

**Nomenclator:
Descriptive Directory Services
for Large, Heterogeneous
Networks**

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DESCRIPTIVE DIRECTORY SERVICE

*Locates people, resources, and information
by describing their attributes*

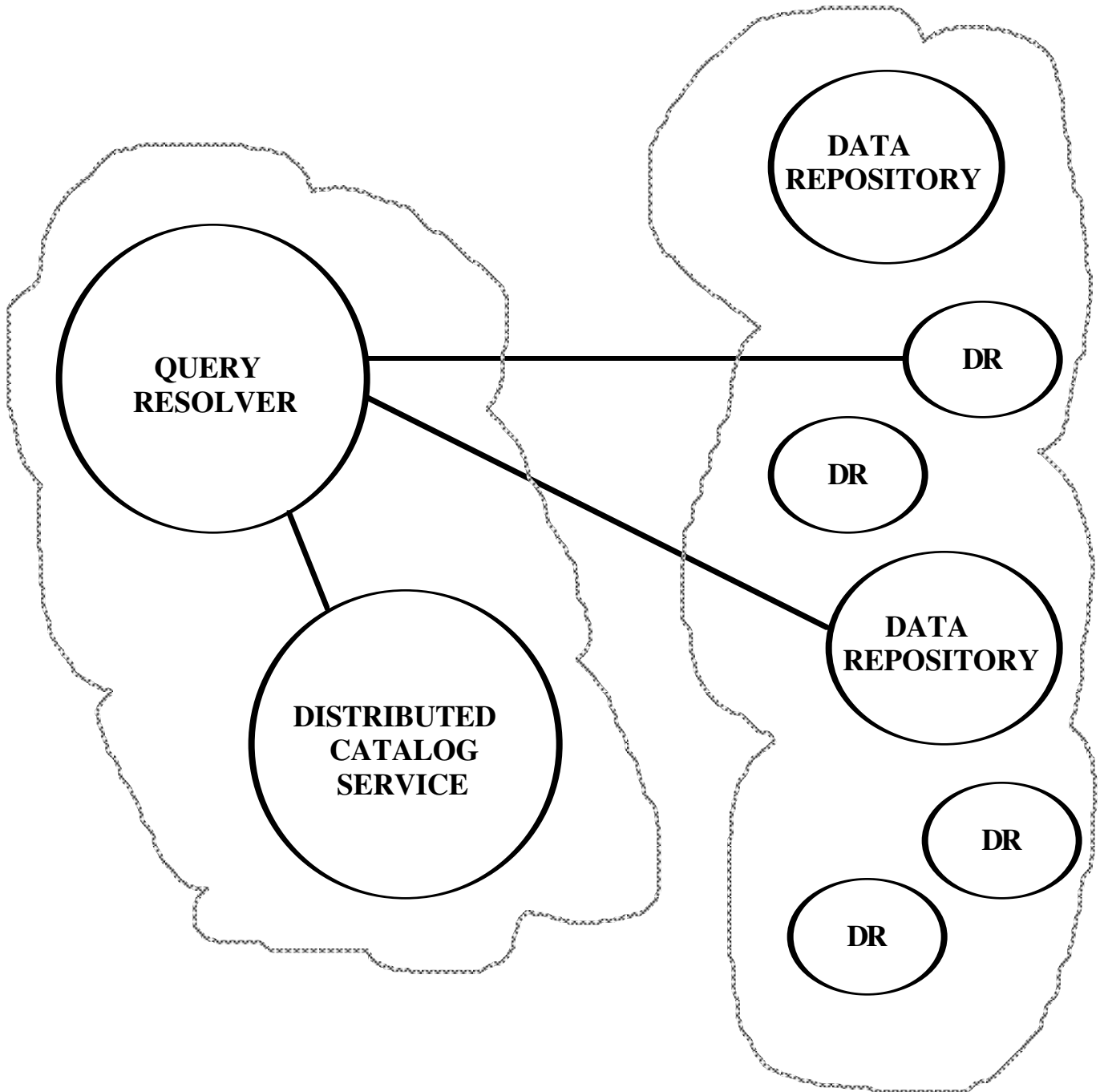
```
select * from People
      where
          name = "Ordille" and
          country = "US"
```

