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Data Governance for Regulated Industries Using Hadoop…and NoSQL

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Who am I?

- Product Manager for 6 years at MarkLogic
- Background in FinServ and web development
- Passionate about data, infrastructure, and user experience

What is MarkLogic?

- Enterprise NoSQL since 2001
- Distributed database + search + app platform
- 250+ paying customers, 500+ production applications

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Agenda

- Data governance considerations
- Legacy approaches: Why it's hard
- New generation: Hadoop + Enterprise NoSQL
- Enterprise NoSQL
- Case studies: FATCA, eDiscovery, Dodd-Frank
- Q&A

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Data Governance Considerations


Security


Retention


Privacy


Continuity


Provenance


Compliance

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Why is this difficult?

And risky?

And expensive?

And behind schedule?

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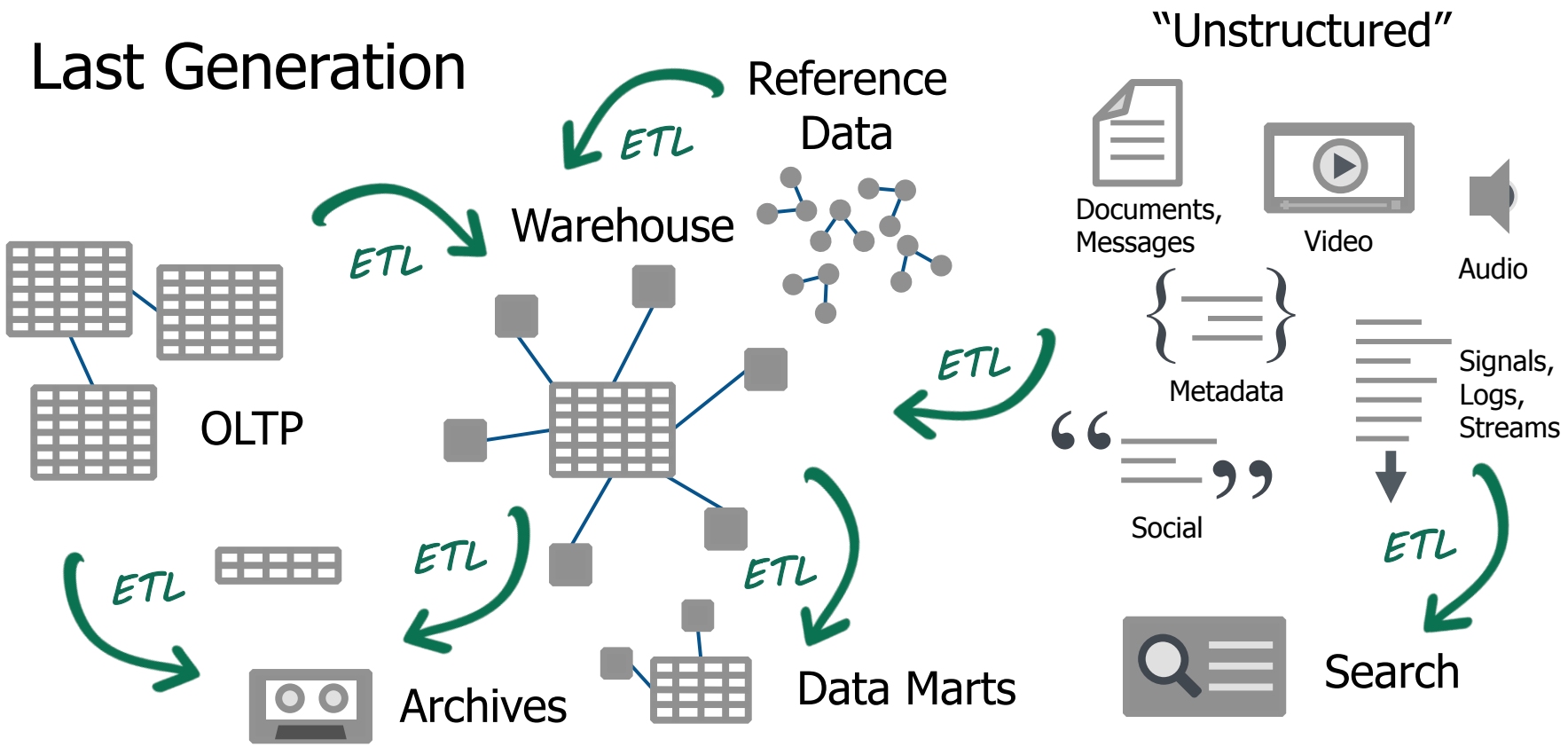
Last Generation



