An Holistic Data Architecture:

From Source tot Insight

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Industry analyst

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Rick F. van der Lans is a highly-respected independent analyst, consultant, author, and internationally acclaimed lecturer specializing in data warehousing, business intelligence, big data, and database technology. He is managing director of R20/Consultancy BV.

He has presented countless seminars, webinars, and keynotes at industry-leading conferences. Rick helps clients worldwide to design their data warehouse, big data, and business intelligence architectures and solutions and assists them with selecting the right products. He has been influential in introducing the new logical data warehouse architecture worldwide which helps organizations to develop more agile business intelligence systems.

He is the author of several books on computing, including his new *Data Virtualization: Selected Writings* and *Data Virtualization for Business Intelligence Systems*. Some of these books are available in different languages. Books such as the popular *Introduction to SQL* is available in English, Dutch, Italian, Chinese, and German and is sold world wide. He also authored numerous whitepapers for vendors.

In 2018 he was selected the sixth most influential BI analyst worldwide by onalytica.com.

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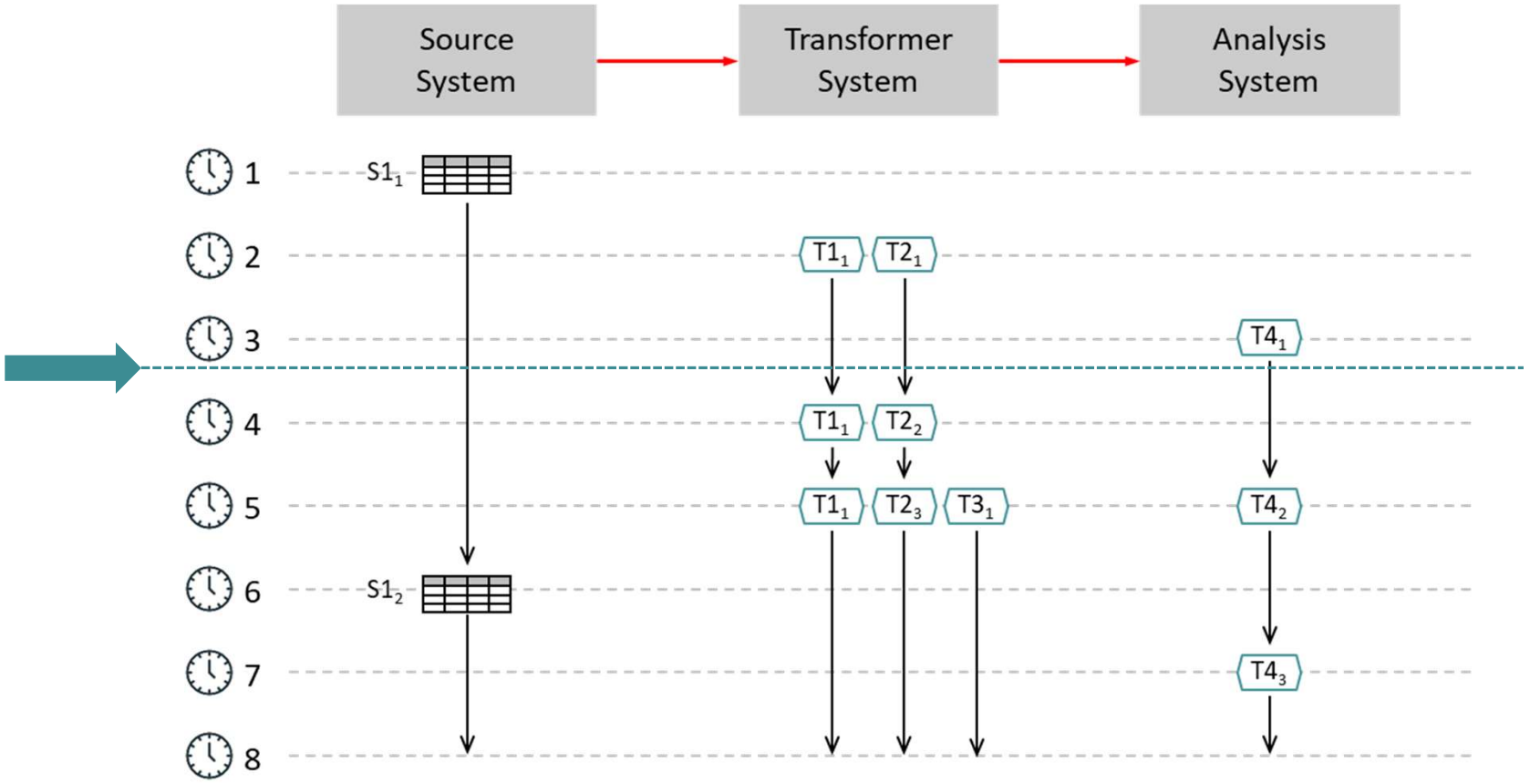
Challenges, Wishes and Requirements

- Accelerating the implementation of *cross-system analysis systems*
- Accelerating the implementation of *cross-organization analysis systems* (open data)
- Simplifying the *synchronization of source systems*
- Increasing the transparency of data processing for *process/decision reconstruction*
- Increasing the *discoverability* and clarity/meaning of data
- Improving *data quality*
- Strengthening *data security* and *data privacy*
- Strengthening *data history*
- Handling unstructured data: video, sound, text, and images
- Simplifying the data processing landscape
- Smarter uses of new technology

Example of Horizontal Lineage With Versions



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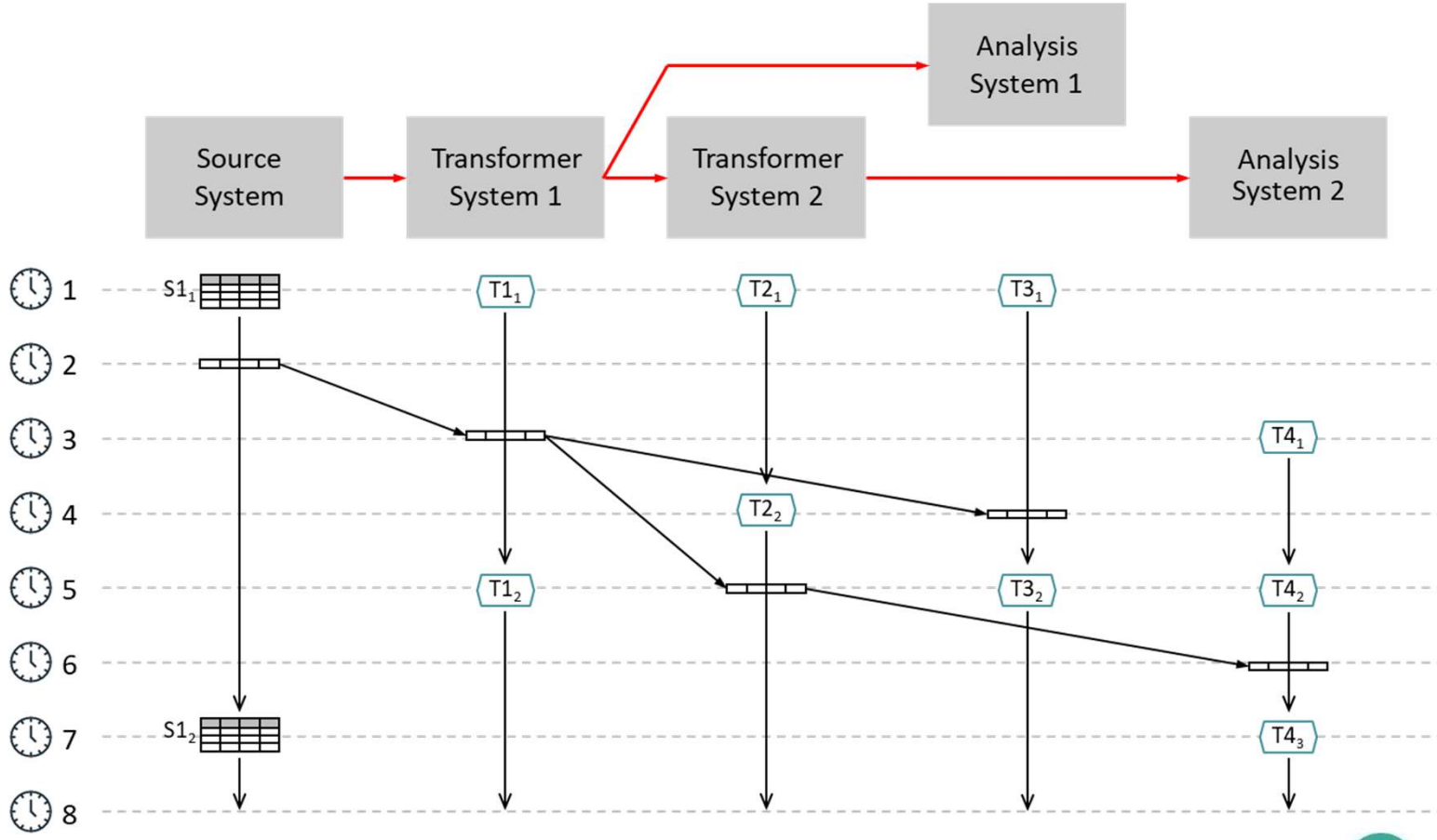
Example of Operational Lineage



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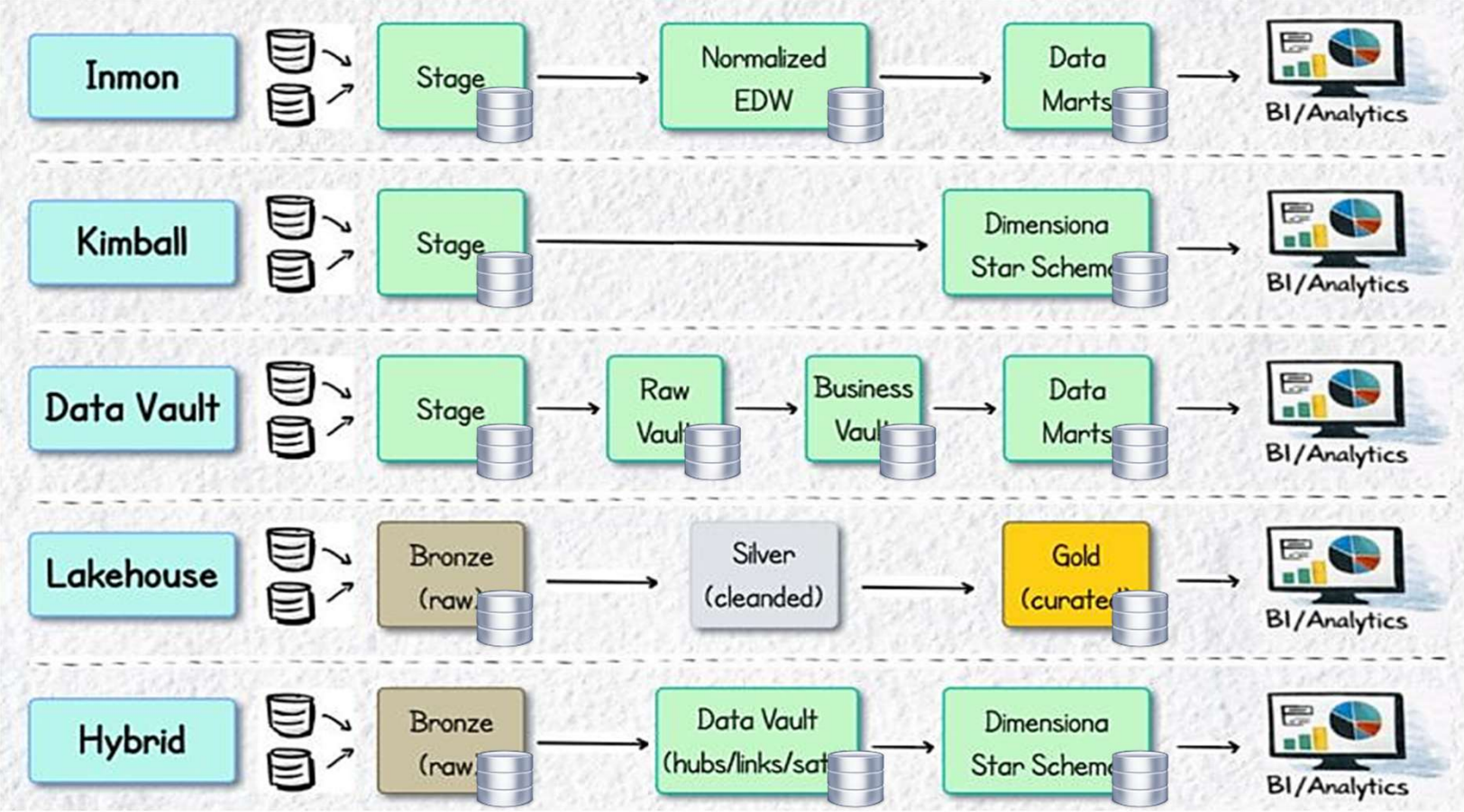
Domain Data Architectures (1)



