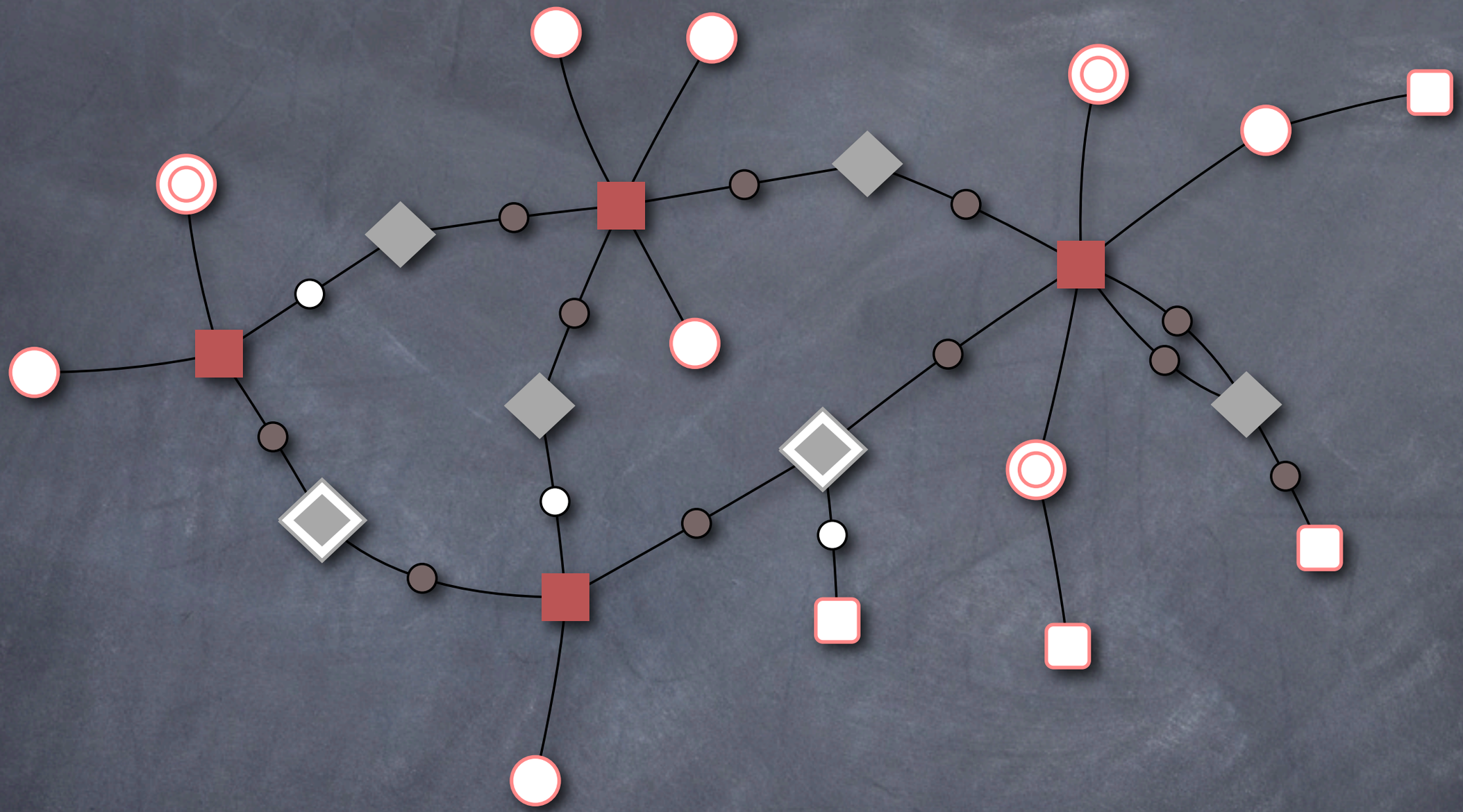
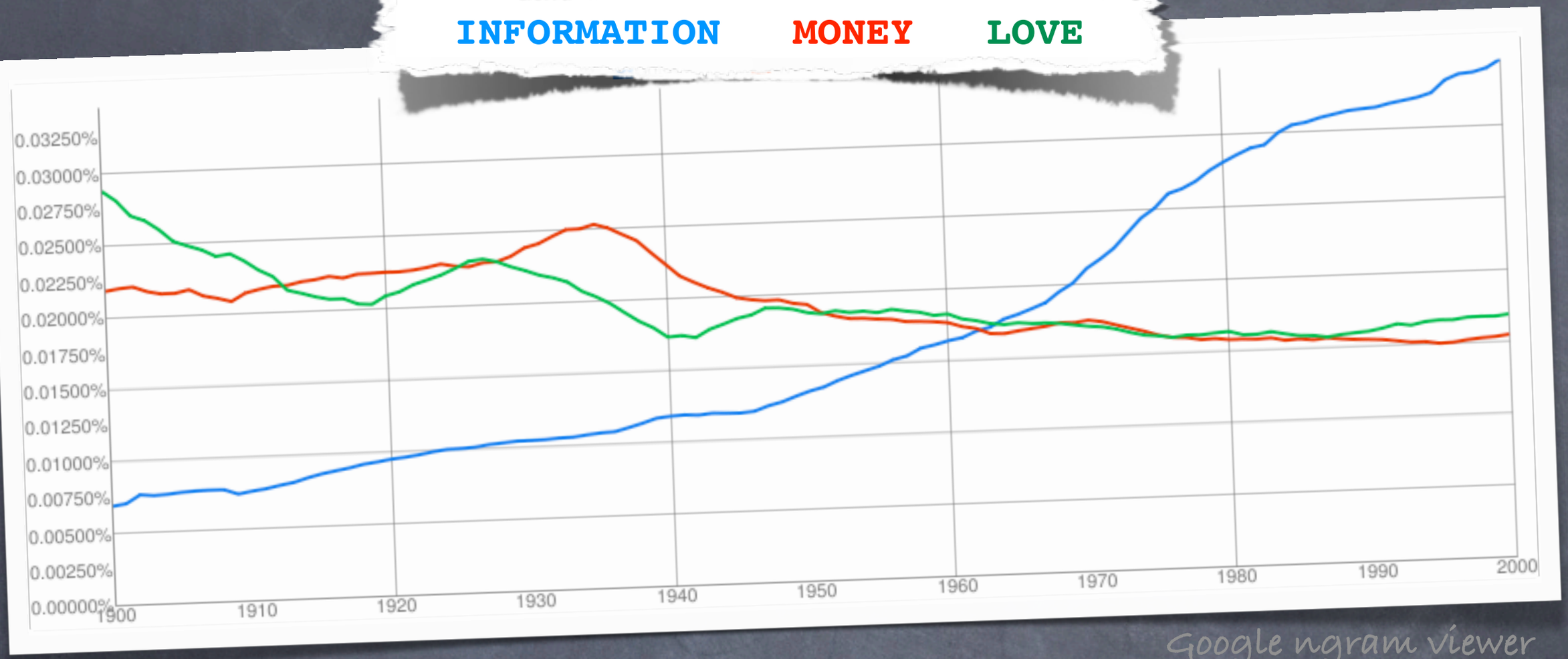