DESCRIPTIVE INFORMATION SERVICE

NOMENCLATOR GOALS

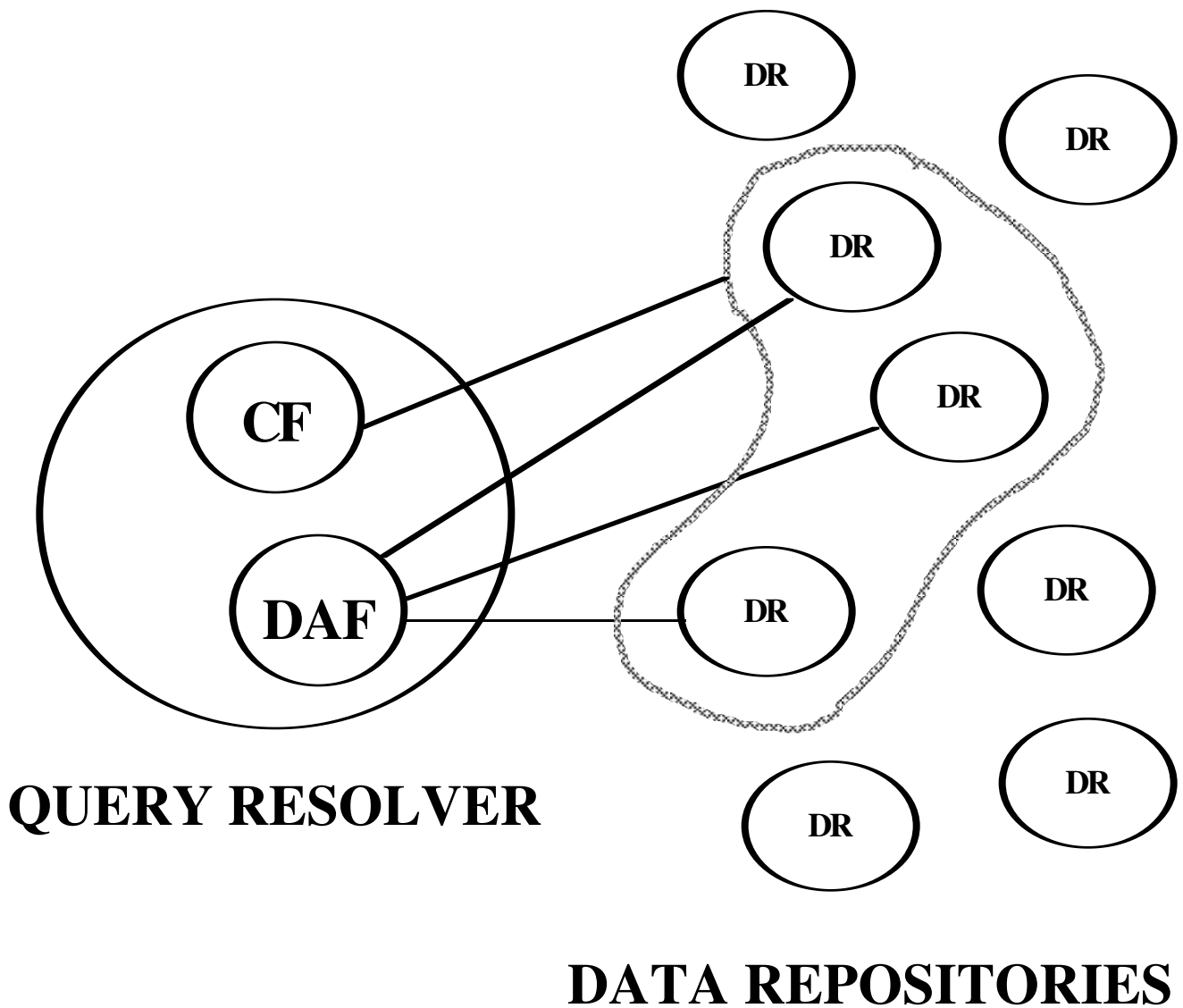
- **FAST Descriptive Directory Service for Large Internets**
 - **Scale**
 - **constraining the search space**
 - **meta-data and data caching**
 - **Autonomy**
 - **one relational interface to a variety of different data sources**
 - **Unavailability**
 - **advice and feedback**

NOMENCLATOR SYSTEM ARCHITECTURE



ACTIVE CATALOG

- **Catalog Functions for Locating Data**
- **Data Access Functions for Obtaining Data**



REFERRALS

| | |
|-----------------|--|
| TEMPLATE | CATALOG OR DATA ACCESS FUNCTION |
|-----------------|--|

IF QUERY -> TEMPLATE

**THEN catalog or data access functions
can be used to answer QUERY**

- **Improves Performance**
 - **Tailors query resolver to user needs**
 - **Combined through intersection and union**
 - **Cached and re-used**
- **Integrates catalog functions (indices)
from different sources into one,
distributed index**