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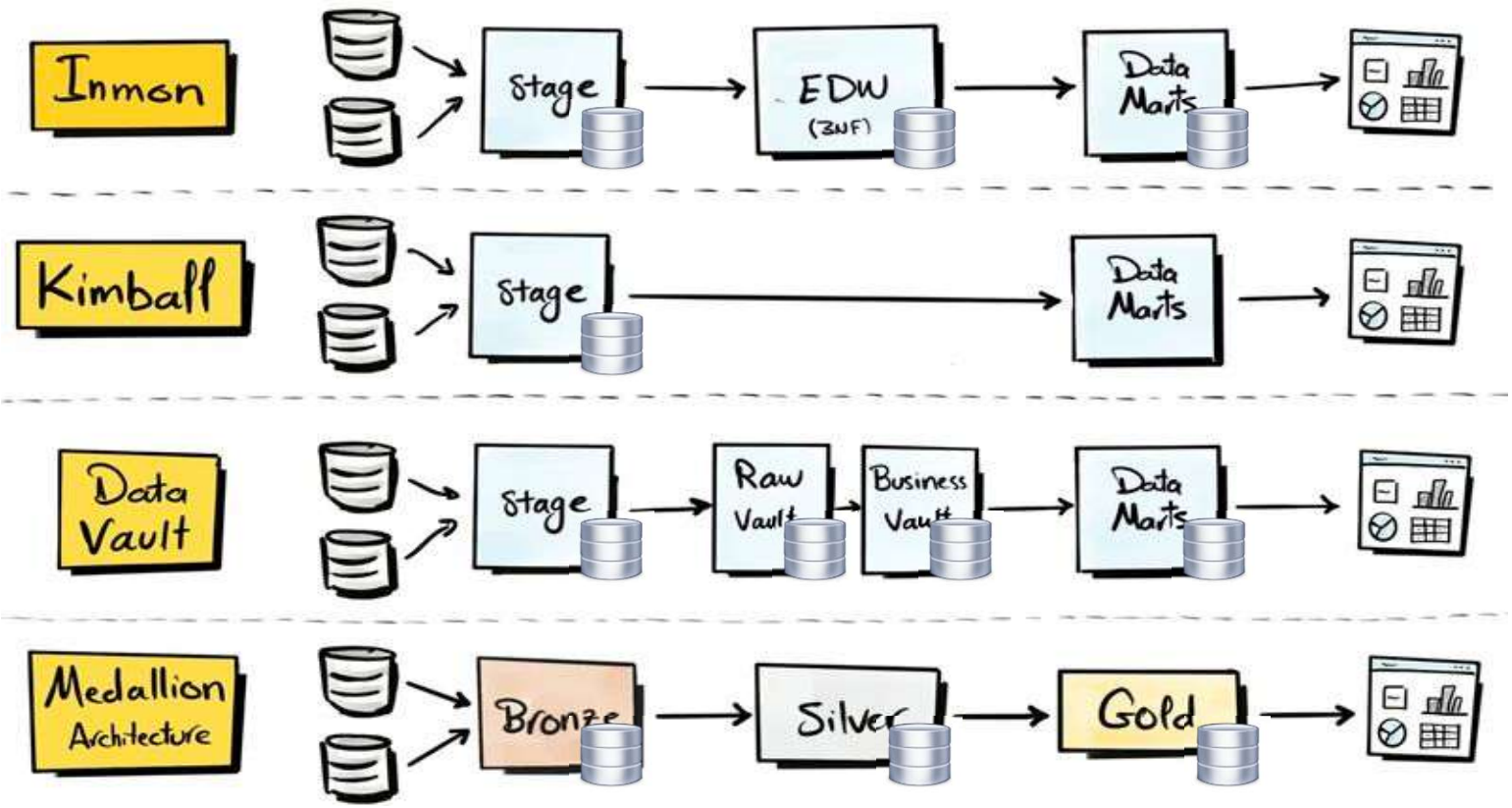
Domain Data Architectures (2)



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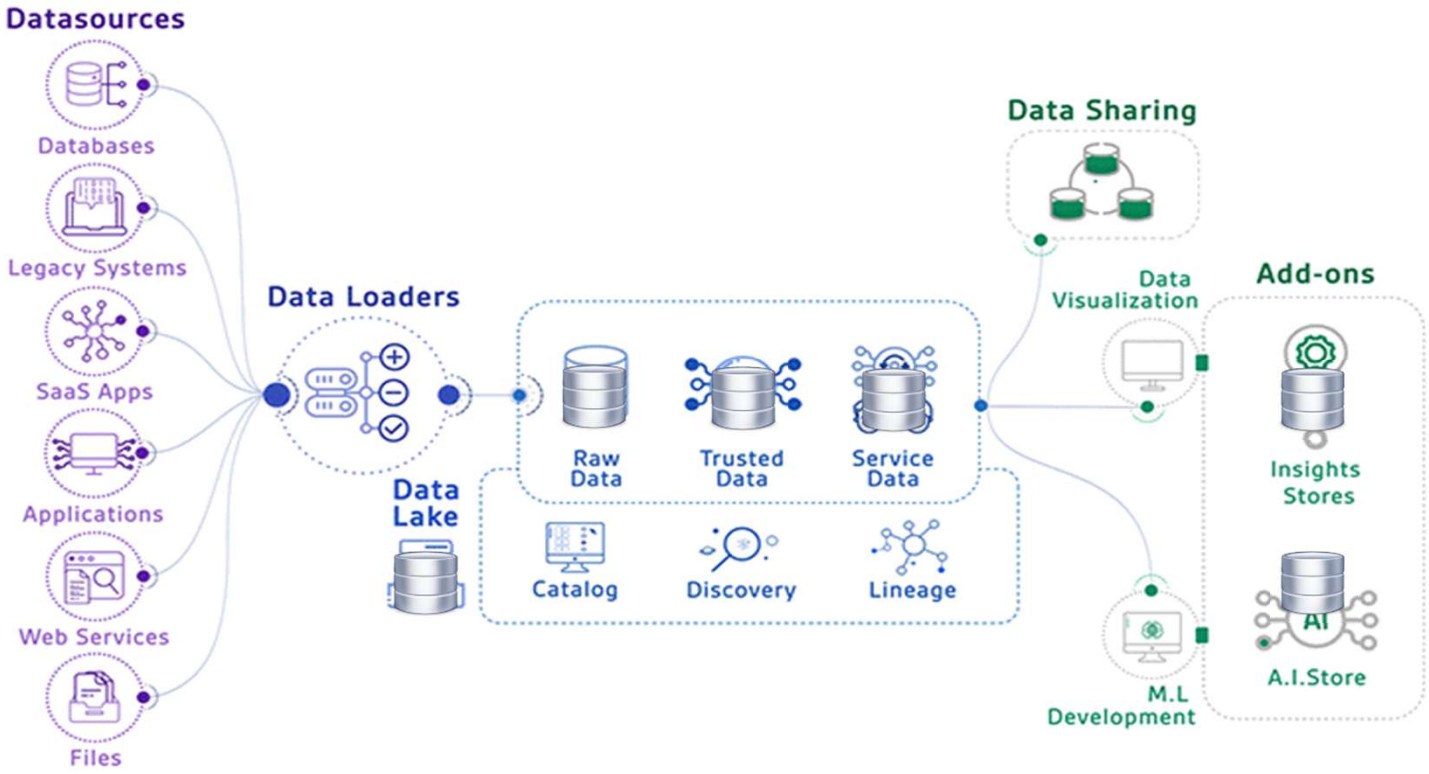
Domain Data Architectures (3)



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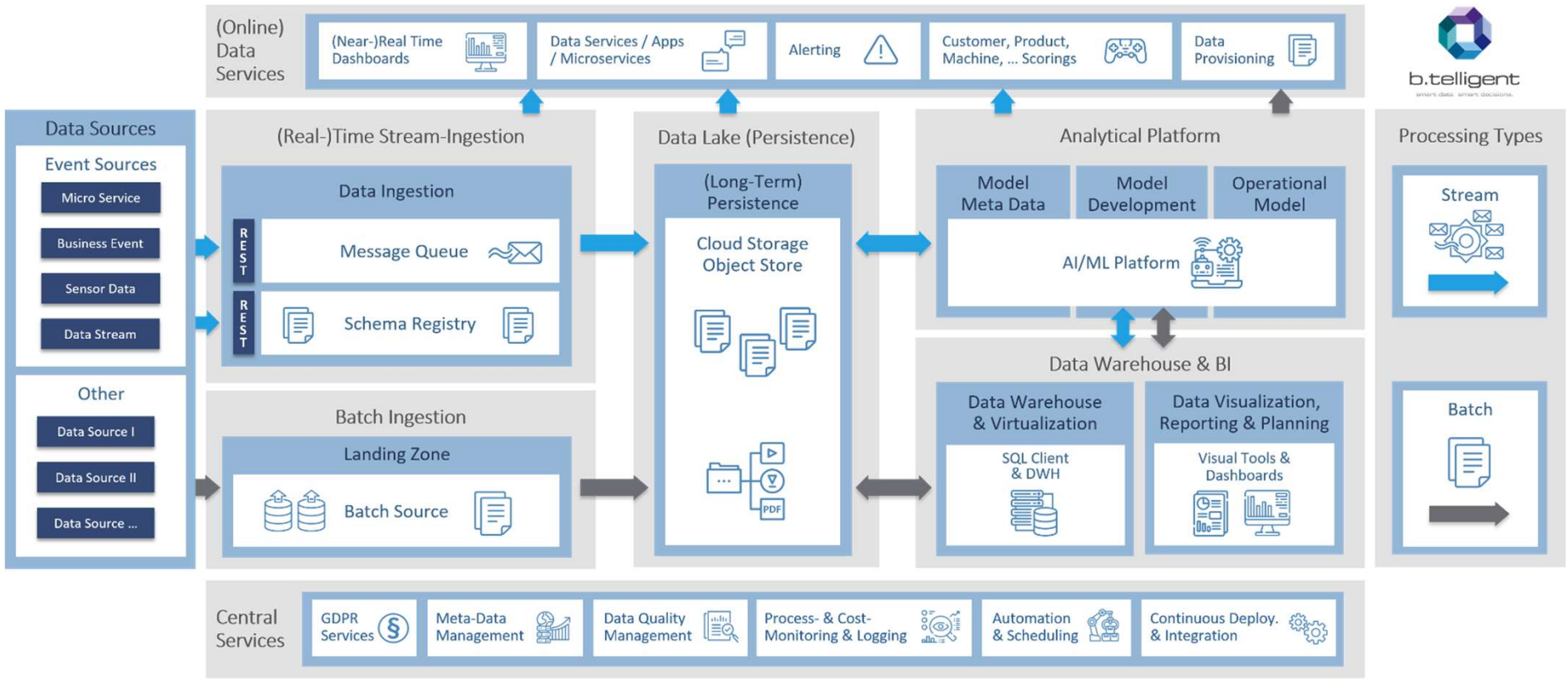
Data-copy Rich Data Architectures



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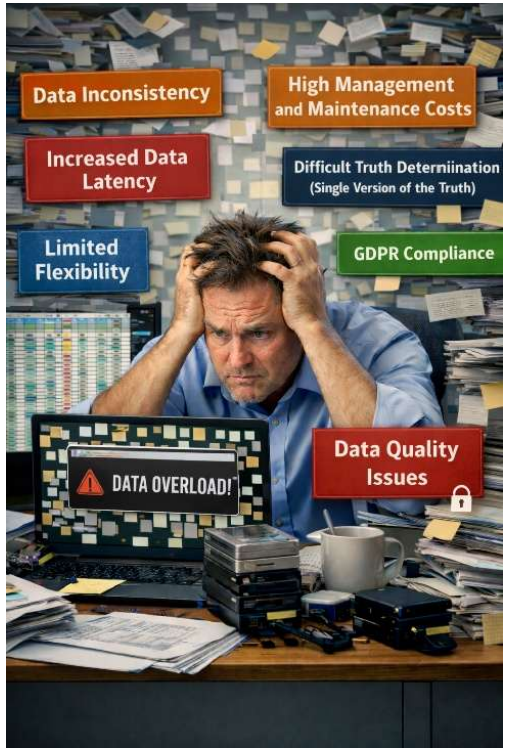
Disadvantages of Data Copying



- Data inconsistency
- Difficult determination of the truth ("single version of the truth")
- Limited flexibility and agility
- High management, development, and maintenance costs
- More complex compliance with General Data Protection Regulation (GDPR)
- Complex data synchronization issues
- Data quality challenges
- More complex data security
- Outdated data (increased data latency)
- …

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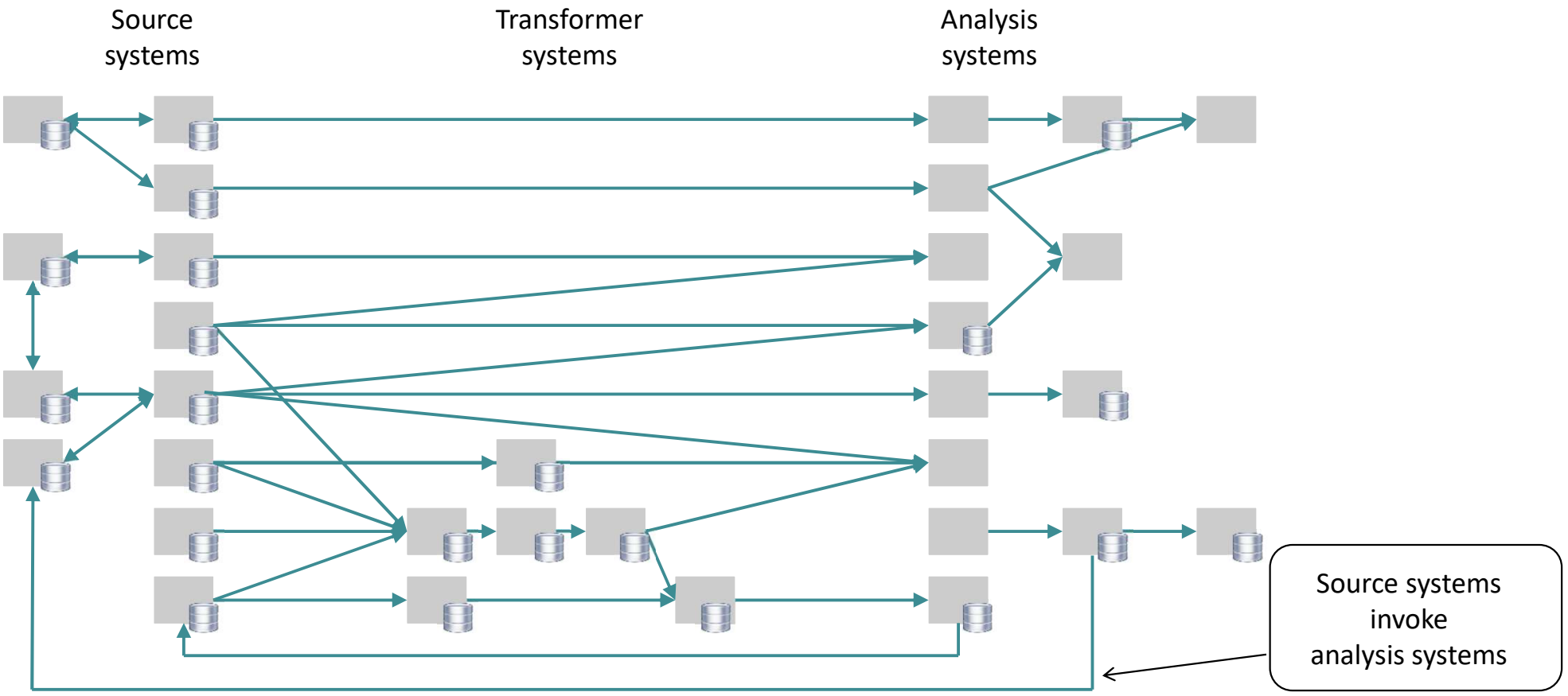
Evolution of the Data Processing Landscape