Anchor Modeling

A Technique for Information under Evolution

Lars Rönnbäck @ GSE Nordics June 7-9, 2011



Google ngram viewer

- Graph showing relative occurrence of words in literature over the last century
- Information is rapidly becoming the most important asset


Heraclitus
500.BC
“Panta rhei”
Everything flows

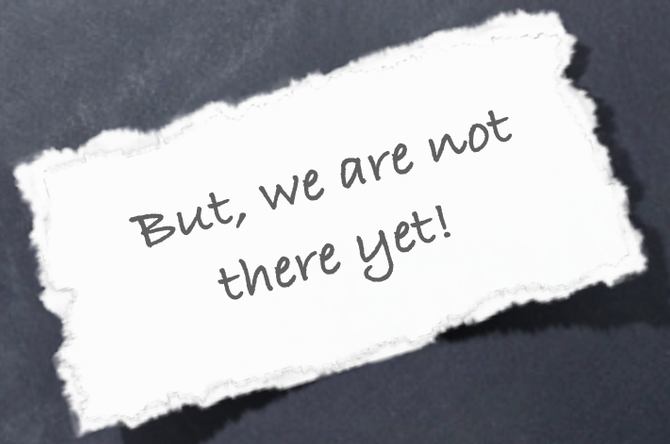
Evolving Information

- Changing content
- Changing structure
- Changing constraints
- Changing interpretation
- Changing origins
- Changing reliability

There's a big difference between saying: "This information has a 95% reliability" and "This information is 100% reliable".