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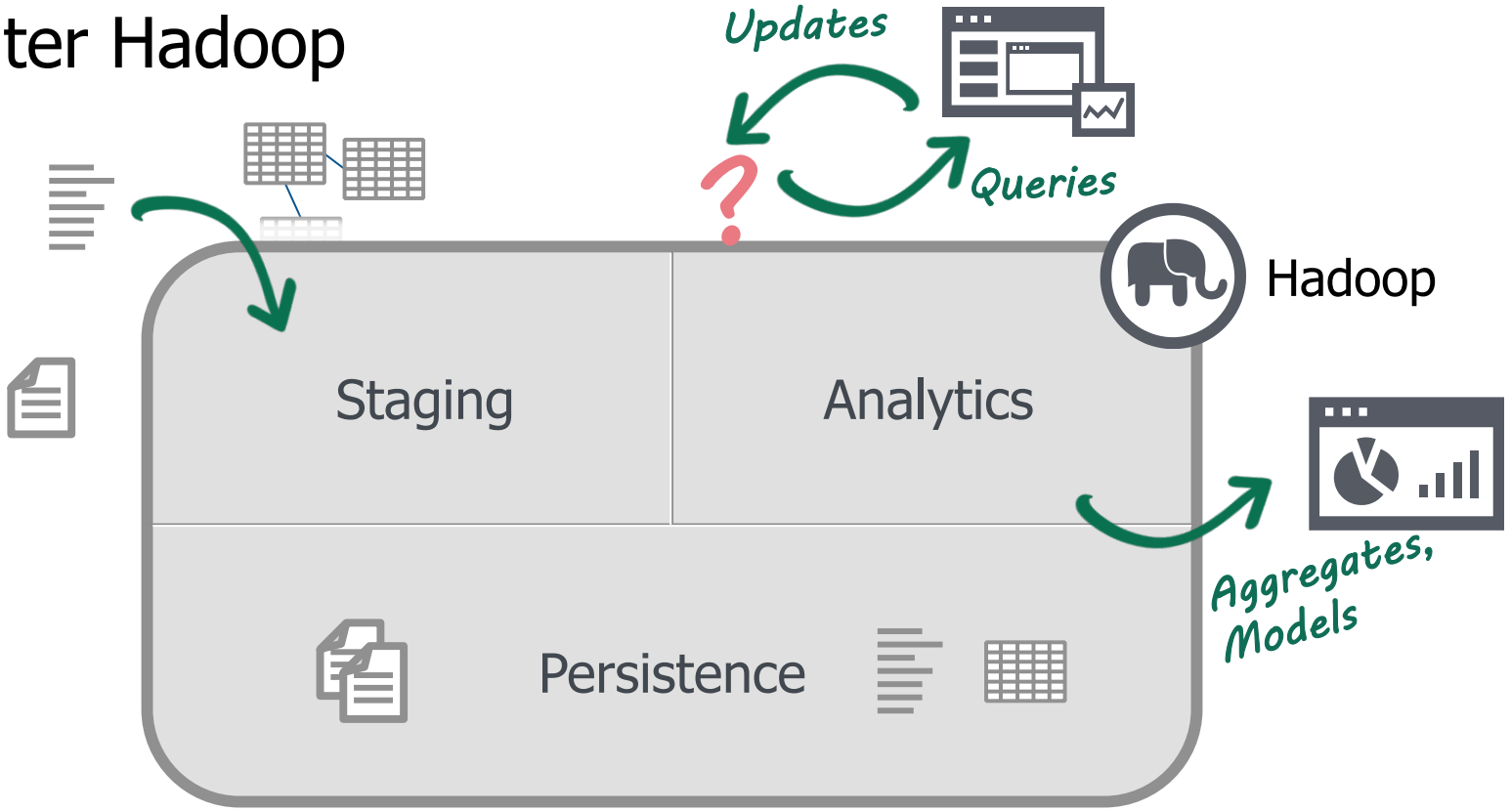
Enter Hadoop



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Why must we choose?