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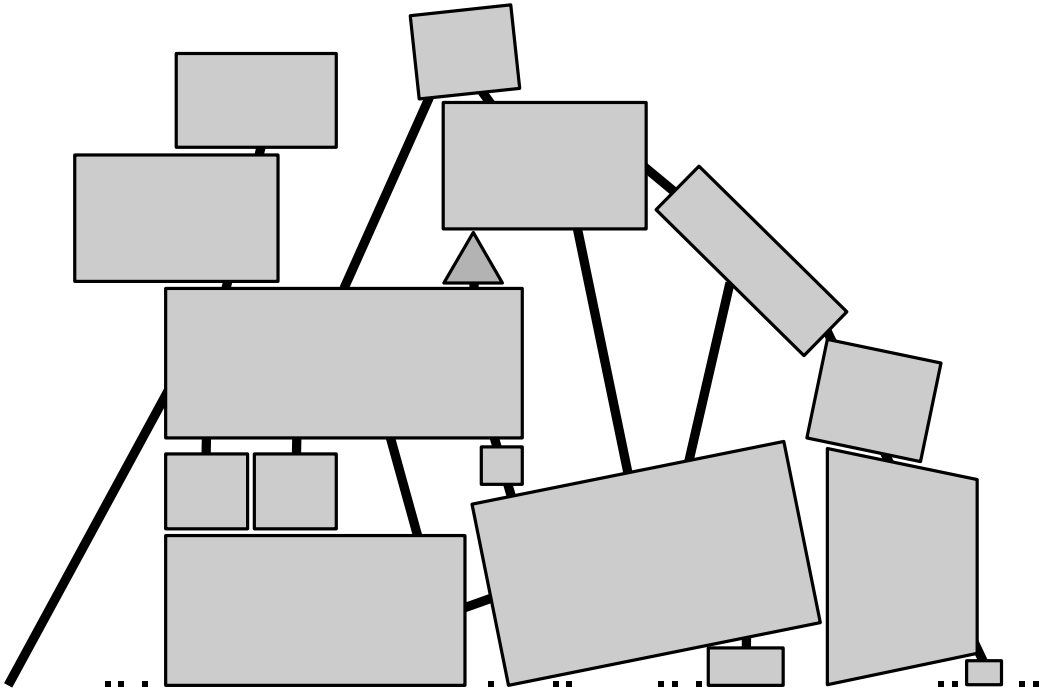
“Wobbly” Foundation of the Data Processing Landscape



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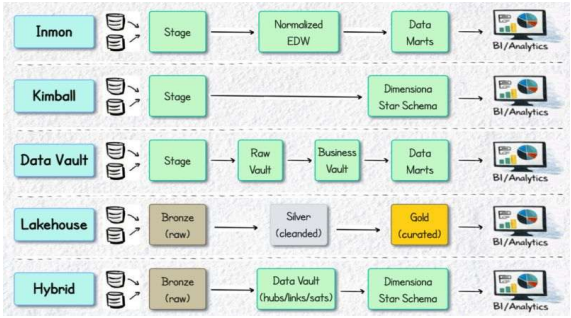
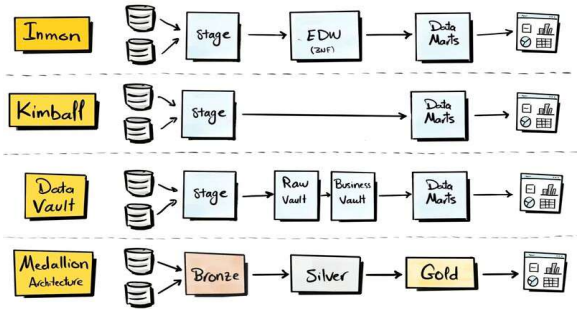
Limitations of Some Data Architectures





- Source systems are unjustly out of scope
  - Old and inflexible
  - Software packages
  - No IT sovereignty
  - No or limited data history
  - Poor data security
  - Complex data synchronization
- Analysis Systems are unjustly out of scope
  - Many data copies
  - Not under control of IT
  - Analysis models input to source systems
- Many requirements are unjustly out of scope
  - Reconstruction
  - Metadata for everyone
  - Data-sharing

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Bring Your (Data)House in Order

- Data in order
- Metadata in order
- Lineage in order (origin and impact)
- Reconstruction in order
- Data security in order
- Technology in order

- It all starts with *data architecture in order*

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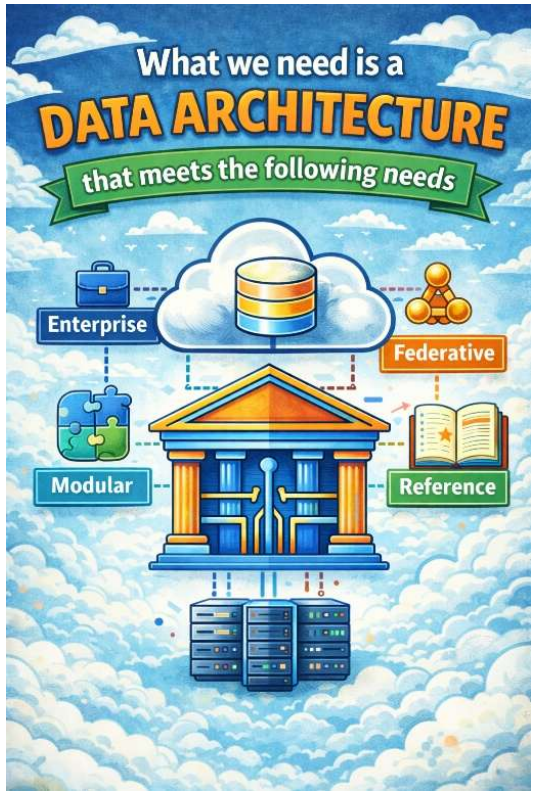
What We Need is a …



- *Enterprise* data architecture
  - Not a domain data architecture
  - Covers the entire data route
  - Not only focused on analysis and data science (and AI)
- *Modular* data architecture
  - Think big, act small
- *Federative* data architecture
  - Data storage minimization – less data copies
- *Reference* data architecture
  - Generic, reusable

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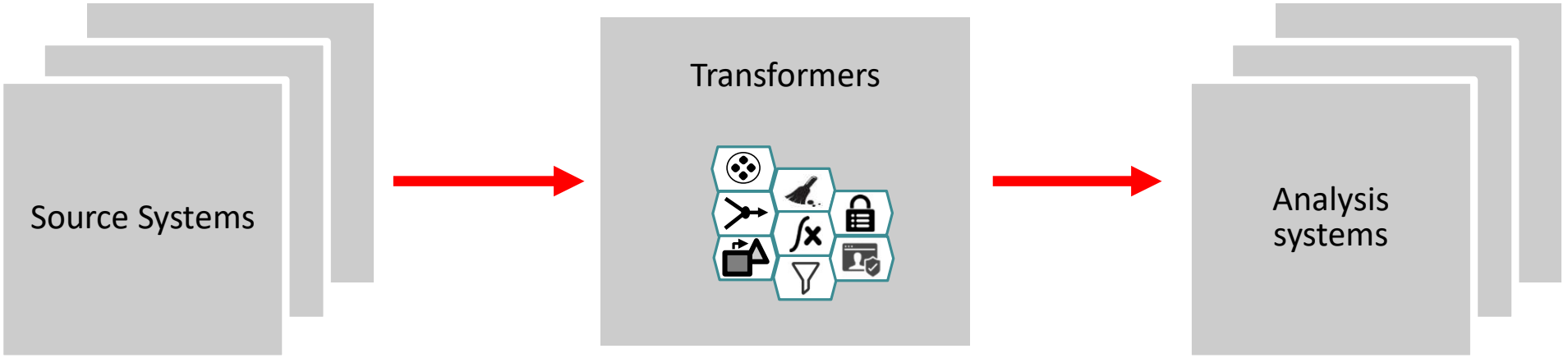
Start with Transformers, Not With Databases



Group
Integrate
Restructurere
Secure

Correct
Calculate
Filter
Anonimize

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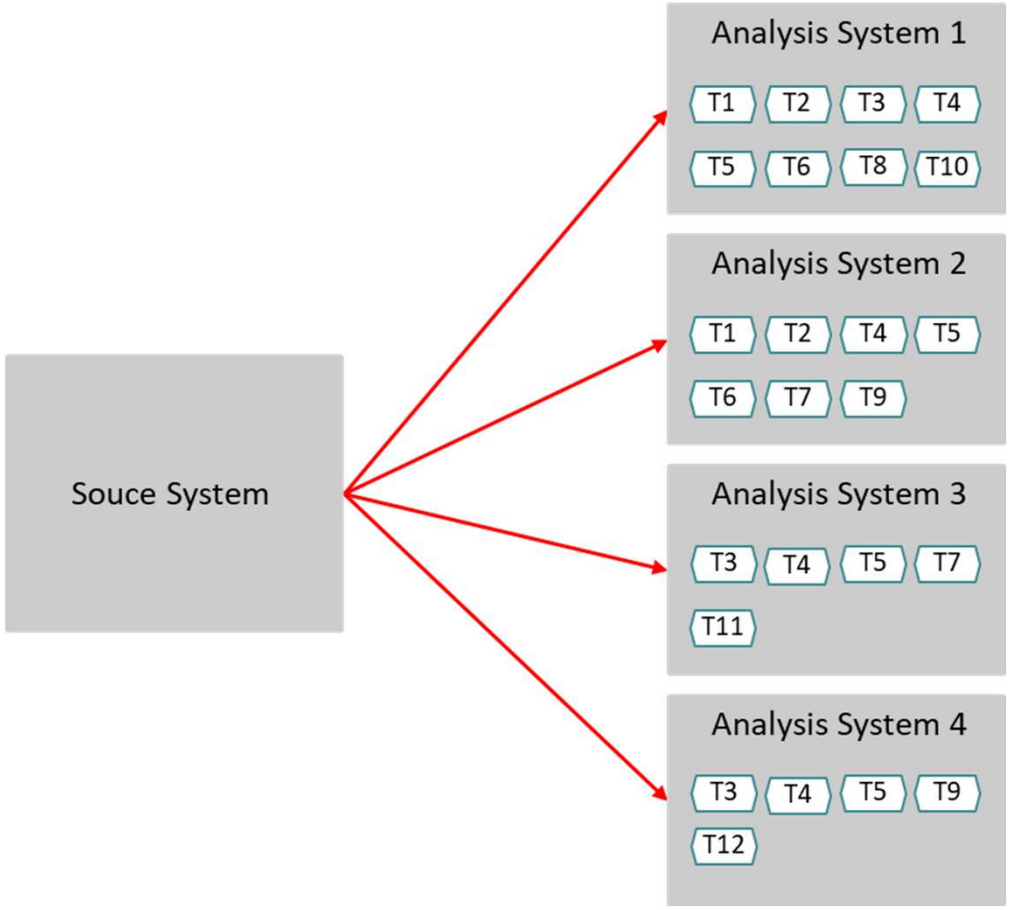
Duplicate Transformers in Analysis Systems



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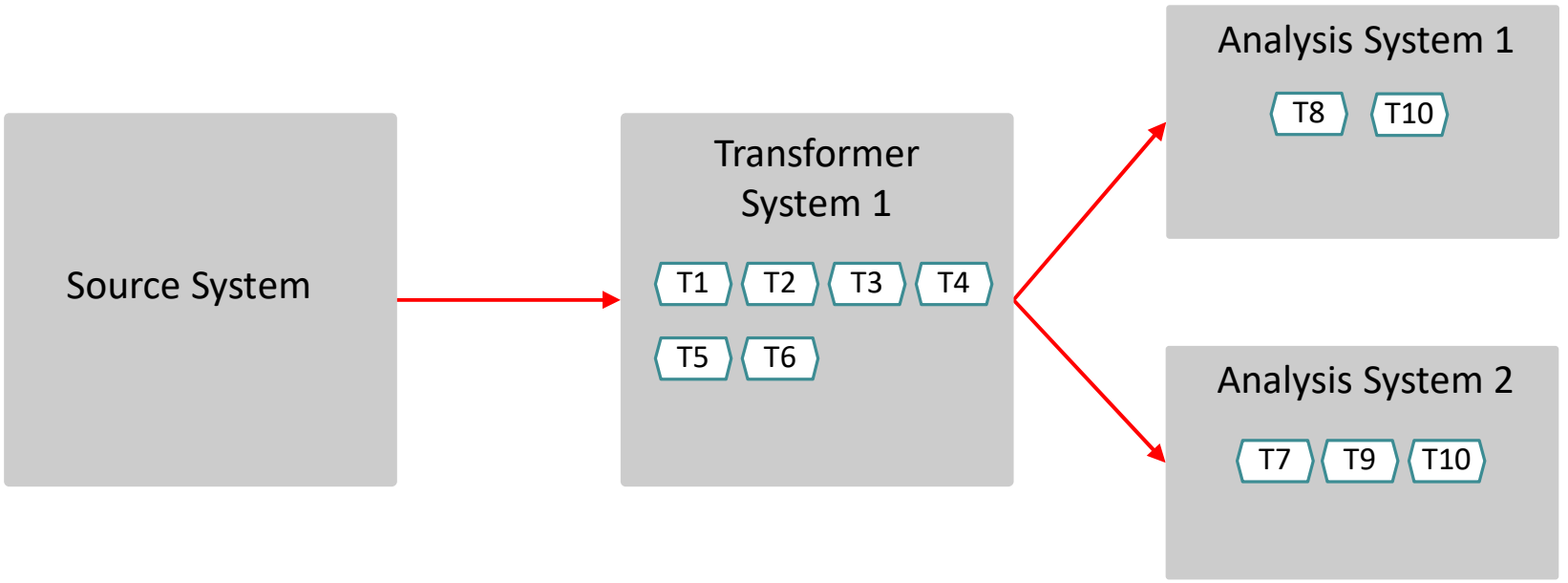
Centralizing Transformers