What is a database?

- The purpose of a database is to store a body of information and allow searches over it.
- The purpose of a temporal database is to store a body of information under evolution and allow historical searches over it.

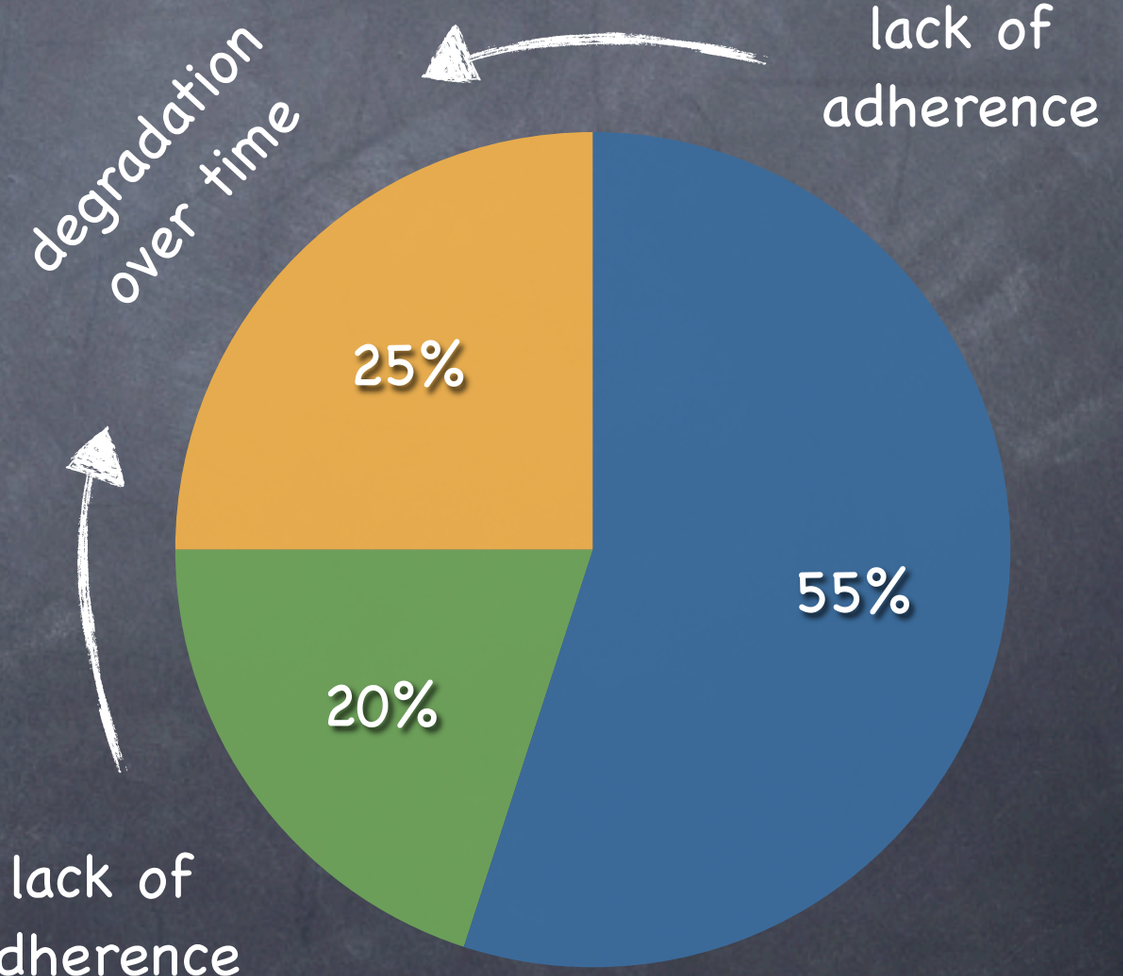


What is a Data Warehouse?