Legacy RDBMS

- Indexes
- Transactions
- Security
- Enterprise operations

"NoSQL"

- Flexible data model
- Commodity scale out
- Distributed, fault-tolerant
- Hadoop sink/source

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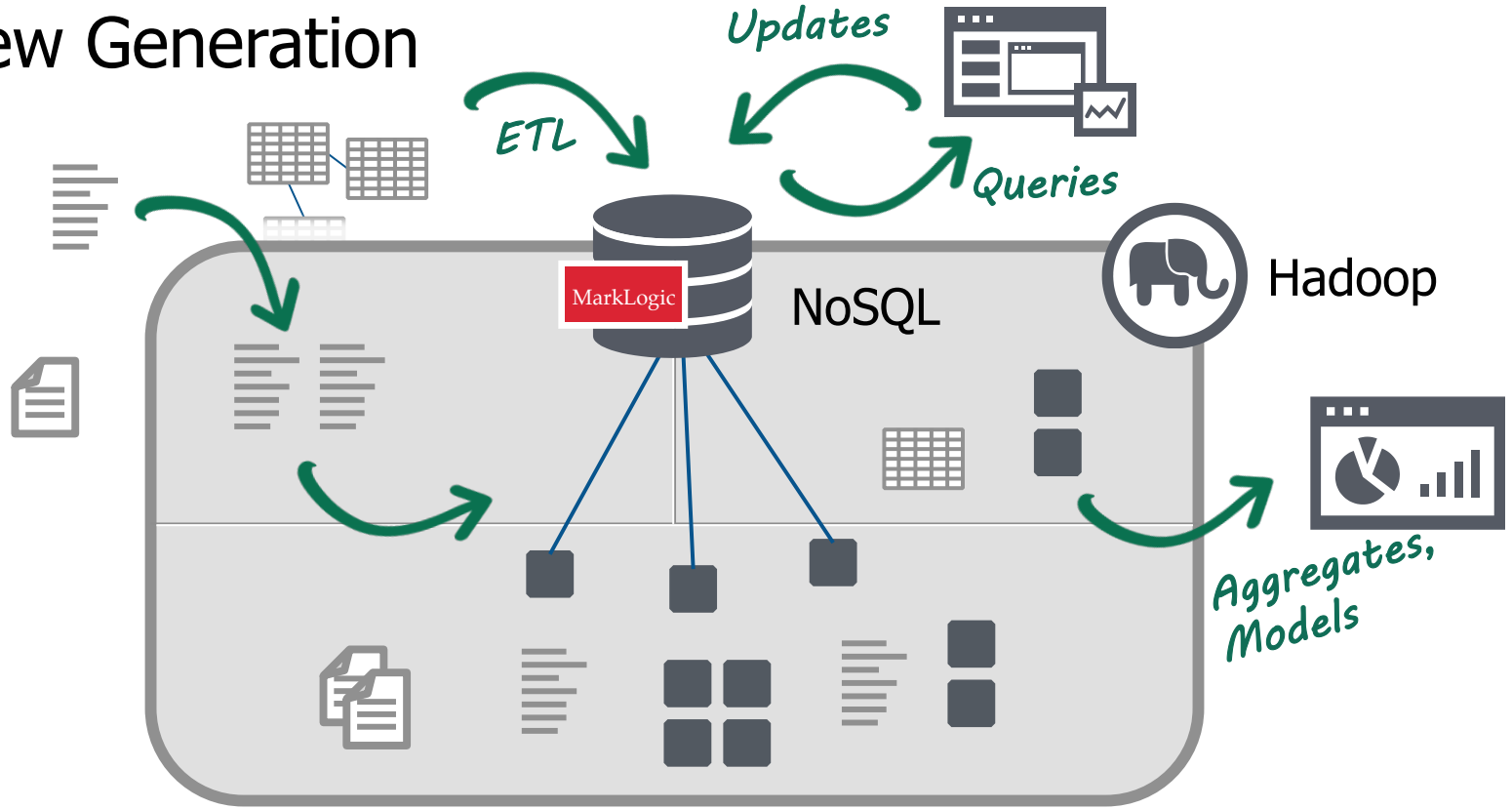
New Generation