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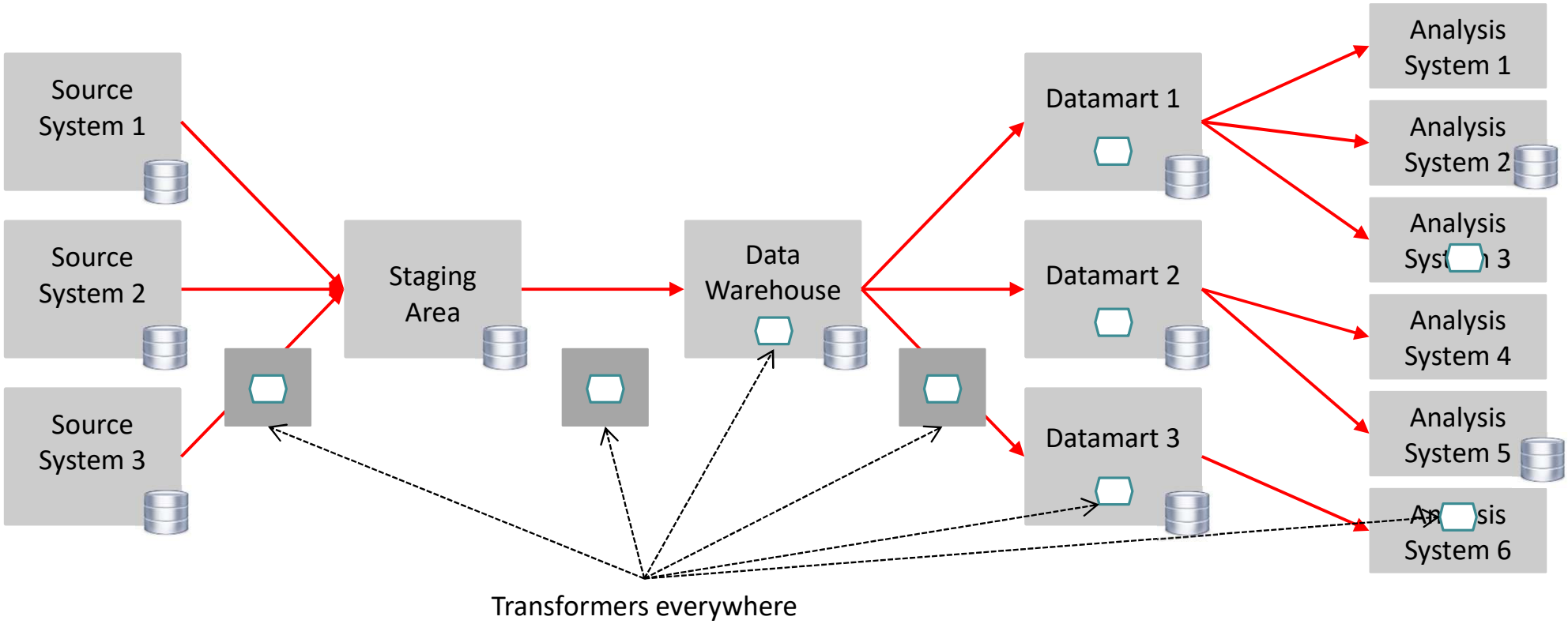
A Traditional Data Warehouse Architecture



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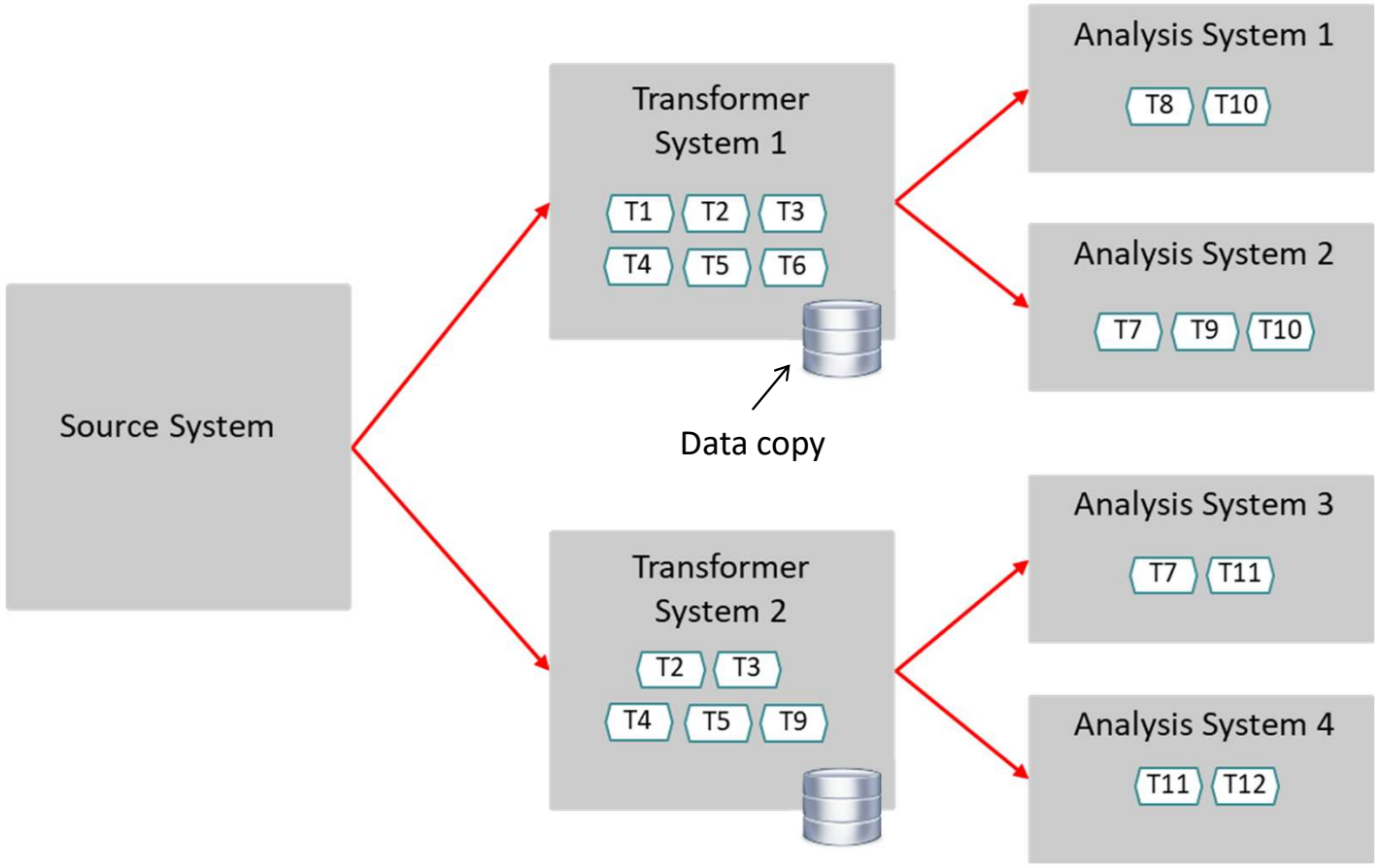
Dupulicate Transformers in Transformer Systems



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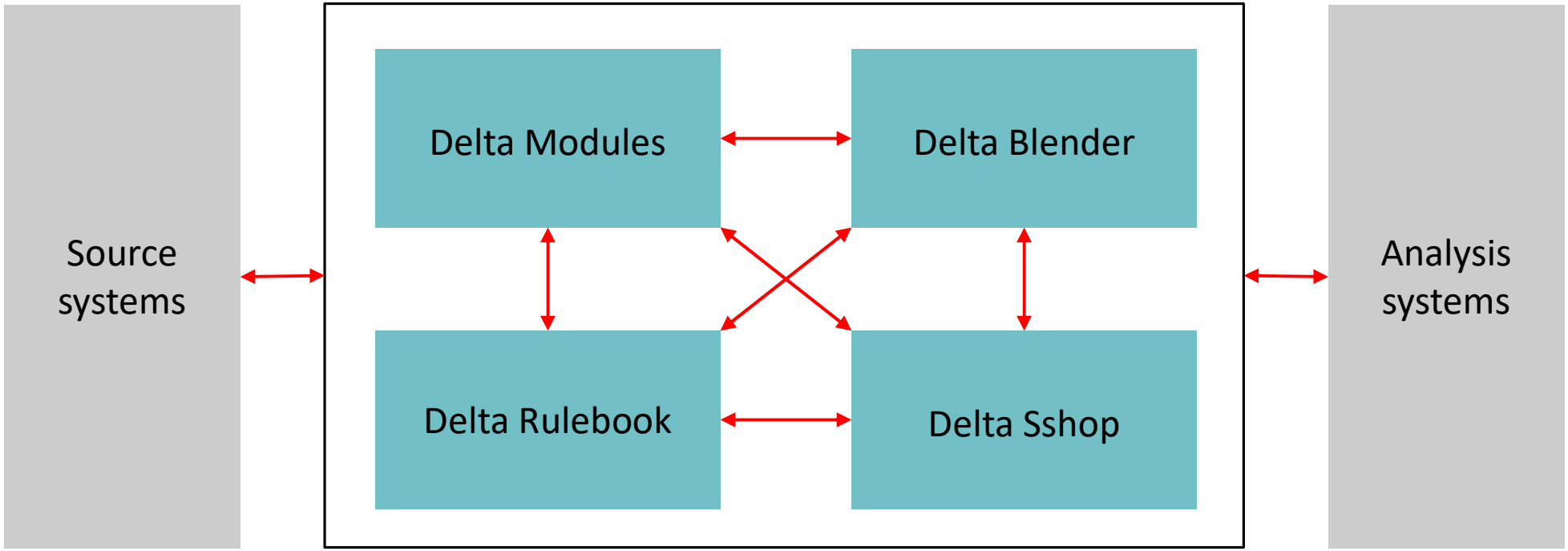
Delta: A Modern, Enterprise Data Architecture



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Six Delta Modules

- CRUD
- Query
- Metadata
- Log
- Messaging
- Data security

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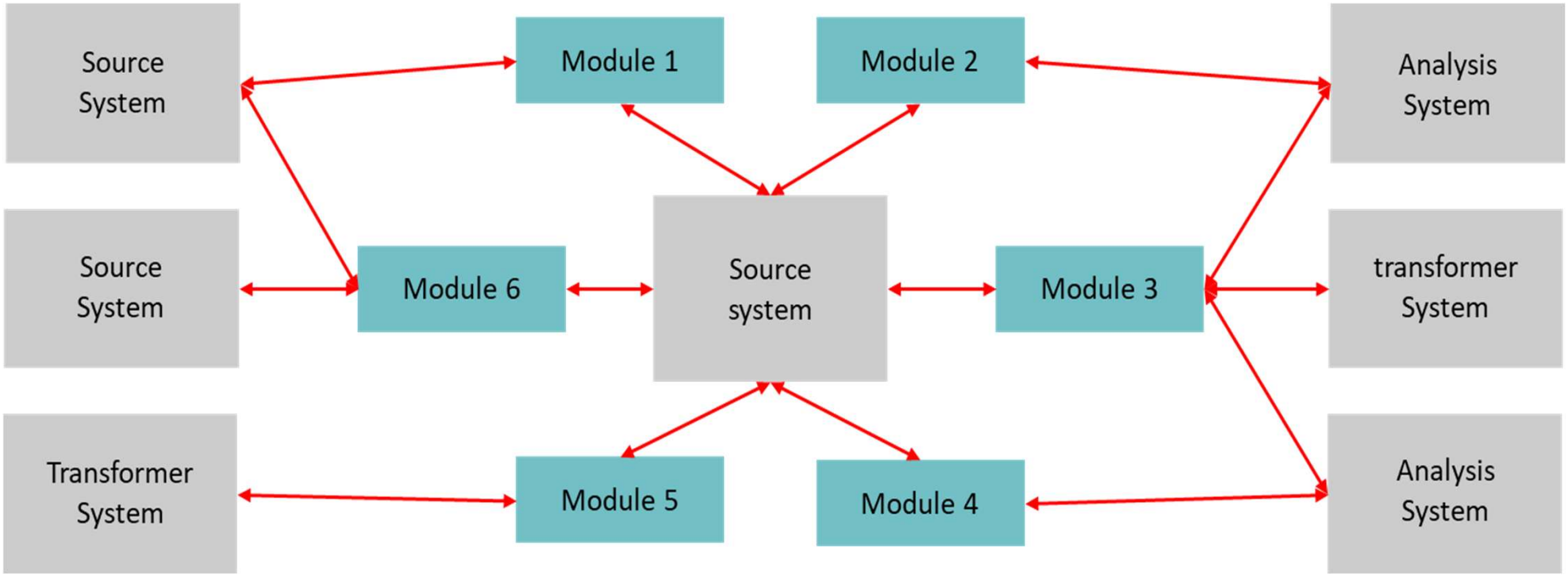
Wrapping the Source Systems - Abstraction