- Integrates information from many sources
- Keeps a history of changes
- Provides "one version of the truth"
- Enables reporting, ad-hoc analysis, mining
- Calculates and stores new information

The dilemma

- Many sources and many users naturally result in many changes



- Dimensional Modeling
- Normalized
- Haphazard

Patch or Redo?

- Patching works initially to cope with new requirements
- Maintenance costs usually rise proportionally to the lifetime of the data warehouse
- Redoing is unavoidable at some point
  (and for dimensional modeling sometimes accounted for)
- The average lifetime is five years
- The return of investment should and could be much better with a longer lifetime!

What is Anchor Modeling?

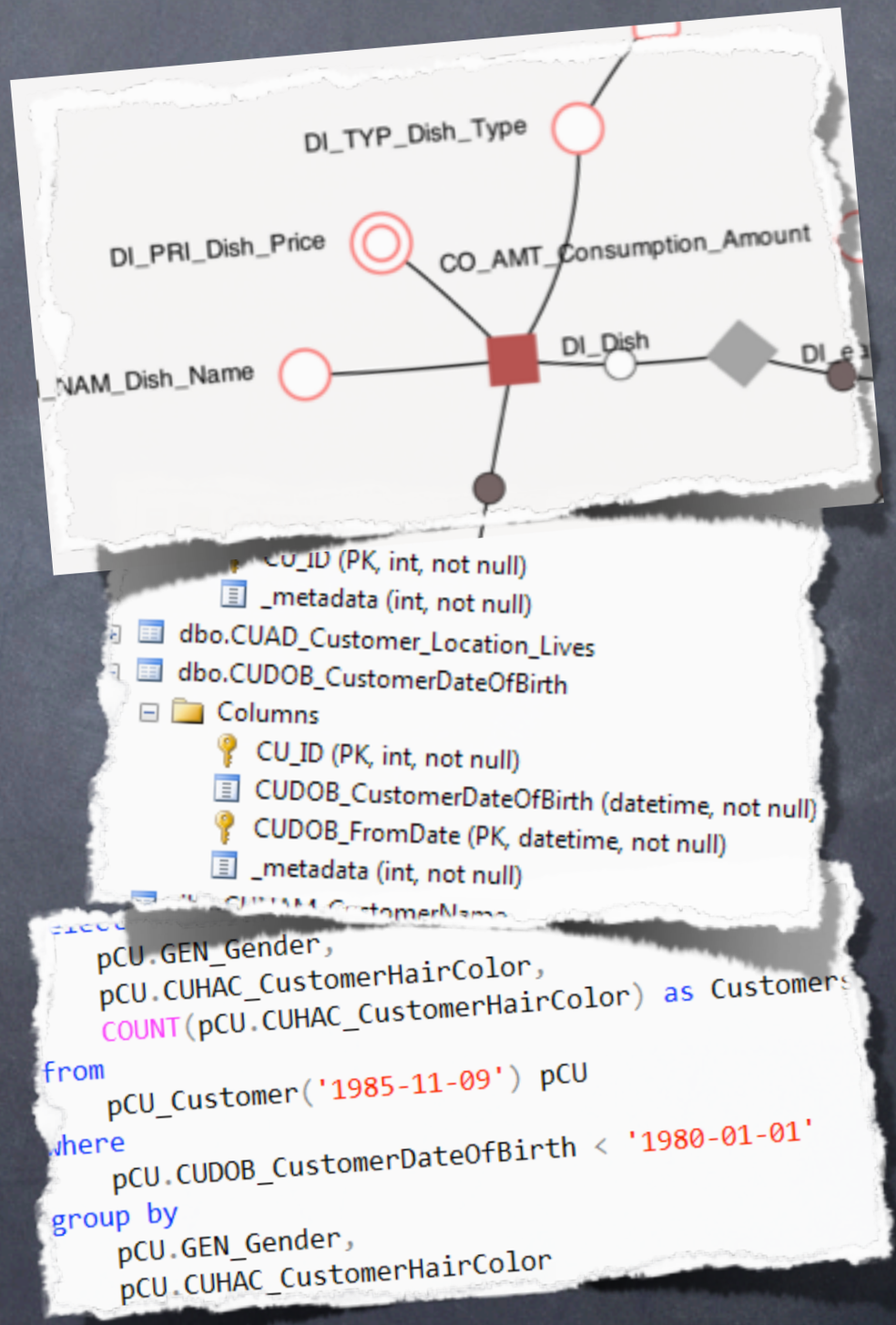
- Anchor Modeling combines normalization and emulation to provide an agile database modeling technique for evolving information that is implementable in current relational databases.
- Most, if not all, of what Anchor Modeling is doing in its physical (relational) representation could be "hidden" from the end-user in a true temporal database.

