Leveraging OAC for Analytic Warehousing

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A Progressive Partner

800+ **Consultants** on Huron's Oracle team

650+ **Oracle Cloud Certifications**

230+ **Oracle Cloud Clients**

Expertise
in supply chain management, inventory management, procurement and EMR integration

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Highlights

- Formed in 2002
- More than 5,660 full-time professionals
- 2023 revenue of $1.4 billion
- Headquartered in Chicago
- Publicly traded on NASDAQ
- Served more than 2,000 organizations and institutions in 2022

Analytic Warehouses are Different

Many traditional data warehouses were designed for storage

Efficiency in storing rather than retrieving

Analytic warehouses are designed for answering queries

Effectiveness in responding rather than hoarding

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Data Warehouse vs. Analytic Warehouse

- For storing data
- Process external data to load via ETL processes
- Emphasis on **provenance** of data
- Grow by replicating data and aggregating data in multiple ways
- Includes all data
- Simple aggregation strategies
- All data inside warehouse

- For retrieving and analyzing data
- Processes data to create new analytic measures and structures
- Emphasis on **use** of data
- Grow by analytic workflows, creating new data
- Includes most important data
- Complex aggregation strategies
- Some data pointed to outside warehouse

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Analytic Warehouse Characteristics

- Organization around **logical structures** designed for analysis
- A distinction between the processing/query engine and the storage layer
- Lots of derived measures, comparative values, and the generation of new data elements and structures
- Emphasis on relationships, hierarchies, and structures (both discovered and assigned) within and between data elements
- Emphasis on the fast processing and delivery of queries
- Ability to federate data and execute queries and analytic processes in external data storage systems
- Ability to perform complex statistical, graphical, and high mathematical processes in parallel

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Analytic Warehouses and the Cloud

- Calculating new data can be done in cloud
- Data federation in cloud
- Consider where to do “specialized” functions
  - Machine Learning, Predictive Modeling, etc.
  - Spatial analytics (location and map analytics, drive-time, geo fencing)
  - Multi-dimensional cubes and hierarchical structures (OLAP)
  - Graph analytics (property graph, RDF and OWL, network, etc.)
- Scalability provides room to grow for unpredictable calculations

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Questions for Data Architects

- What problems are you trying to solve?
- What use cases provide the most value?
- Ad hoc vs presentation – affects design
- Who is your audience?
  - Casual vs every day, skilled?
  - End user / developer
- Data used for reporting or analytics tool?
- Data created by transactions or analysis?
- Data scanned by humans or scanned by algorithms?
- Data needs ad-hoc or predictable (justifies effort)?

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Five S for Analytic Architecture

- Sort – Determine which data is valuable and worth investing in
- Straighten – Determine naming conventions for tables, columns, schemas, and other objects
- Sweep – Get rid of old reports, scripts, processes, servers. Consolidate and simplify your system in scheduled intervals
- Standardize – invest in training and avoid doing the same thing five different ways. Determine which platforms and languages will the standard for the system. Keep exceptions exceptional.
- Sustain – establish strong, consistent business processes that reinforce the value and usability of your analytics system. Regularly pursue user feedback and support your power users.

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Demo

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Recommendations for Analytics

- Machine learning/data mining systems like wide tables
  - Allows ml/dm engine to find most predictive attributes
  - May need to simplify for end users
  - Can achieve via joins
- Prefer star schemas to third normal form
- Represent transactional data
- Normalize and standardize data, but …
- Don’t scrub out all the interesting data

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Recommendations for Analytics 2

- "Data warehouses" often have complicated rules
- Simplify for analytics purposes
  - Sales is sales, except when reason code is 'R' in case it is a return
  - Necessitates complex filter conditions and expressions
  - Drives users nuts
  - How to handle freight?
- Factless fact tables often used for counting
  - E.g. instances of people calling a call center
  - Count the number of people calling the center

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Classifications of Data in AW

- Specific to business performance, position, and flows
- Internal or external
- Raw or derived
- Data type
  - Numeric
  - Text/character string
  - Date/Time
  - BLOB/CLOB
  - Special Type
    - GeoSpatial
    - JSON Docs
    - Video and audio