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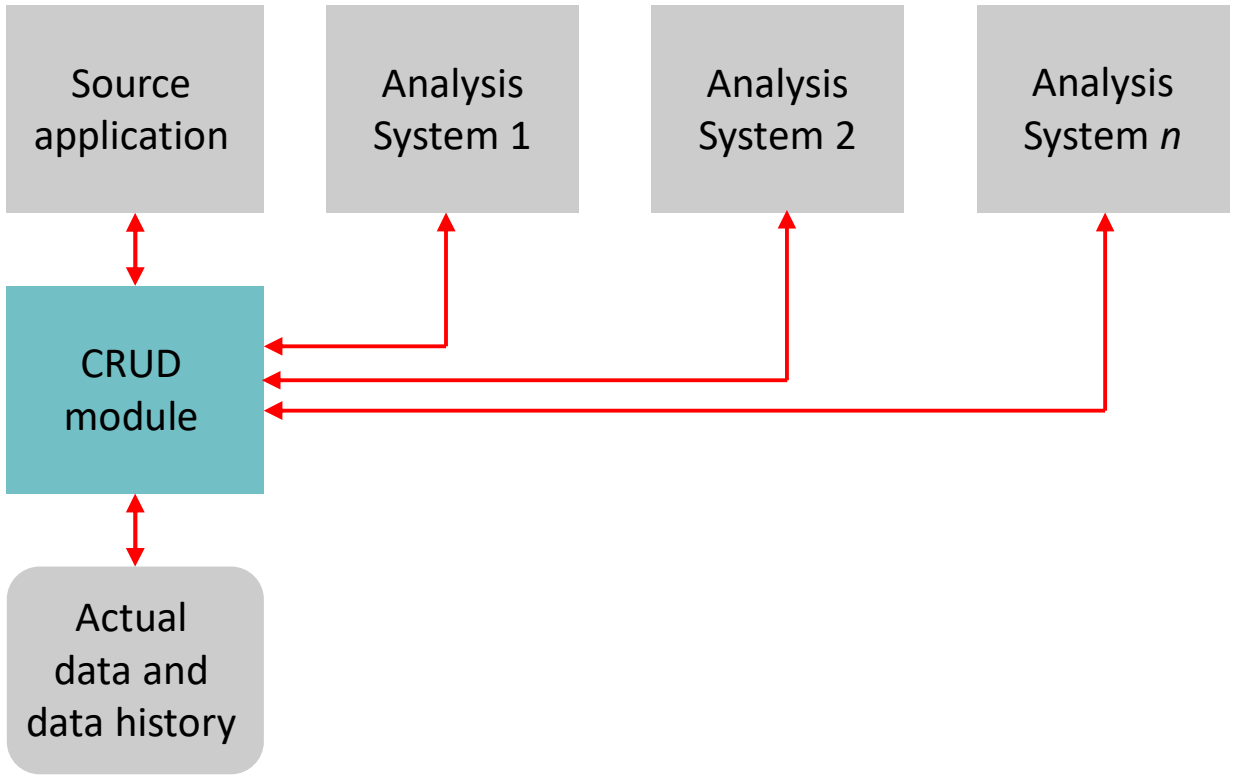
CRUD Module (1) – The Dream



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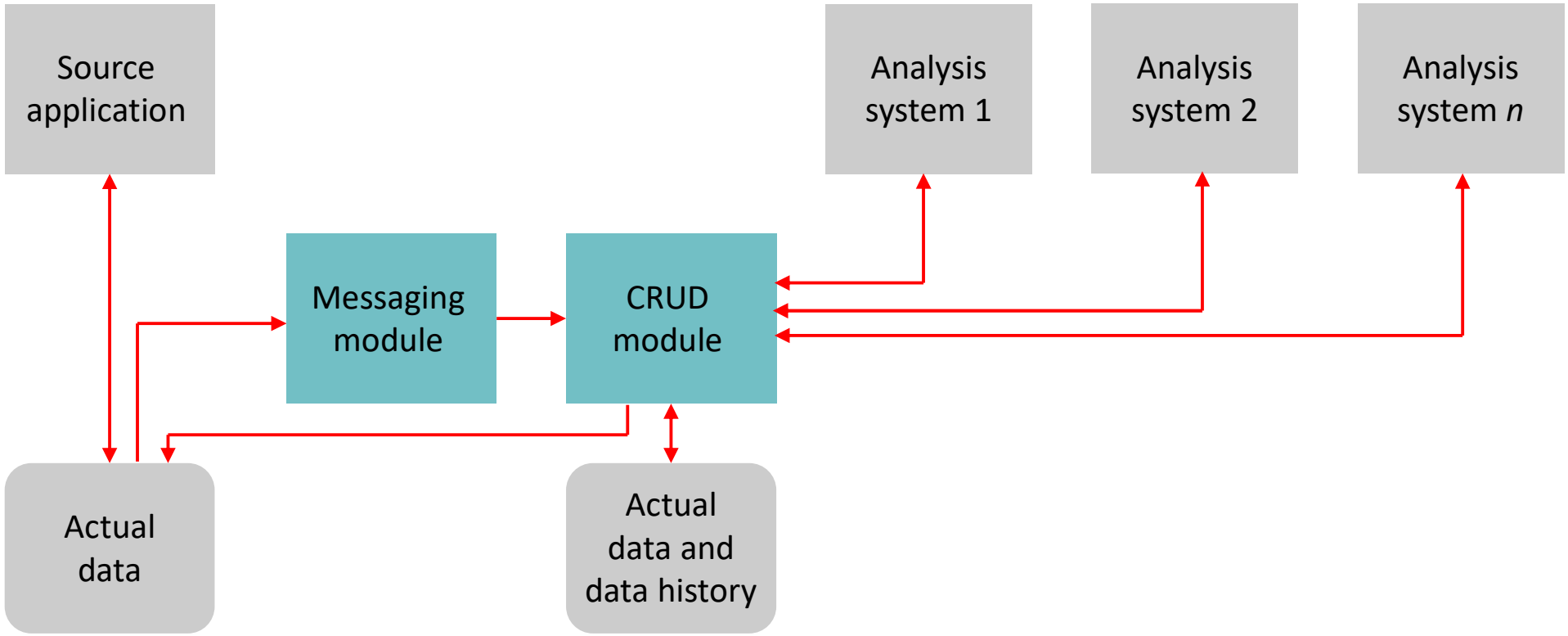
CRUD Module (2) Via Meesaging Module



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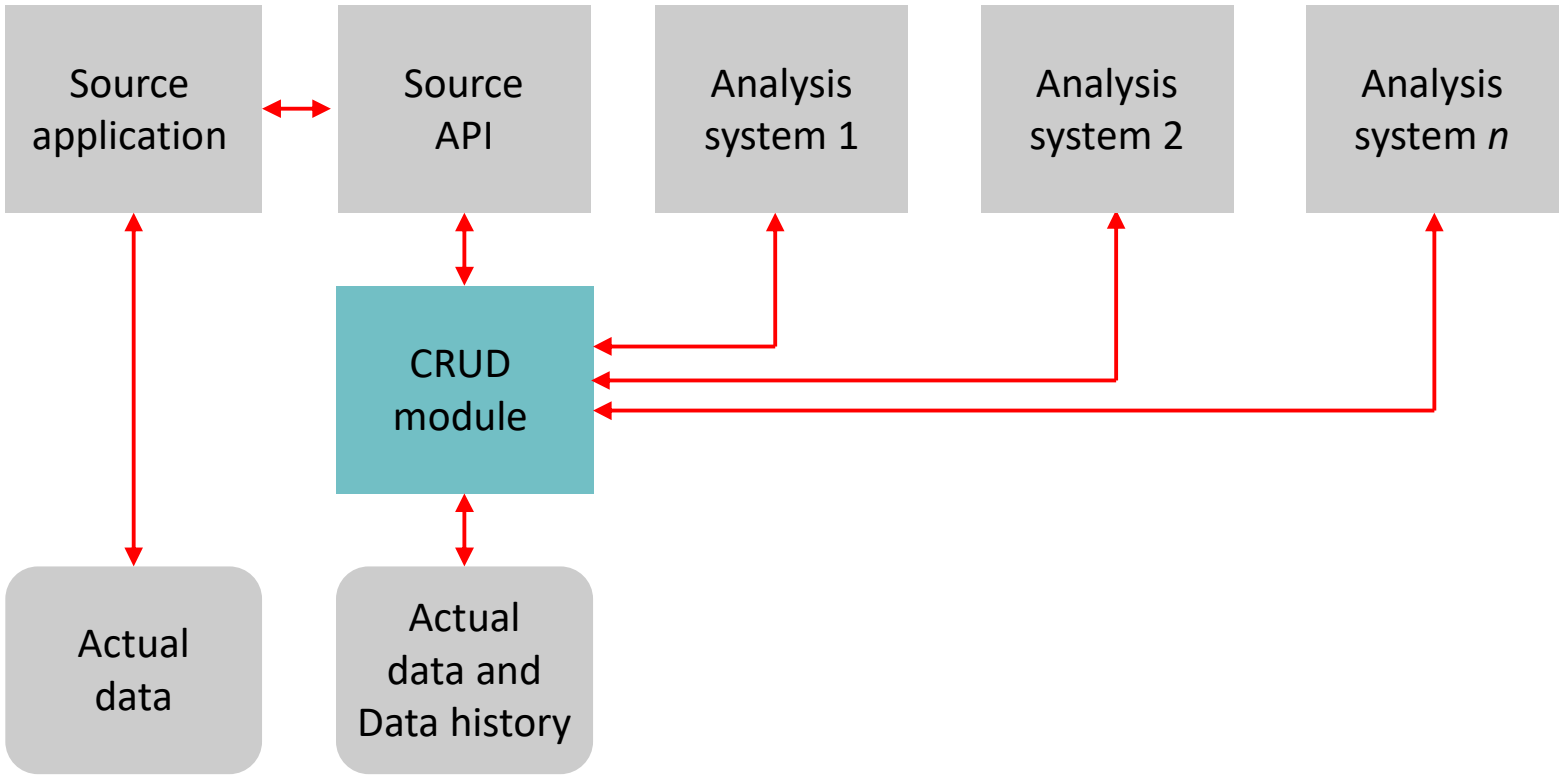
CRUD Module (3) Via API of Source System



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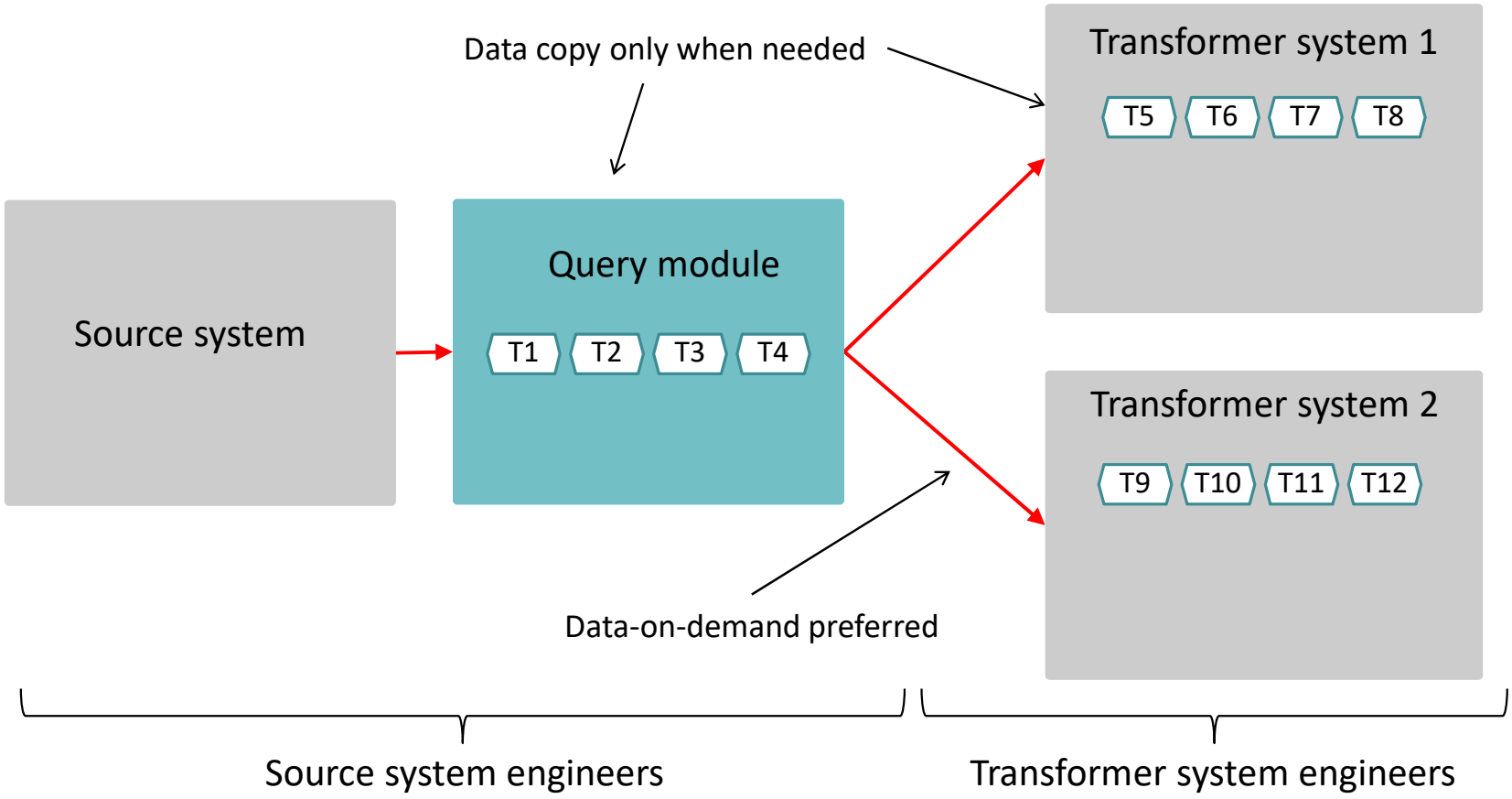
Transformers Closer to the Source Systems