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Enterprise NoSQL

- Flexible data model, comprehensive indexes
  - Documents: Hierarchy, text, values, tags—schema "on-demand"
  - Scalars: Aggregates and range filters, including geospatial
  - Triples: Linked facts and inferencing
  - Permissions: Users, roles, compartments, and privileges
  - Queries: Reverse indexes for alerting, matching
- Ad hoc dimensions, lock-free reads
- Real-time transformation
- Strict consistency throughout

Preserving Context with Documents

Before

…movement of materials was observed en route to Abattabad some time after 14:30…

Inline Enrichment

After

…movement of materials was observed en route to

```
<place lat="…" long="…" version="2.2.1">
  <original>Abattabad</original>
  <canonical ref="…">Abbottabad</canonical>
  <source>/sources/1234</source>
  <confidence>0.87</confidence>
  …
</place>
```

some time after 14:30…

Transactional updates

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Complementary Approaches

NoSQL

- Online applications
- Delivery
- Decision-making
- Real-time
- Granular updates
- Distributed indexes

Hadoop

- Offline analytics
- Staging
- Model-building
- Long-haul batch
- Write-once, read-many
- Distributed file system

Case Studies

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KPMG: FATCA Compliance for Customer On-Boarding

- Thousands of rules, 1–2M accounts, 30–40M documents
- Encoding, adjusting, and matching rules must scale
- Impossible to pre-define dimensions, relationships
- Vet new accounts and "show your work"
- Real-time decision-making

6-48 hours to
3 seconds

KPMG

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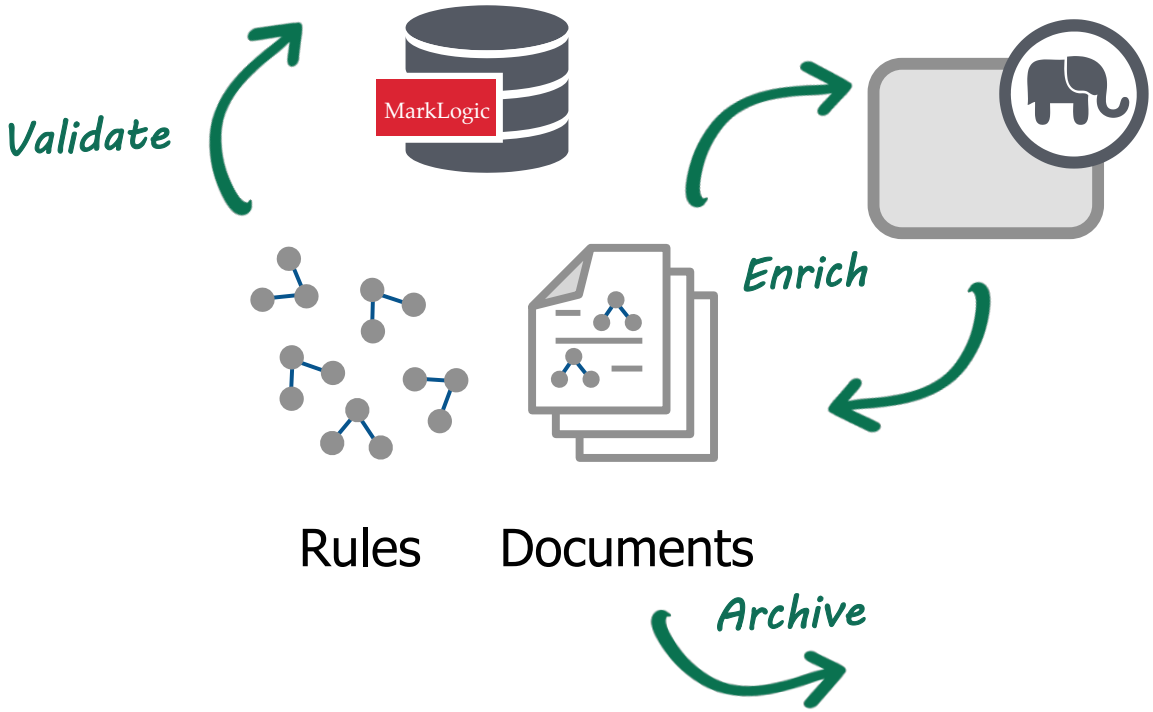
KPMG: FATCA Compliance for Customer On-Boarding