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Data Classifications and Strategy

- Highly available – highly modeled – highly governed– highly enriched
- Infrastructures that support all high on all four dimensions are expensive.
- IOT data may be highly clean, low modeled, medium governed, medium enriched
- ERP source data may be medium clean, medium modeled, medium governed, and low enriched
- AW predictive model scoring data may be medium clean, medium modeled, medium governed, highly enriched

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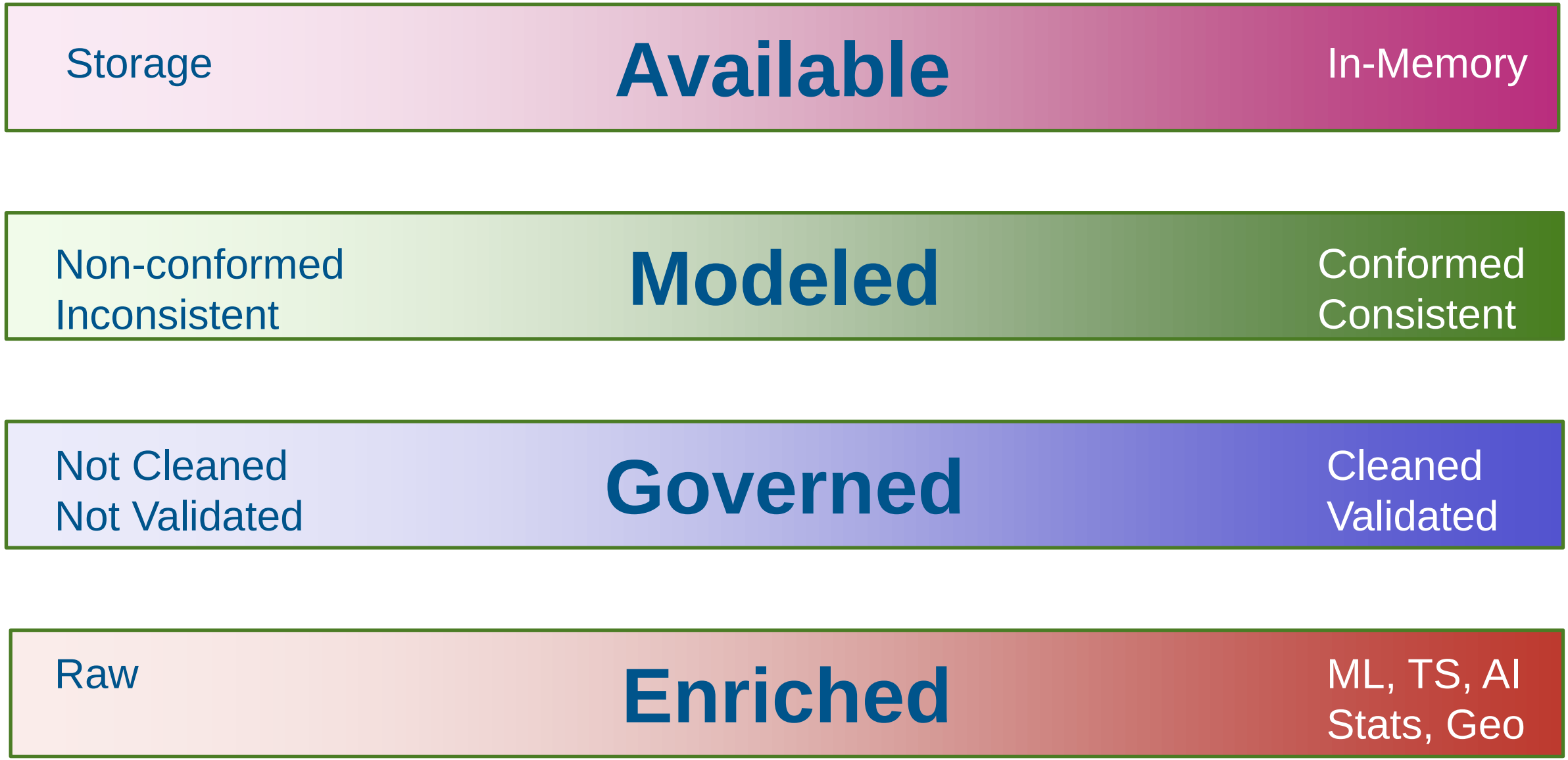
Four Data Classifications