Technologies

- Entity-Relationship Modeling

one-to-one

- Sixth Normal Form Tables
- Temporal Database Emulation



History

Best Paper Award
@ ER'09

Paul Johannesson

Lars Rönnbäck

Olle Regardt

Maria Bergholtz

Petia Wohed

research

consulting

03	04	05	06	07	08	09	10	11
DW	MDM	EDW	DW	TDWI	SU WWW	DW ER09	DKE TOOL	DW GSE AMW

Philosophy

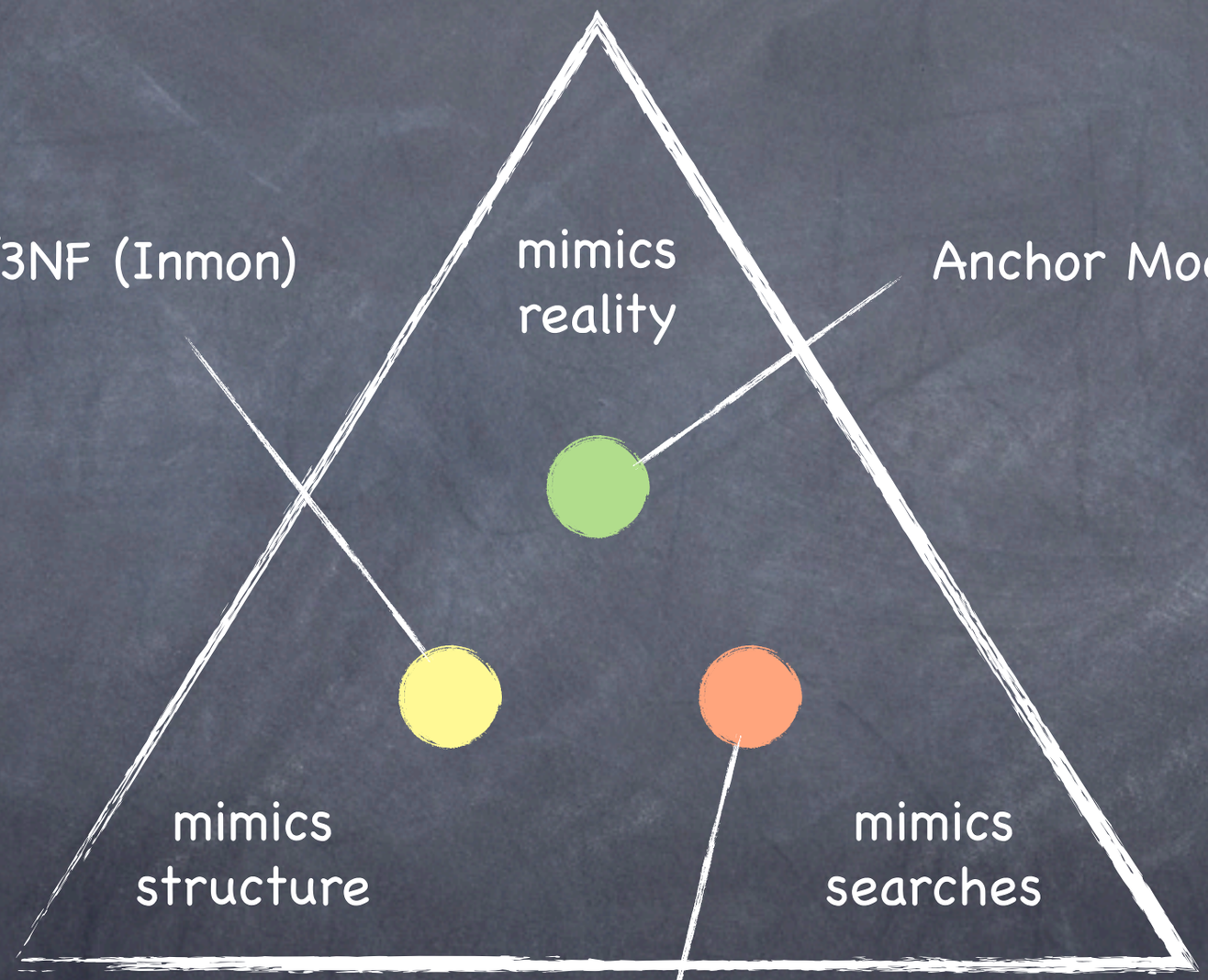
- Make modeling free from assumptions
- Make modeling agile and iterative
- Make evolution non-destructive
- Do not duplicate information
- Do not alter existing information
- Decouple metadata from the model
- Provide a simple interface for queries