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Tier 1 European Bank: Compliance and Legal Holds

- Accurately respond to discovery as part of litigation
- Hold, review, produce data across current, legacy systems
- Repatriate and reconcile distributed data
- Demonstrate fidelity and audit trail
- Reduce infrastructure and maintenance costs

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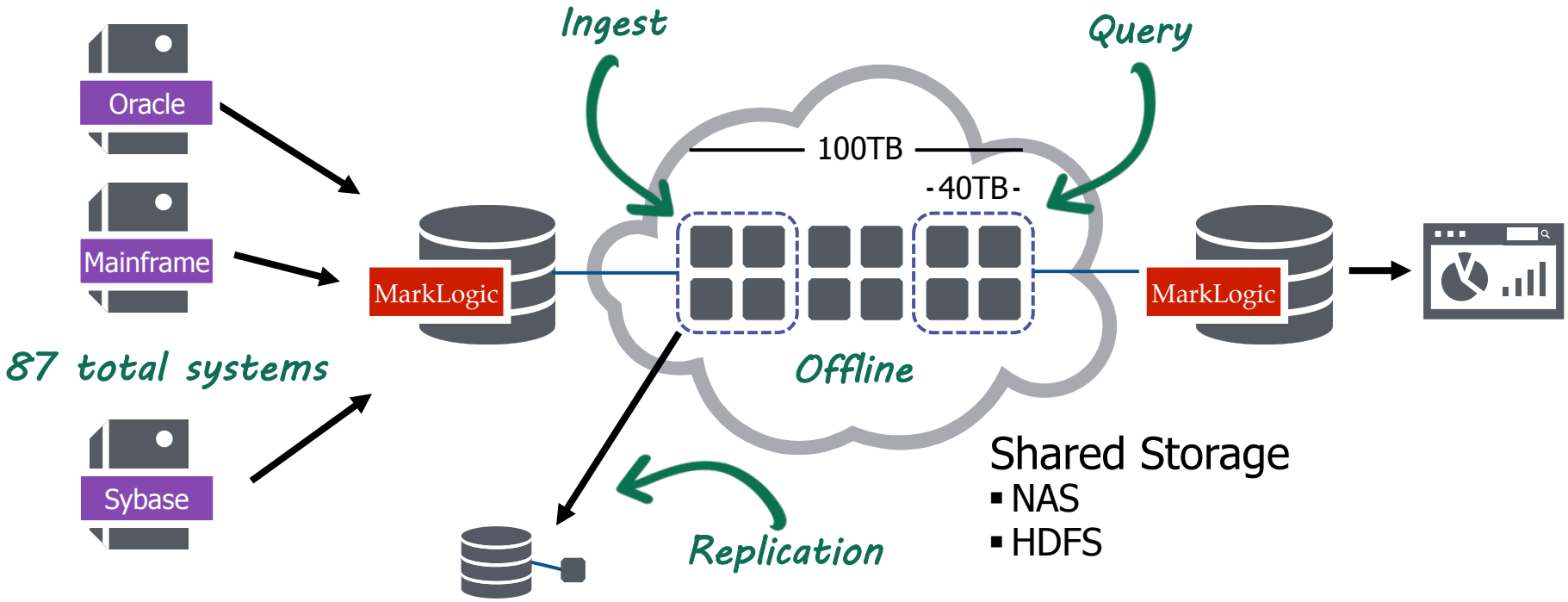
Tier 1 European Bank: Compliance and Legal Holds