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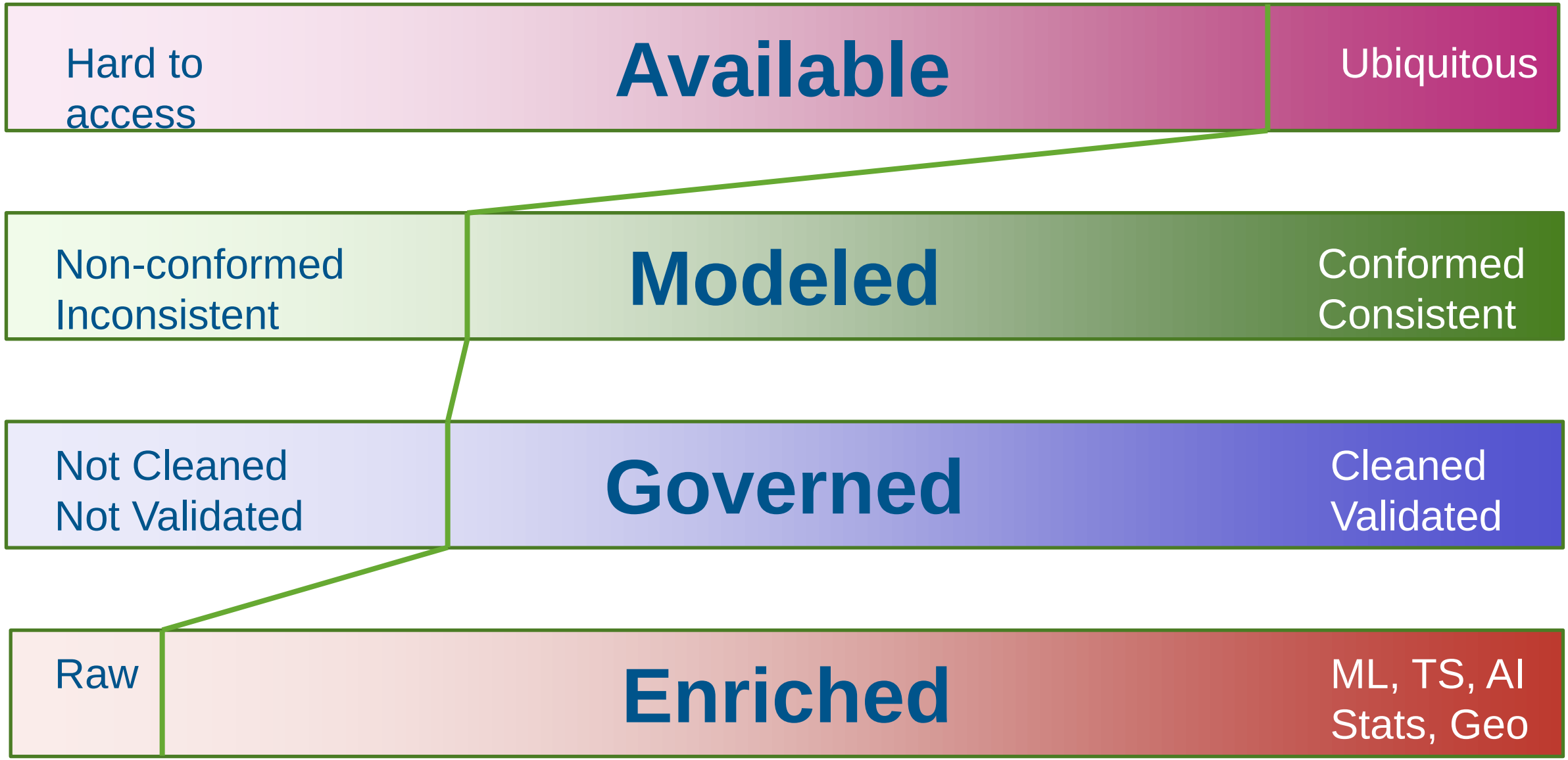
Example: ERP Transactional Data