Evolution in Anchor Modeling

- **Changing content**
  full support [6NF + time of change]
- **Changing structure**
  full support (through extensions) [non-destructive schema evolution]
- **Changing constraints**
  minimal support [only primary and foreign keys]
- **Changing interpretation**
  achievable [explicitly modeled]
- **Changing origins**
  restricted support [using metadata]
- **Changing reliability**
  restricted support [using metadata]

Positioning
Anchor Modeling

Domain driven modeling



Data driven modeling

Use-case driven modeling

Basic Notions

Attributes - properties

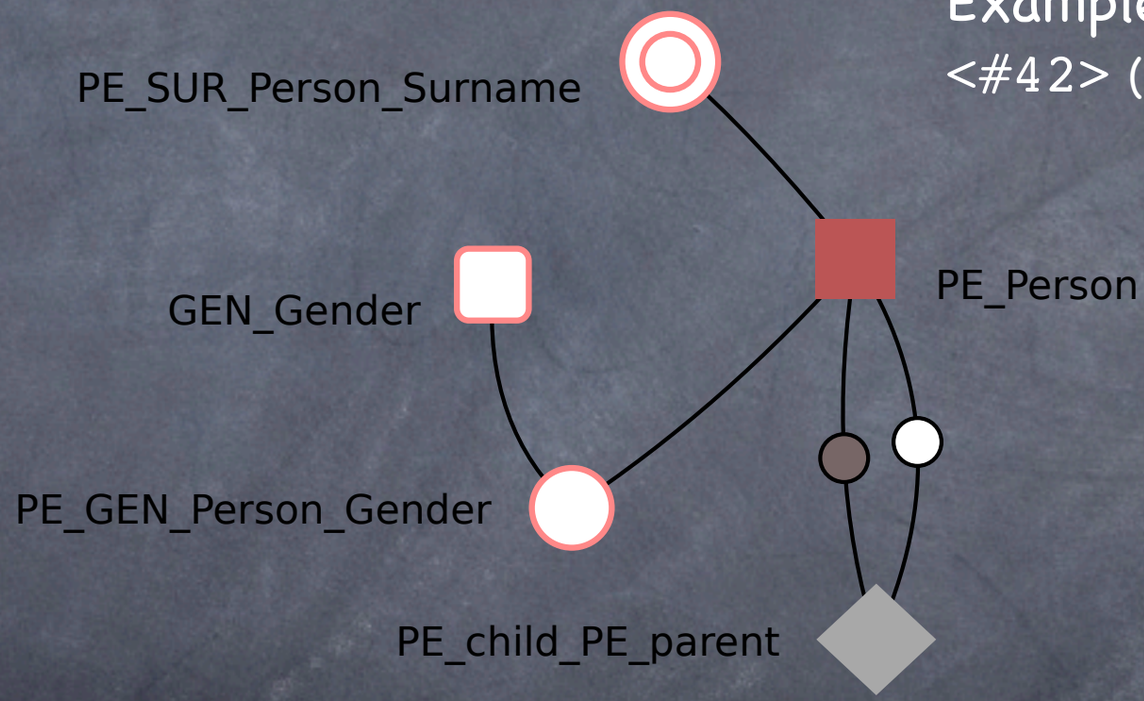
Example: The surname of a Person

<#42, ‘Rönnbäck’, 2004-06-19>

Anchors - entities

Example: A Person

<#42> (holds only identities of entities)