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Ernst & Young: Dodd-Frank Compliance

- Trace lineage of order lifecycle for OTC derivatives
- Search, link supporting communications, documents
- Strict reporting and retention rules, response times
- Existing policies, point solutions don't scale

EY
Building a better working world

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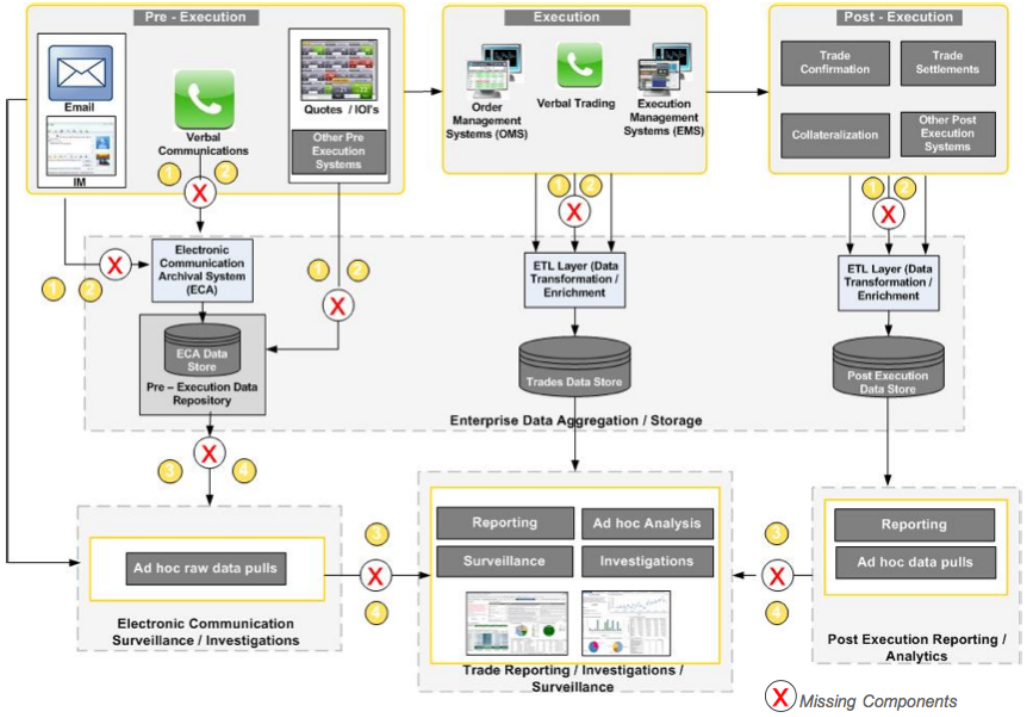
Current State



- Missing key relationships between pre-/post-trade data
- No way to query across silos
- Segregated reporting and surveillance