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Example: Curated BI Data

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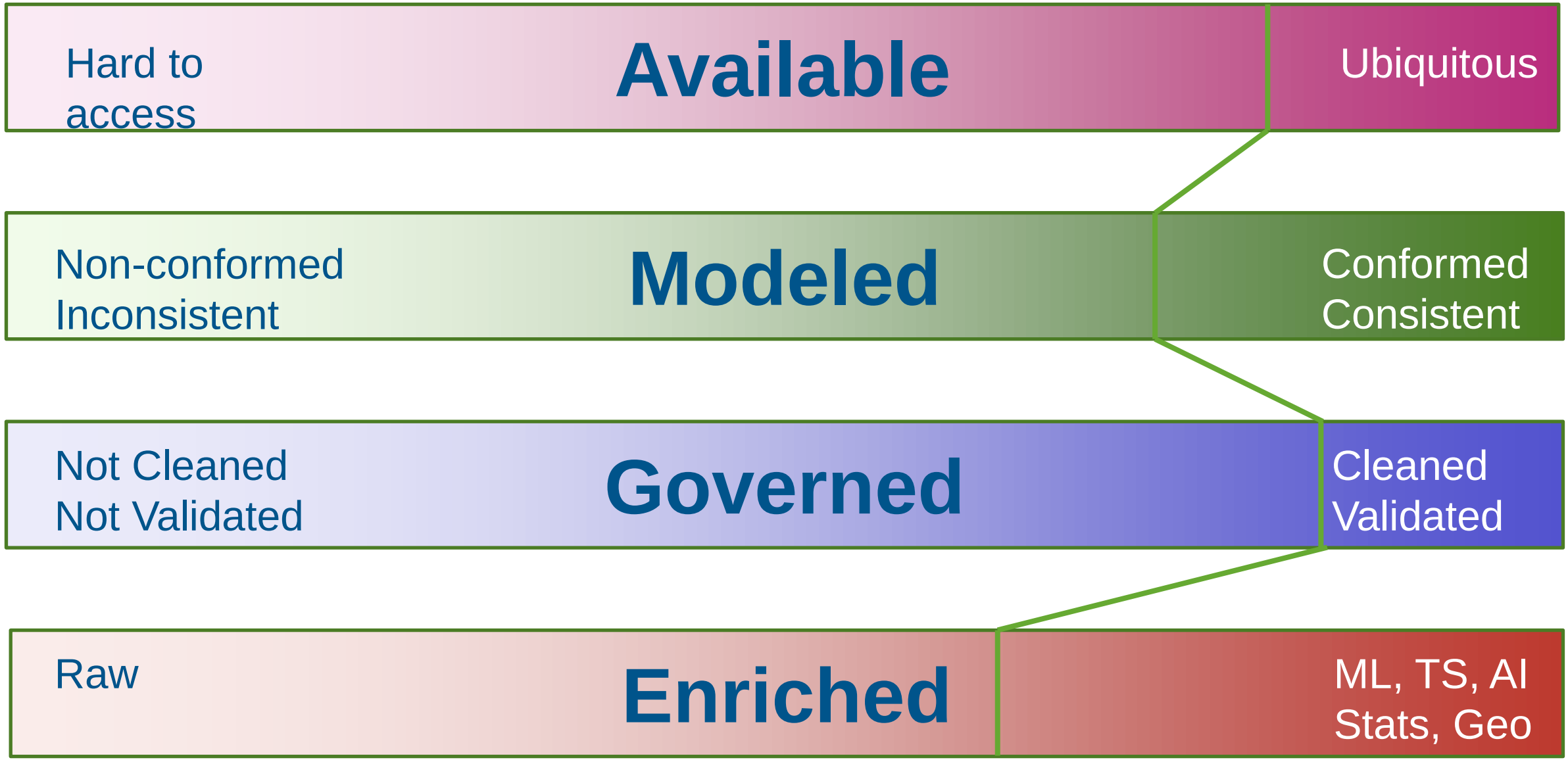