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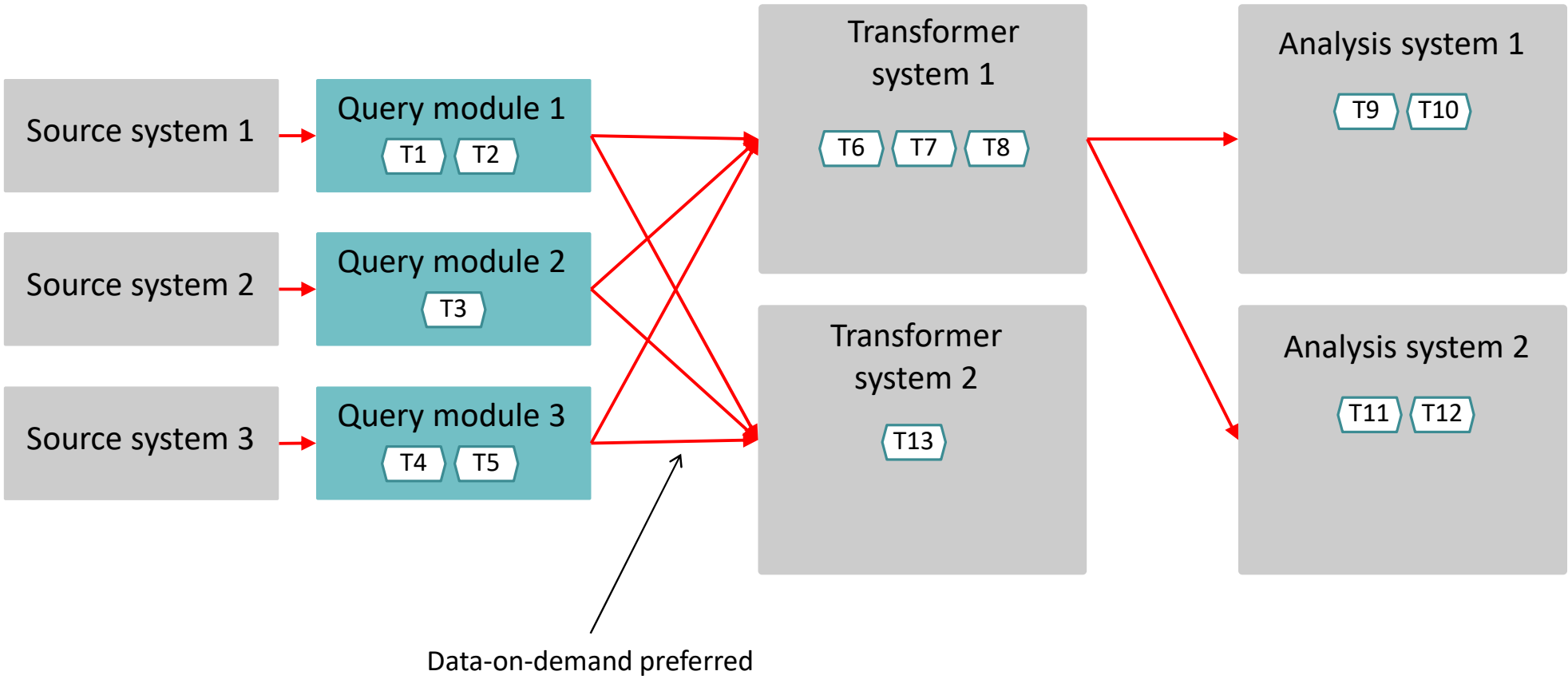
Transforming Data in Delta Modules



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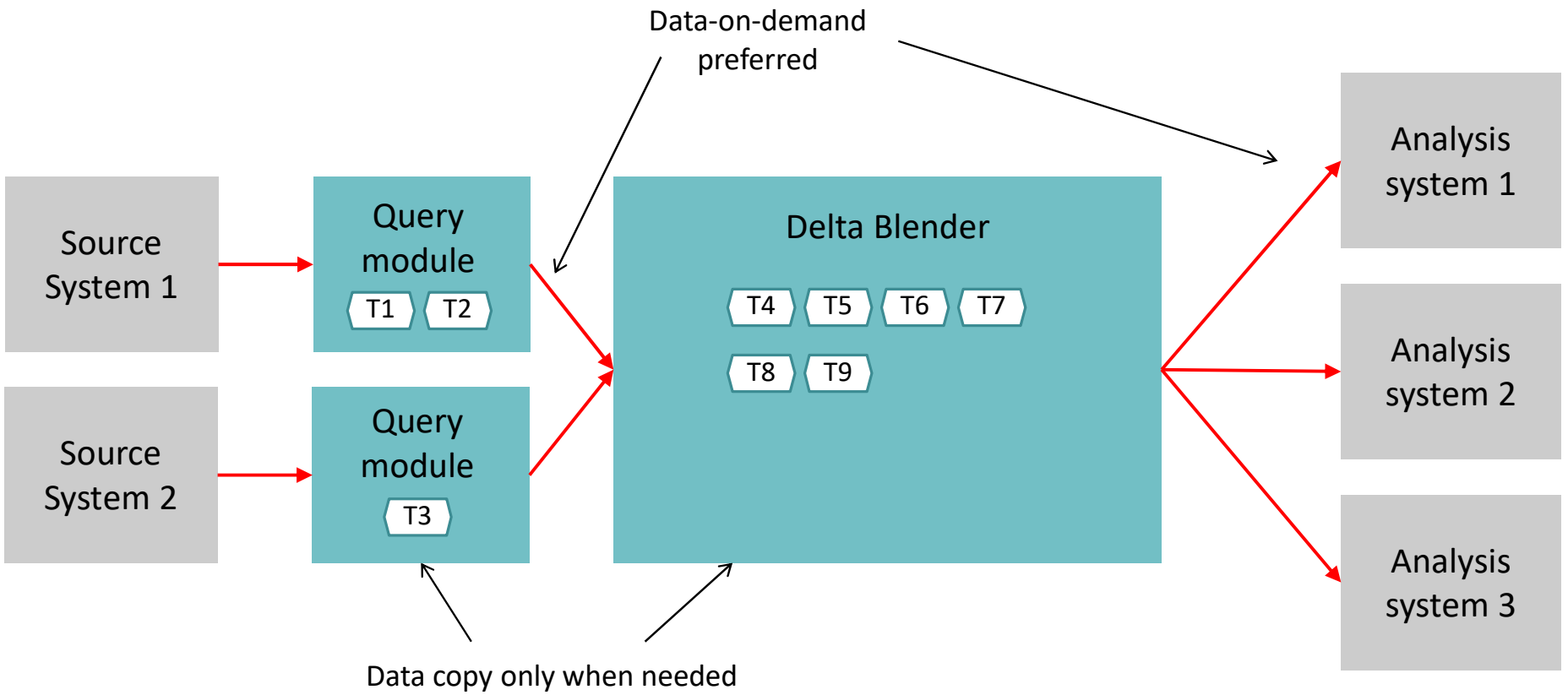
Transforming Data in Delta Blender



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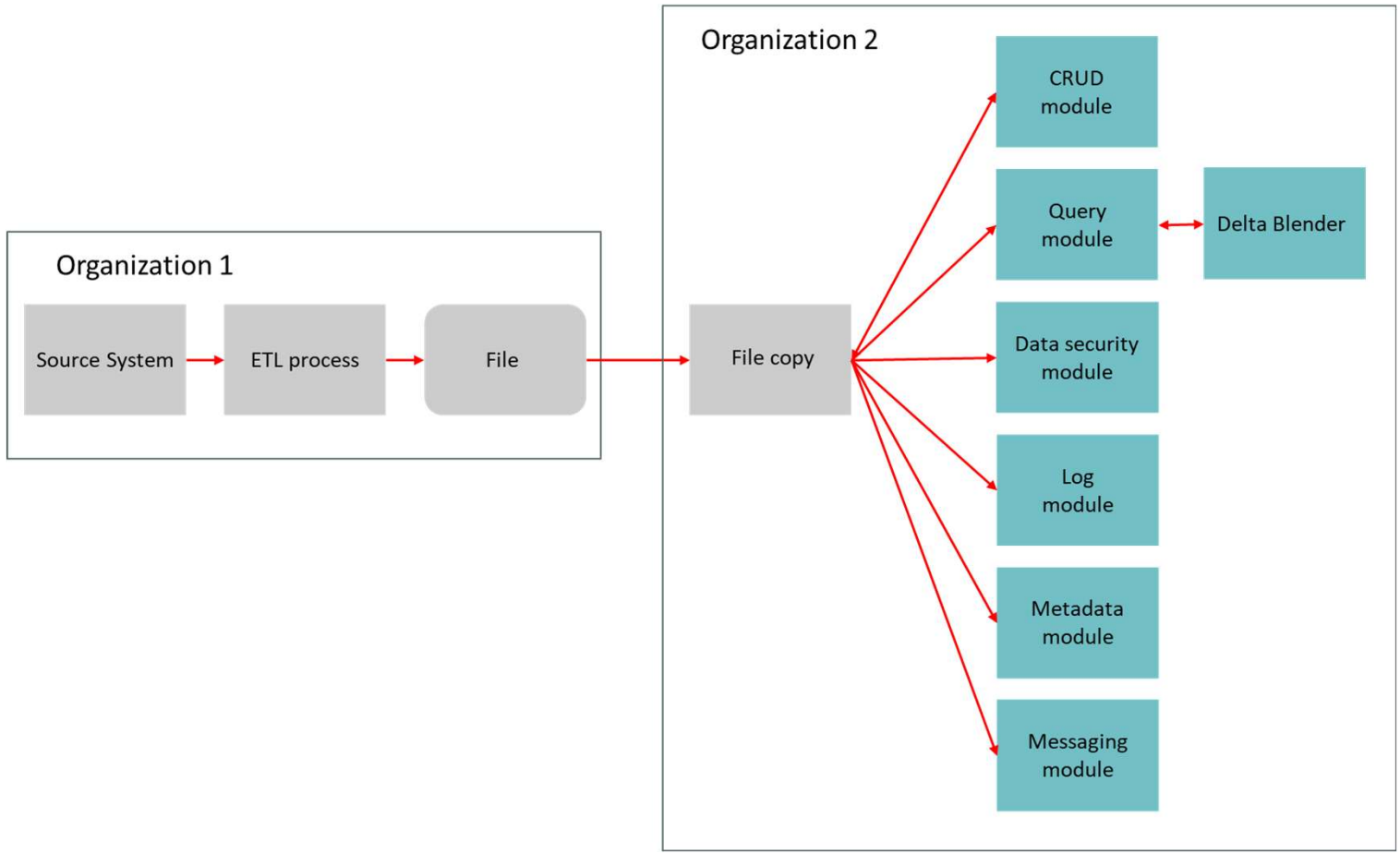
Files Hidden Behind Delta Modules



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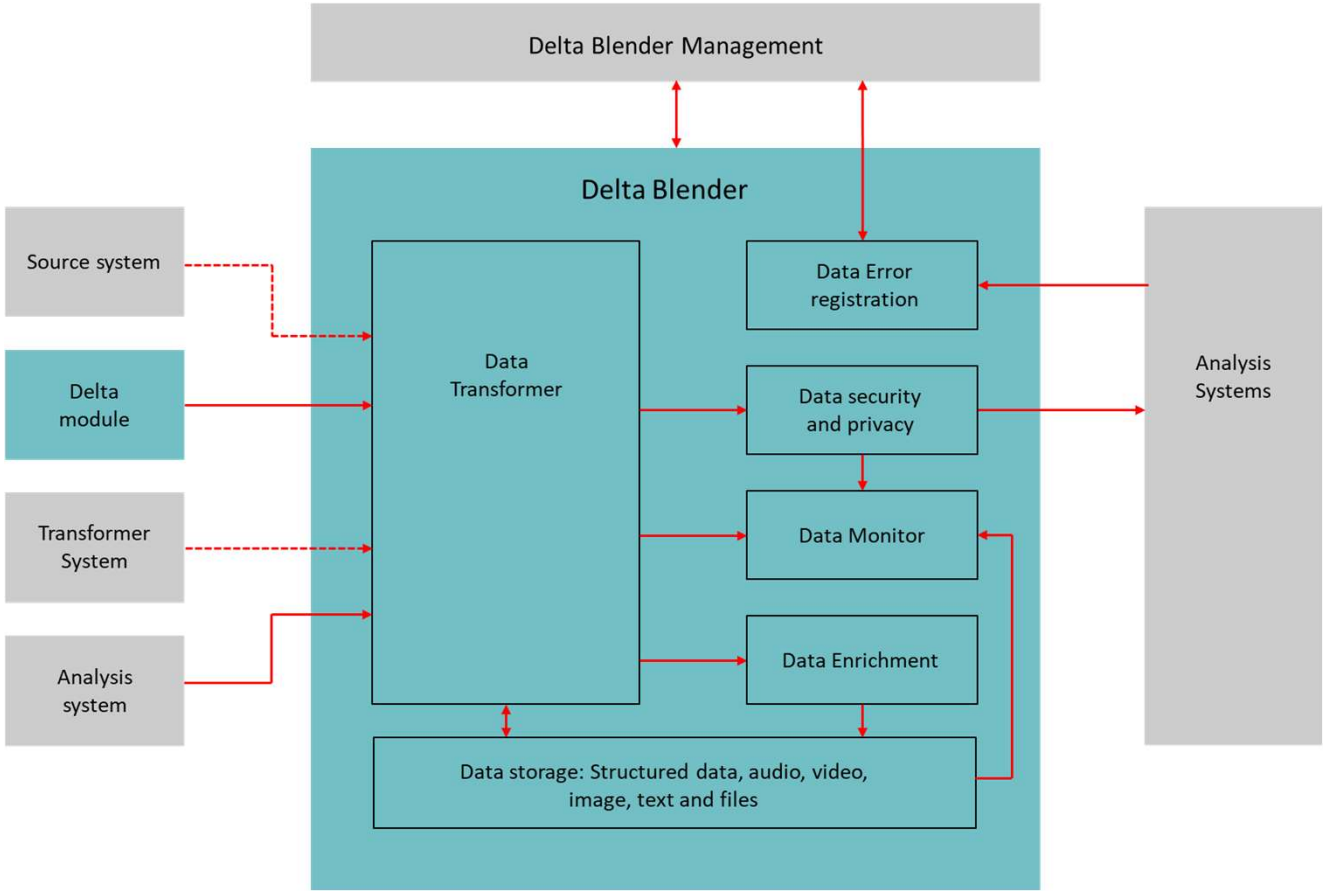
Delta Blender Components