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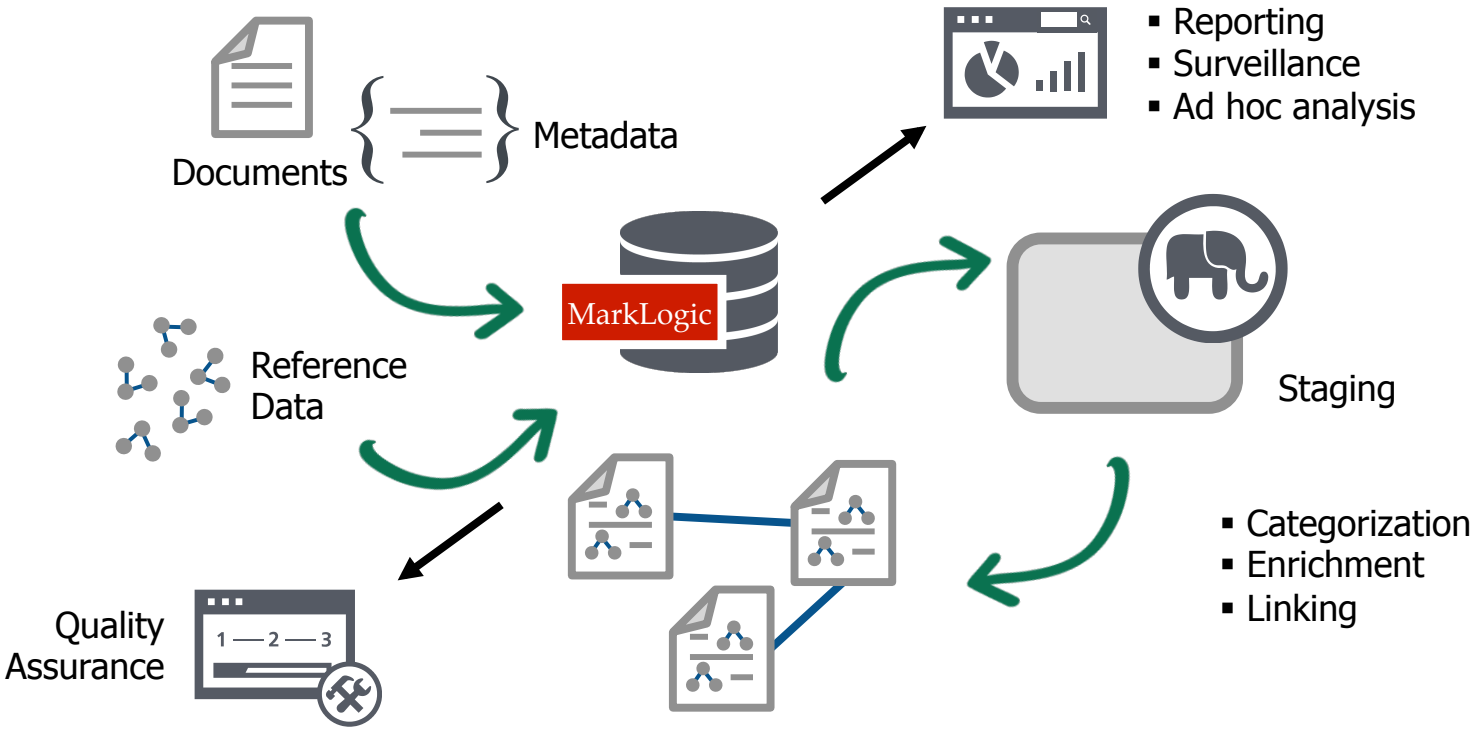
Ernst & Young: Dodd-Frank Compliance