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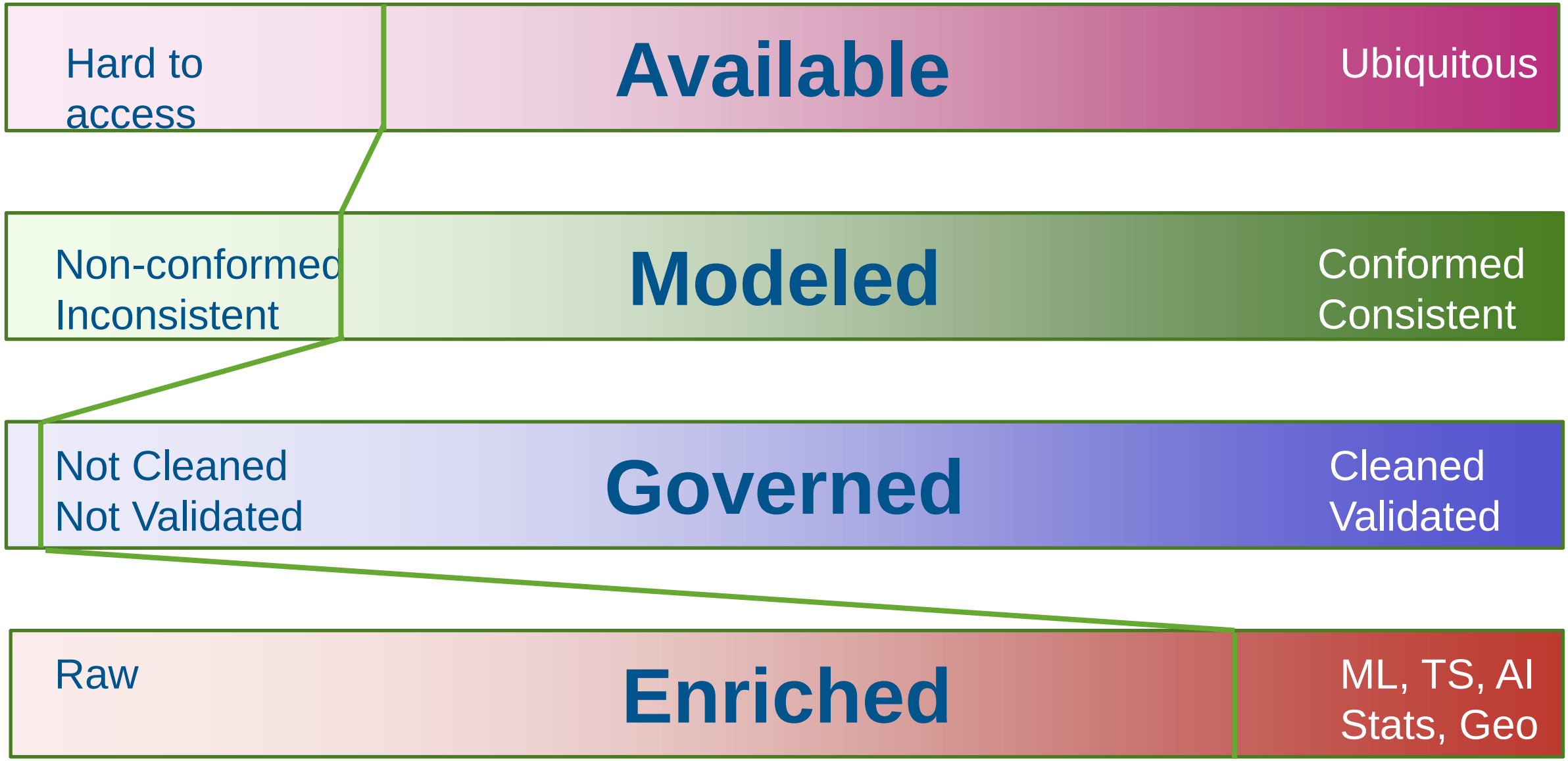
Example: Self-service BI Data