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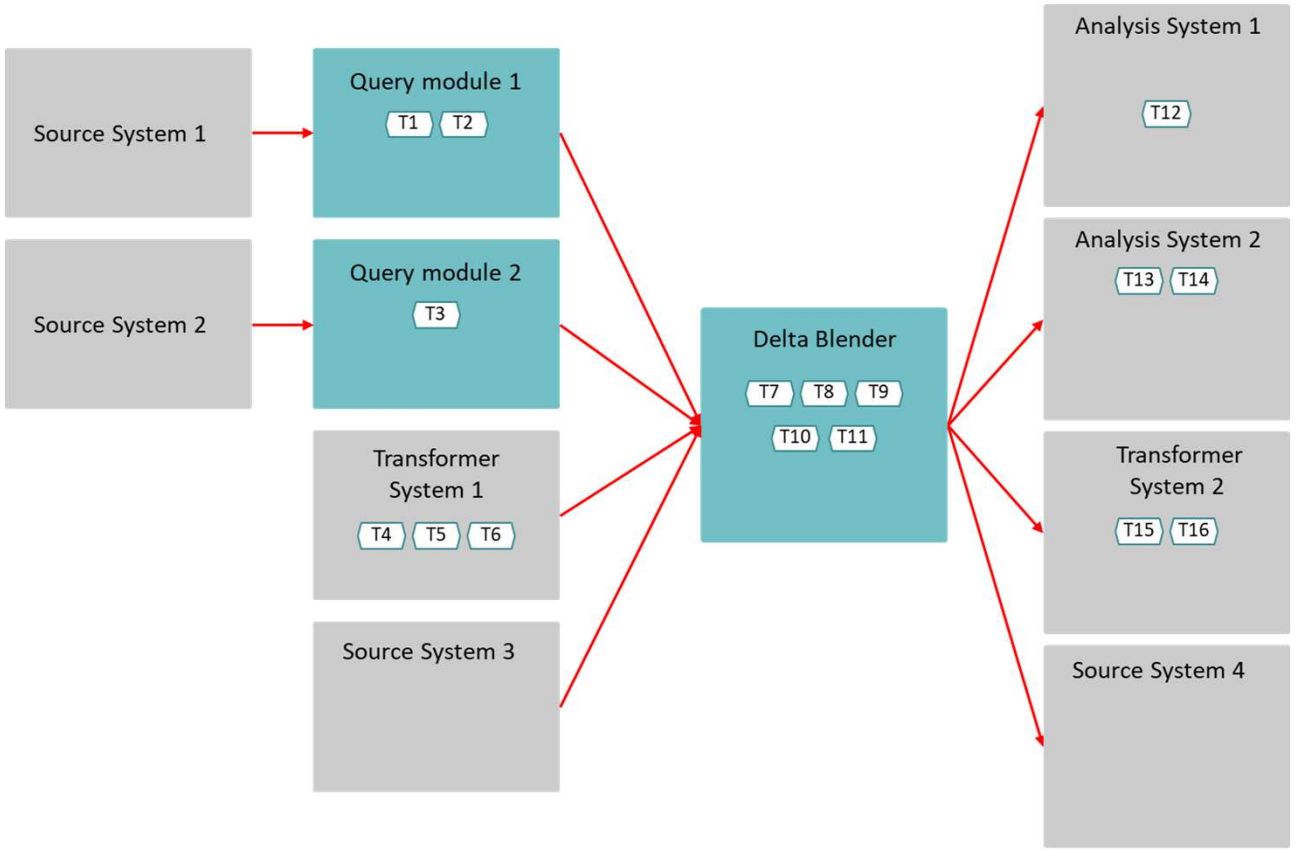
Delta Blender: Transformers



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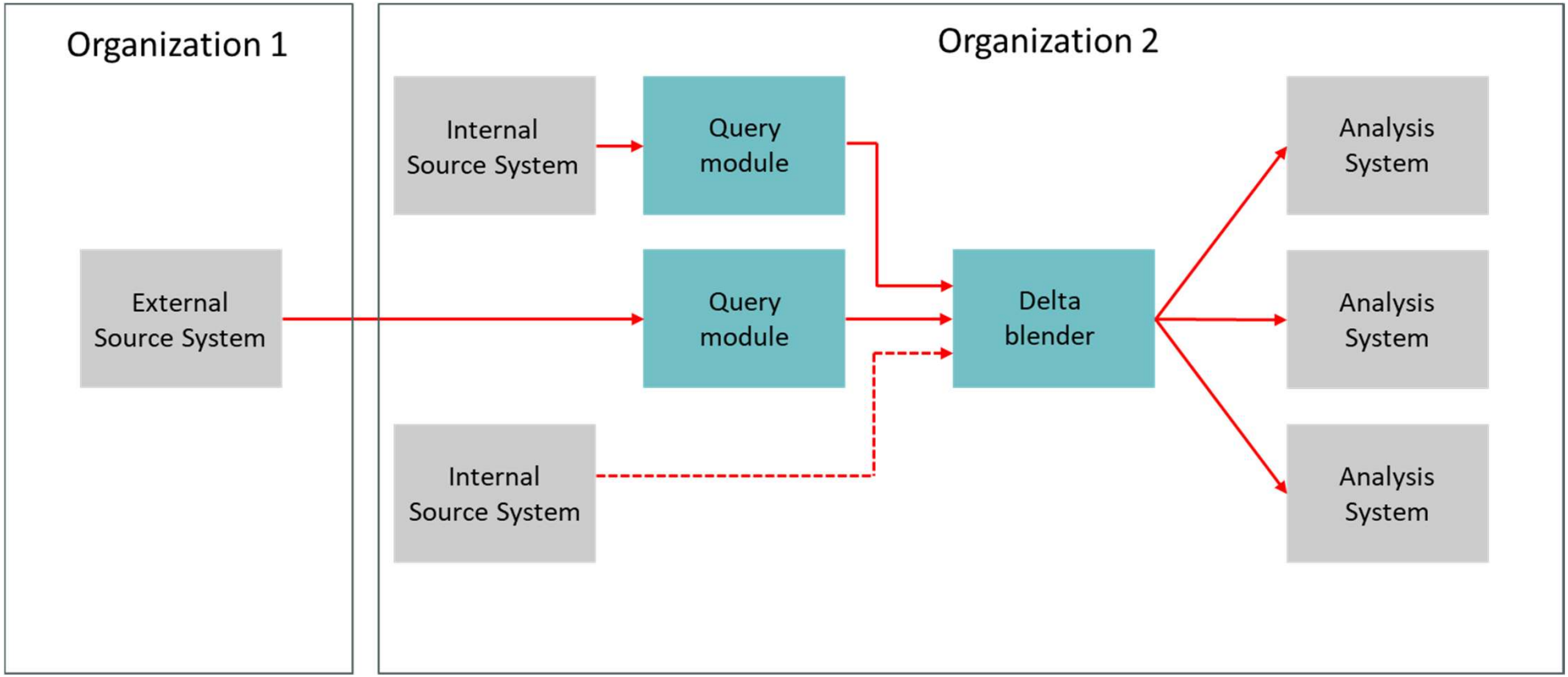
Local Federative Data Architecture



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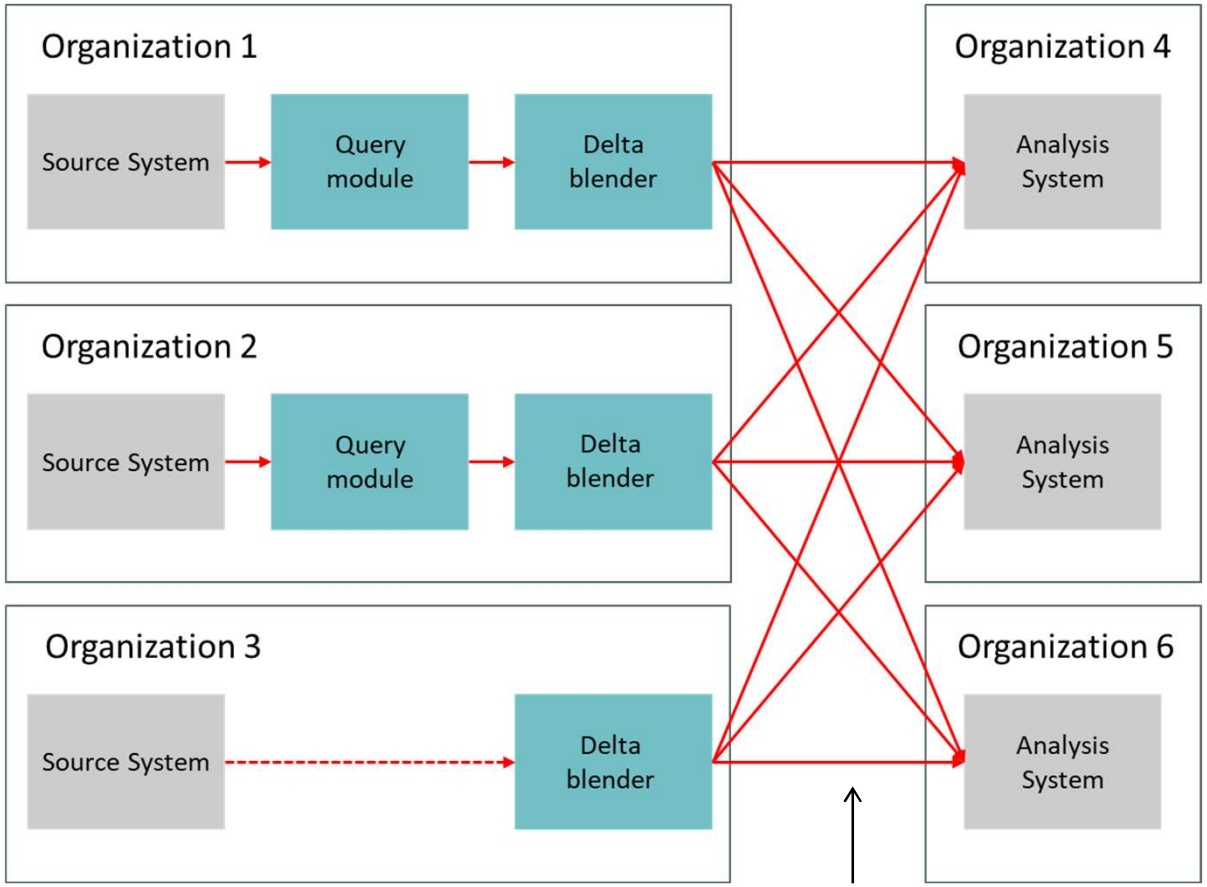
No Federative Data Architecture



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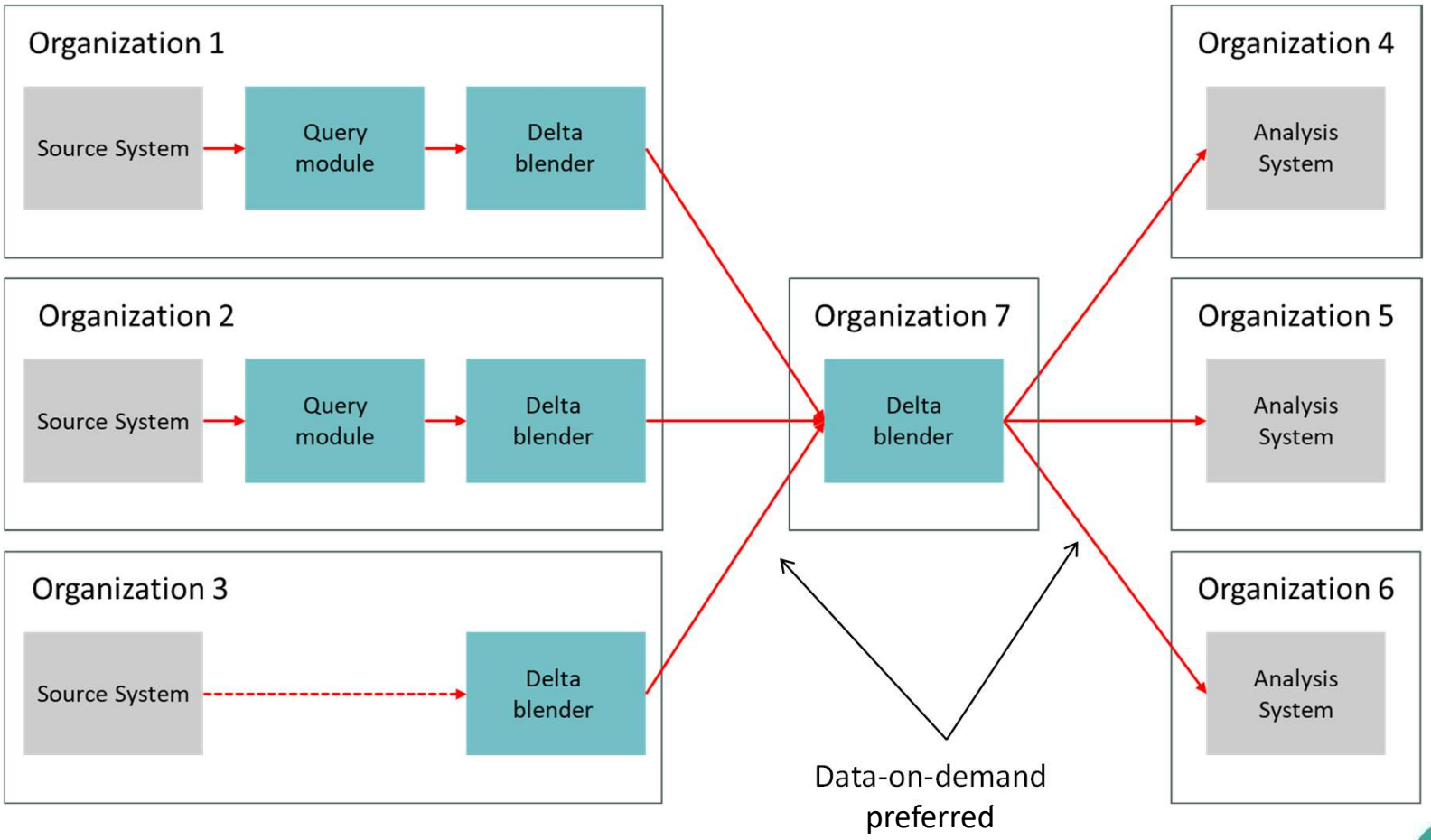
Global Federative Data Architecture



