancement of skills for the current workforce across the organization.

## Looking Ahead

Completing the data maturity assessment marks the beginning of the Office of the Chief Data Officer’s (OCDO) journey to transform HUD’s data governance and management capabilities to a higher level of maturity, enabling the agency to leverage data as strategic assets in decisionmaking processes that support its mission of “creating strong, sustainable, inclusive communities and quality affordable homes for all” (HUD, n.d.). Looking ahead to the upcoming year, OCDO will use the assessment results as a benchmark and feedback from program offices to guide the next phase of work. These insights will significantly influence foundational activities at OCDO, including developing the data strategy, data program handbook, open data, data catalog and metadata, and data literacy training. OCDO eagerly anticipates continuing the momentum and collaborating with stakeholders and partners to cultivate a transparent, sustainable, and collaborative data culture at HUD.

## Appendix A. HUD Data Maturity Assessment Model—Subcategories

Exhibit 7. Data Attribute

 <b>DATA</b>		Identifies opportunities to govern and manage data across the enterprise to establish data integrity, data security, data availability, and data sharing
CATEGORY	SUBCATEGORY	DEFINITION
<b>Data Management</b>	Data Management Strategy	The goals, objectives, and regular processes for prioritizing data management across the organization
	Data Governance Model	The defined framework, including clear roles and responsibilities and operating model to enforce, monitor, and control implementation of data governance across the organization
	Data Policies and Processes	The data policies and processes supporting all aspects of data life cycle to establish data security, data integrity, data confidentiality, and data availability
	Data Standards and Procedures	The policies, requirements, and structure for all aspects of data operations, including data flow, data duration, data metrics, business ontologies, and change management
<b>Data Security</b>	Data Protection	The regular systematic processes and procedures or security controls in place to protect organizational data from internal and external threats effectively and efficiently (i.e., encryption at rest or in motion, masking, etc.)
	Data Privacy	The regular systematic processes to identify and protect the data related to privacy of an individual (i.e., Personally Identifiable Information [PII] and Protected Health Information)
<b>Data Integrity</b>	Data Quality Framework	The formal structures and processes used to ensure and measure the delivery of consistent, accurate, complete, and timely data to users across the organization
	Data Quality Assurance	The regular systematic processes of determining whether data meet the specified requirements of quality to support underlying business needs involving a combination of methodologies, processes, and business rules
<b>Data Availability</b>	Data Access	The processes and policies for requesting, granting, and monitoring access to data from information consumers
<b>Data Operations</b>	Metadata Management	The administration of information that describes other data
	Data Collection	The methods by which data are collected, captured, harvested, loaded, and formatted to support business requirements in alignment with privacy and security controls
	→ <b>Customer Experience Related Assessment</b>	
	Customer Experience (Data Collection)	<p>Communication methods used to receive customer inquiries within your program area (e-mail, phone calls, chat bots, online forms, paper forms, and other)</p> <p>Kind of operational data your program area collects and stores within the organization (demographic data, operational data, customer sentiment data)</p>

 <b>DATA</b>		<i>Identifies opportunities to govern and manage data across the enterprise to establish data integrity, data security, data availability, and data sharing</i>
CATEGORY	SUBCATEGORY	DEFINITION
		Collection methods used for customer satisfaction data
		External entities you partner with to collect data for your business purposes (Federal agency, state agency, local agency, commercial based organization, etc.)
		Collection methods used for demographic data (e.g., age, income level, medical information, or educational background, income, employment status, etc.)
	Customer Experience (Data Privacy)	The process, techniques, and controls to protect PII data (e.g., aggregation, anonymization, masking)
		The process, techniques, and methods to use PII data
Customer Experience (Equity)	Methods and techniques used to address equity concerns within your organization	