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Example: ML Scoring Model Data

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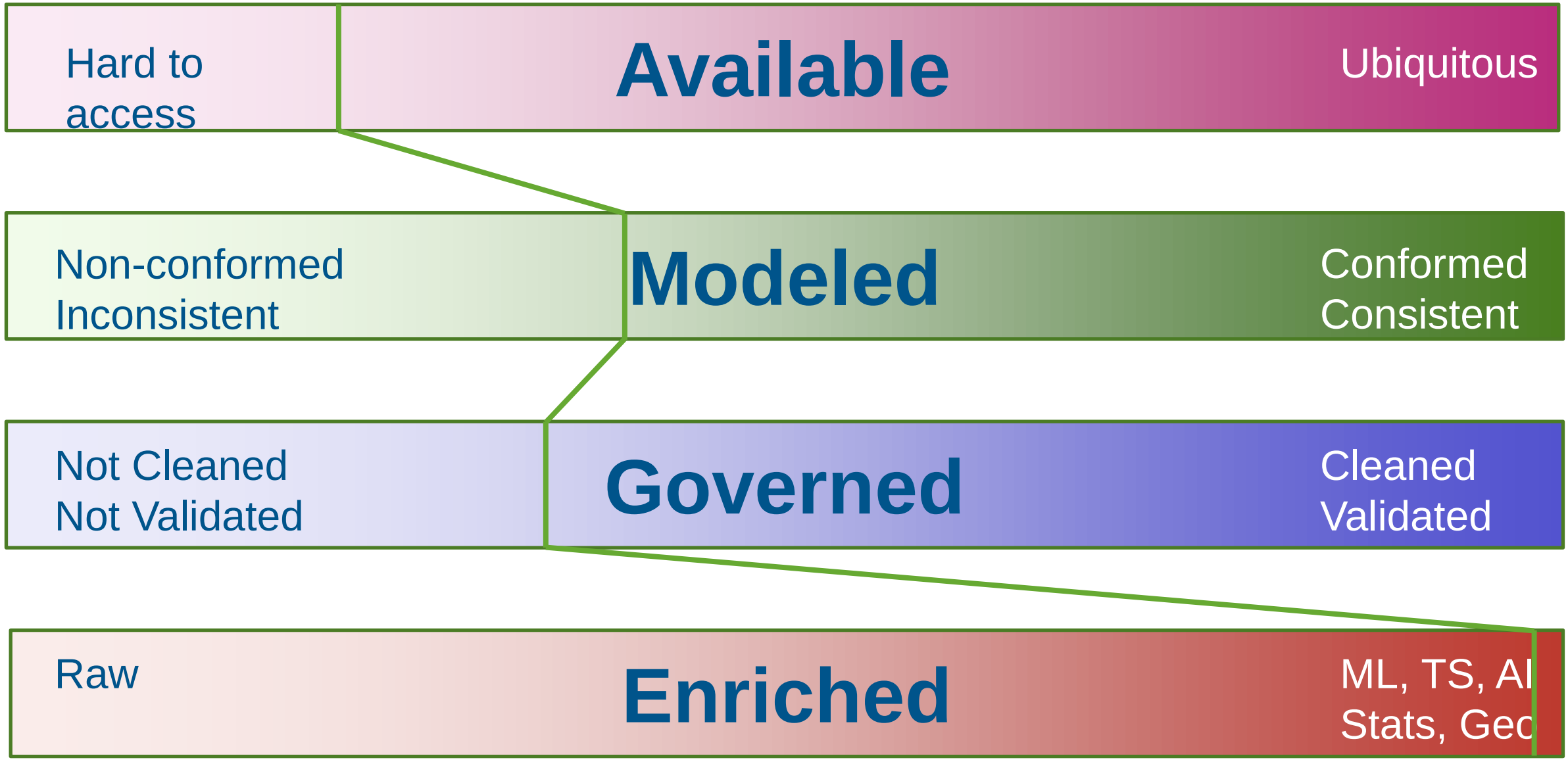

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THANK YOU!!

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