Knots - shared properties

Example: The gender of a Person

<#1, ‘Male’> + <#42, #1>

Ties - relationships

Example: The children of a Person

<#42, #4711>

Historization

```
<#42, 'Samuelsson', 1972-08-20>
<#42, 'Rönnbäck',   2004-06-19>
```

closed interval
historical information

open interval
current information

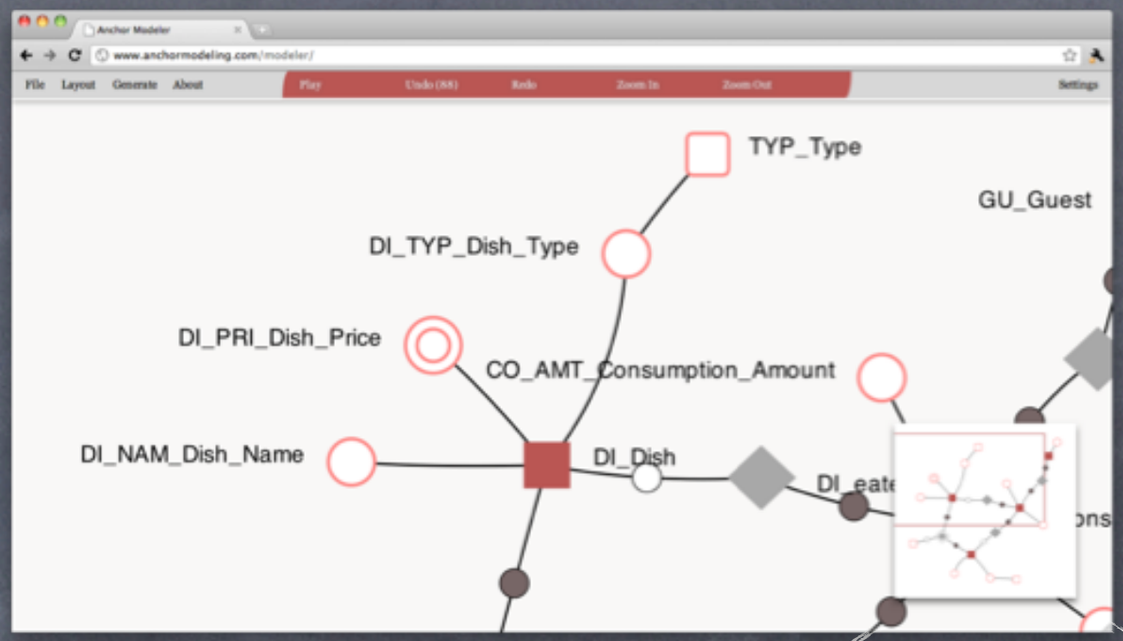
Historization is done using the time of change as the start of an interval implicitly closed by another instance of the same identity with a later time of change.

Note that `UPDATE` is never allowed in an anchor database

The Modeling Tool

- Open Source
- Online (**HTML5**)
- Free to use
- In the Cloud
- XML Interchange Format
- Automatic generation of SQL scripts
- Interactive (force-directed) Layout Engine

www.anchormodeling.com/modeler



DEMO!

Important Benefits

- Handles evolving information (keeping the integrity intact)
- Increases longevity (databases with long life expectancy)
- Simplifies modeling concepts (less prone to error)
- Enables modular and iterative development
- Needs no translation logic to the physical layer
- Automates generation of scripts
- No downtime when upgrading databases
- Scans only relevant data during searches
- Sparse data cause no gaps (no null values)

More Information

Homepage:
http://www.anchormodeling.com

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LinkedIn Groups:
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Temporal Data Modeling

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