Source: HUD Data Maturity Assessment Model

**Exhibit 8. Technology Attribute**

 <b>TECHNOLOGY</b>		<i>Identifies the optimal ways to leverage new and existing technologies, including analytics, applications, data platforms, and infrastructure to manage data life cycle</i>
CATEGORY	SUBCATEGORY	DEFINITION
Tools & Infrastructure	Data Integration	The tools for bringing data from disparate sources together to provide users with a unified view
	Data Analytics Tools	Software and programs that collect and analyze data in order to improve processes and help uncover patterns to that help make data-driven decisions
	Visualization and Reporting tools	Tools used to represent information pictorially and graphically, highlighting patterns and trends in data to help the user understand the content easily
	→ <b>Customer Experience Related Assessment</b>	
	Customer Experience (Data Management Tools)	Ingestion tools and technologies currently in use within your program area (Customer Relationship Management, Application Programming Interface, other)
		Storage tools and technologies currently in use within your program area (Database, data warehouse, data lake, excel tables, other)
Analytics tools and technologies currently in use within your program area (Business Intelligence, Artificial Intelligence/Machine Learning, visualization, other)		

Source: HUD Data Maturity Assessment Model

**Exhibit 9. Analytics Attribute**

 <b>ANALYTICS</b>		<i>Identifies the analytic tradecraft and techniques that may be applied to generate insights from data</i>
CATEGORY	SUBCATEGORY	DEFINITION
<b>Data Analytics</b>	Data Analysis	The process of examining unstructured or structured data to describe, discover, explain, predict, and advise. Methods include outlier analysis, categorizing, clustering, extracting, summarizing, and modeling with data.
	Data Visualization	The methods and techniques used to represent data or information as visual objects to communicate information more clearly and effectively to different data consumers or audiences.
	Reporting and Distribution	The methods by which analytic reports are created, published, and distributed within and external to the organization (e.g., dashboards, static reports, on-demand reporting, ad hoc reports, and other required reports).
	<b>→ Customer Experience Related Assessment</b>	
	Customer Experience (Analytics Management)	The projects and products an organization manages or maintains for analytics and insight purposes.
		Data Visualization tools currently in use within the organization for internal and external purposes.
Customer Experience (Analytics Capabilities)	External entities you partner with for analysis purposes (Federal agency, state agency, local agency, commercial based organization, etc.).	

Source: HUD Data Maturity Assessment Model

**Exhibit 10. Data Culture Attribute**

 <b>DATA CULTURE</b>		<i>Identifies the set of organizational data worker skill sets and mechanisms that reinforce, communicate, and establish awareness of the importance of data management to support evidence-based decisionmaking</i>
<b>CATEGORY</b>	<b>SUBCATEGORY</b>	<b>DEFINITION</b>
<b>People, Literacy, &amp; Awareness</b>	Data Skills	The formalized procedures in place to identify the essential knowledge and skills required to manage and govern data within the organization
	Learning Opportunities	The professional learning opportunities and platforms (e.g., instructor-led, web-based, rotational assignments, shadowing) offered within the organization to enhance and build the data management skills and capabilities of the existing workforce
	Communication	Regular exchange of information within an organization to discuss and share data management activities through a variety of channels
	Leadership Engagement	The level to which leadership is engaged and supportive of the value of data management and actively progressing the goal for evidence-based decisionmaking
	Promotion and Awareness	The existing organizational processes and procedures available to promote adoption of data management (e.g., implementation of policies and standards) and build awareness for data resources throughout the organization
	Staff Recognition	The specific organizational programs that recognize the employees engaged in managing the data life cycle or involved with data management activities within the organization

Source: HUD Data Maturity Assessment Model

## Appendix B. HUD Data Maturity Assessment Subcategory Score Ranking

### Exhibit 11. Ranking

No.	Subcategory	Score
1.	Data Protection	3.83
2.	Data Access	3.83
3.	Data Privacy	3.75
4.	Data Collection	3.42
5.	Reporting & Distribution	3.33
6.	Data Policies & Processes	3.17
7.	Data Quality Assurance	3.08
8.	Data Quality Framework	3.00
9.	Leadership Engagement	3.00
10.	Visualization & Reporting Tools	3.00
11.	Data Management Strategy	2.92
12.	Data Visualization	2.92
13.	Data Integration	2.83
14.	Data Governance Model	2.83
15.	Data Analytics Tools	2.75
16.	Data Standards & Procedures	2.75
17.	Communication	2.67
18.	Learning Opportunities	2.67
19.	Staff Recognition	2.67
20.	Metadata Management	2.58
21.	Promotion & Awareness	2.25
22.	Data Analytics	2.00
23.	Data Skills	1.83

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