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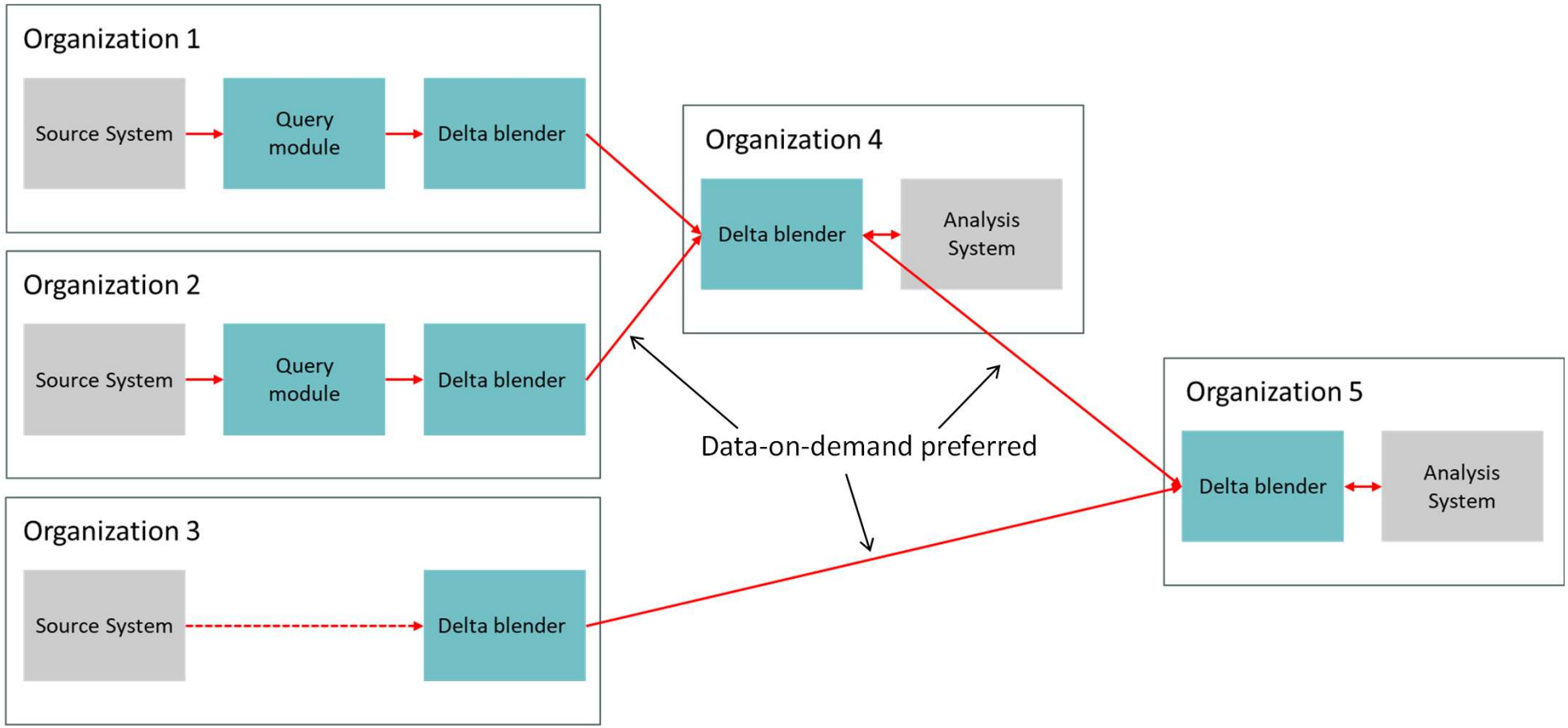
Layered Globale Federative Data Architecture



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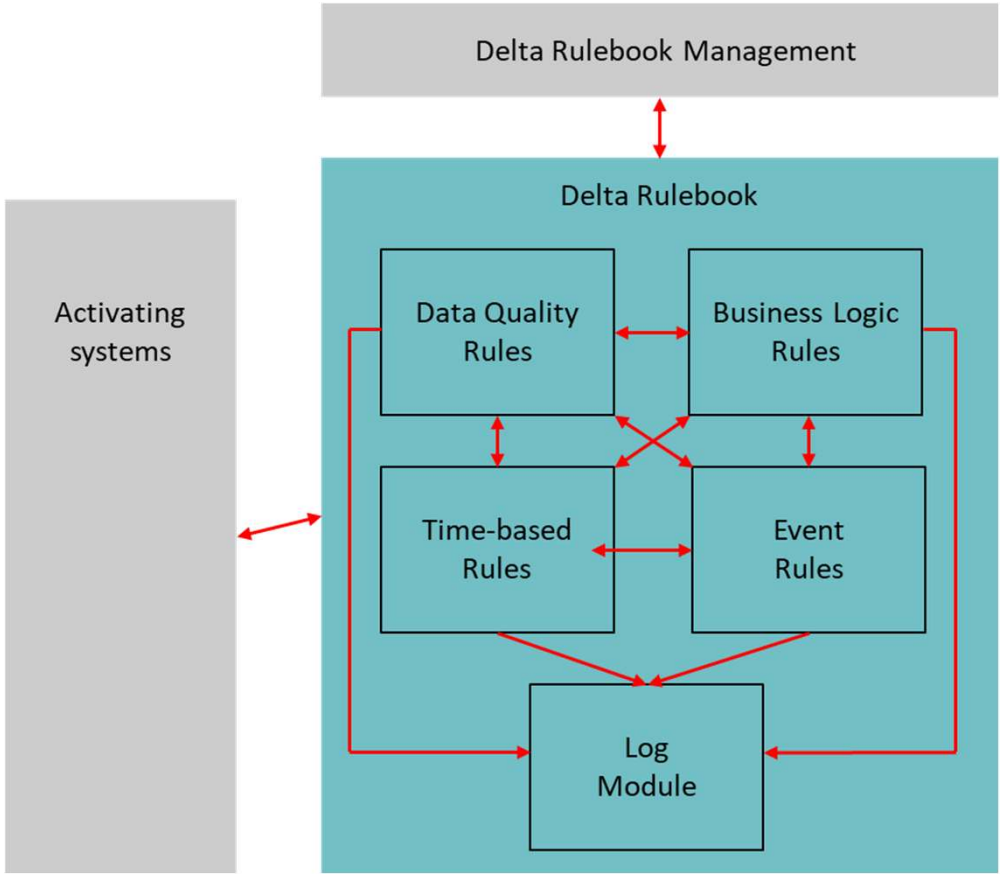
Delta Rulebook Components



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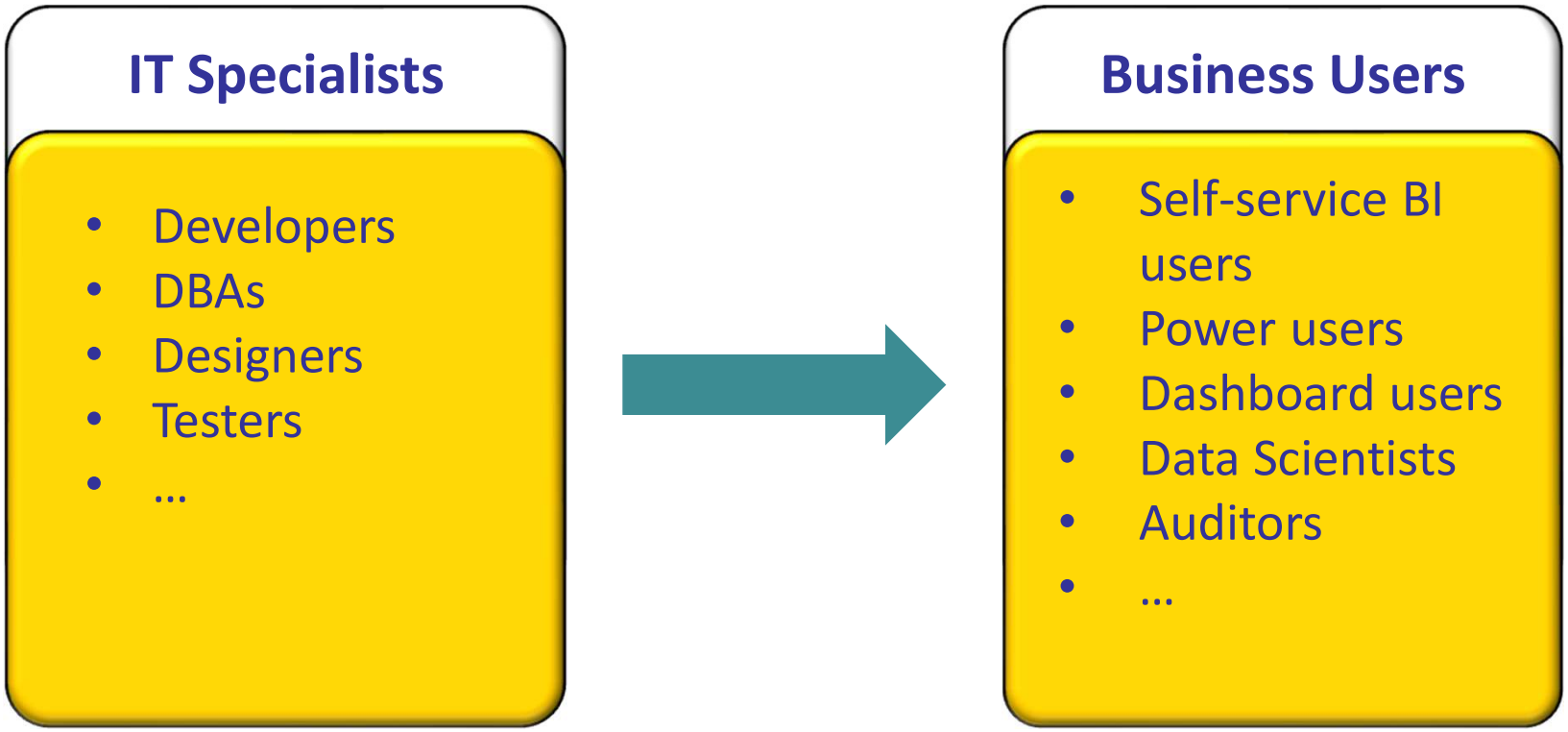
Target Audience of Metadata Has Changed



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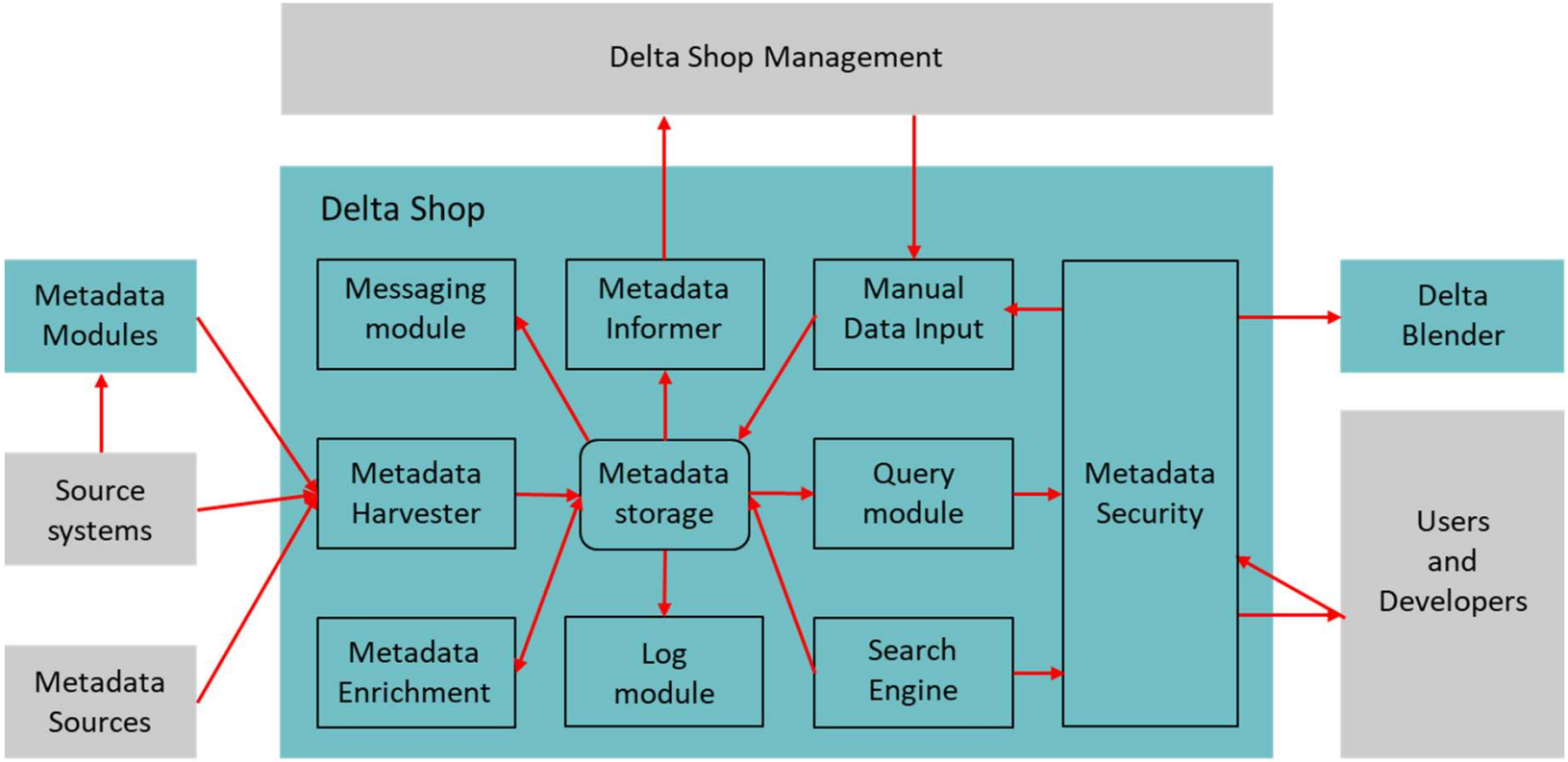
Delta Shop Components



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Summary

- Unbridled creation of data copies must stop
- Requirement: the (data)house must be in order
- A good (data)house starts with a holistic data architecture
  - Federated data architecture
  - Enterprise data architecture
  - The system is formed by the transformers, not the collection of databases
  - Avoid duplicate transformers
  - Data must be ready-to-use, findable, and insightful
  - Metadata for everyone
  - Operational lineage for reconstruction, transparency, and auditability

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De Delta
data-architectuur:
van bron tot inzicht
Rick F. van der Lans