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Enrichment and Linking

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<Email>
   <Subject>CDS 050907 Trade Interest</Subject>
   <From>Sam@ACME.com</From>
   <To>Phil.D@DEUTSCHE.com</To>
   <Party>ACME</Party>
   <Party ID>100 </Party ID>
   <CounterParty>DEUTSCHE</CounterParty>
   <CounterParty ID>200 </CounterParty ID>
   <Trader Name>SAM</Trader Name>
   <Trader ID>1001</Trader ID>
   <Trade Date>2012-06-20</Trade Date>
   <Quantity> </Quantity>
   <Security ID>2001</Security ID>
   <Security Name>CDS 050907</Security Name>
   <Execution Price>.015 </Execution Price>
   <Principal Amount>5000000</Principal Amount>
</Email>
```

Trade Record

Trade Data	
Party	ACME
Party ID	100
Counter Party	DEUTSCHE
Counter Party ID	200
Trade Date	2012-06-20
Buy/Sell	Sell
Quantity	
Principal Amount	5000000
Price/Interest	.015
Currency	USD
Security ID	2001
Security Name	CDS 050907
Security Type	CDS

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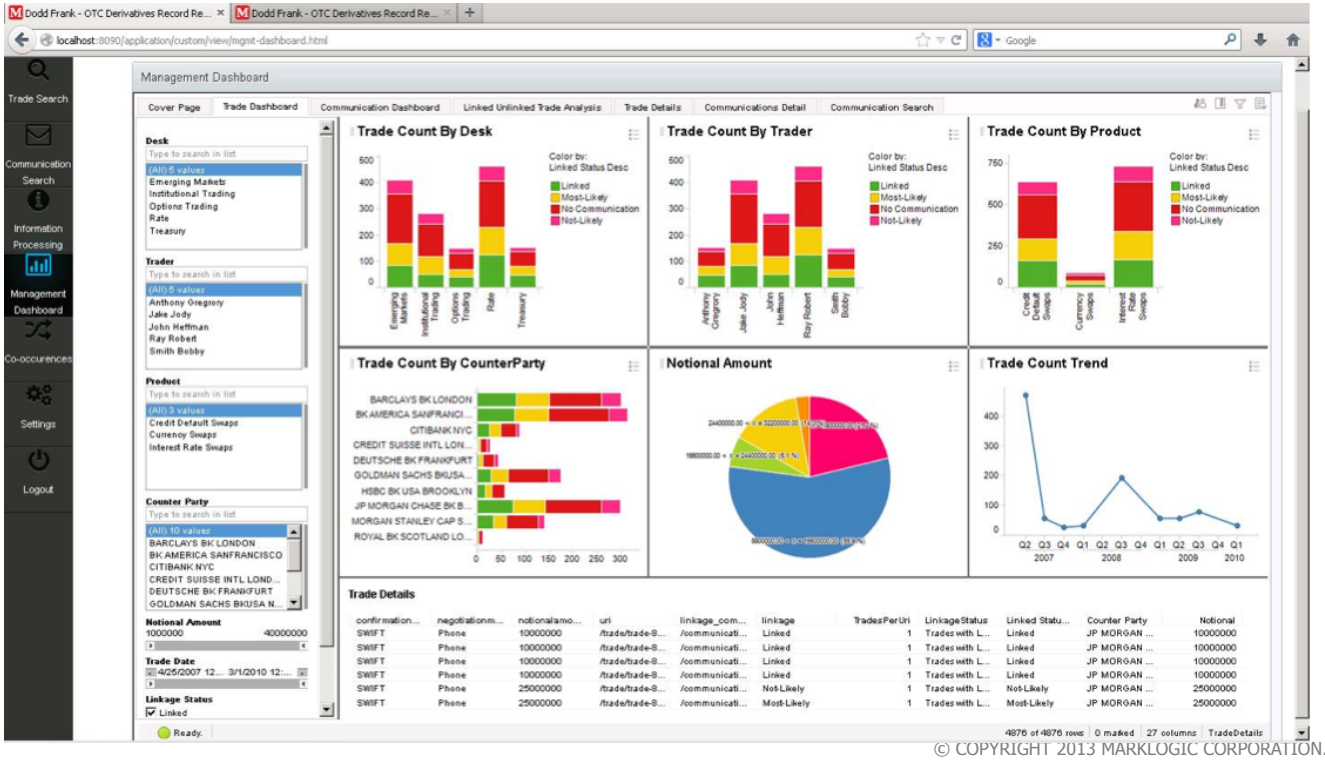
Management Dashboard



What now?

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Take-Aways

- New and more data is both an opportunity and a threat
- Last generation of data management is not sufficient
- More copies, representations, transformations increase risk
- Index once and reuse across workloads, lifecycle
  - NoSQL: indexing and updates for interactive apps
  - Hadoop: staging, persistence, and analytics

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DO MORE WITH HADOOP

SECURE

Minimize duplication, costly ETL, reduce risk

REAL-TIME

Enterprise-class database for real-time search, delivery & analytics

RUN APPLICATIONS

Run mission critical applications directly on HDFS