EXAMPLE OF REFERRALS FOR X.500

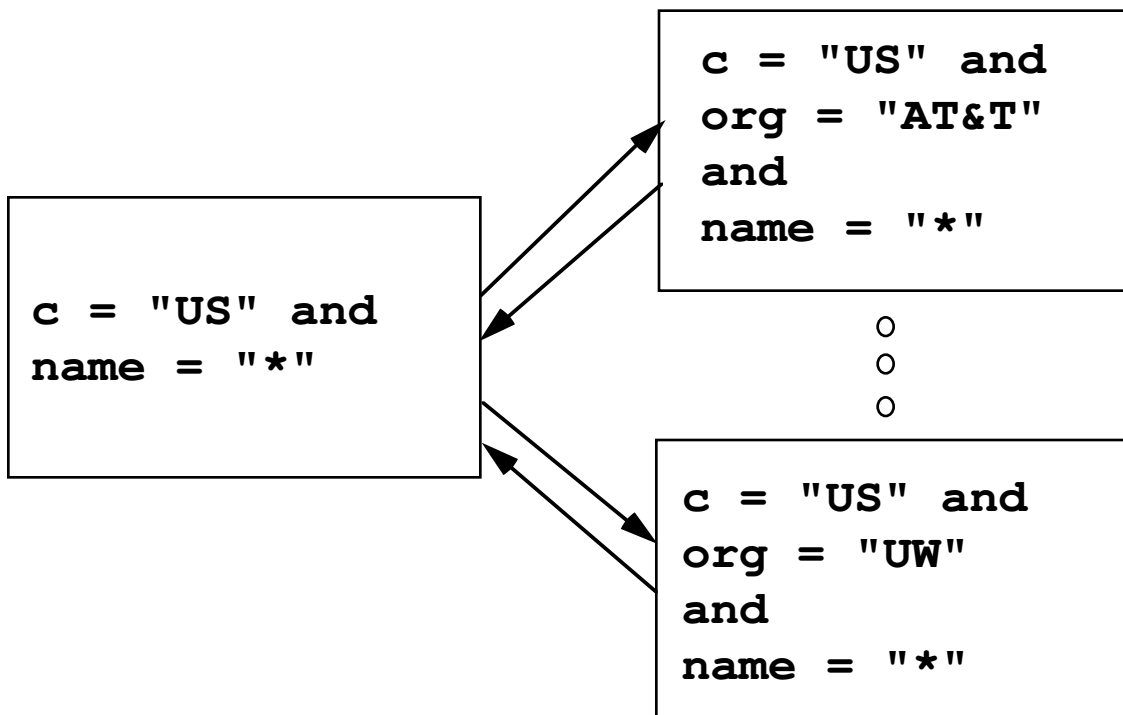
```
select * from People
  where
    name = "Ordille" and
    country = "US"
```

| | |
|--|--------------------------------------|
| <pre>name = "*" and country = "US"</pre> | <pre>US_Names Catalog Function</pre> |
|--|--------------------------------------|

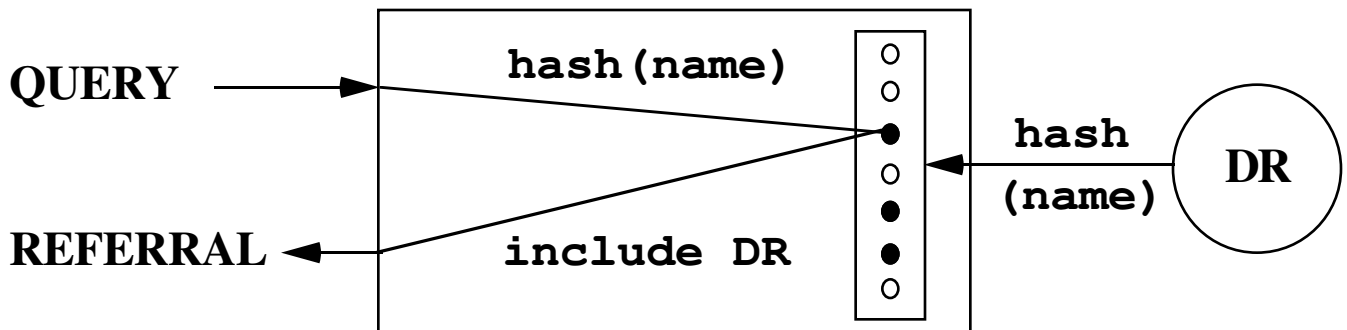
| | |
|--|--|
| <pre>name = "Ordille" and country = "US"</pre> | <pre>X.500 Data Access Function and UW X.500 DSA Address</pre> |
|--|--|

EXAMPLE OF CATALOG FUNCTION TECHNIQUES

Catalog Function DAGs



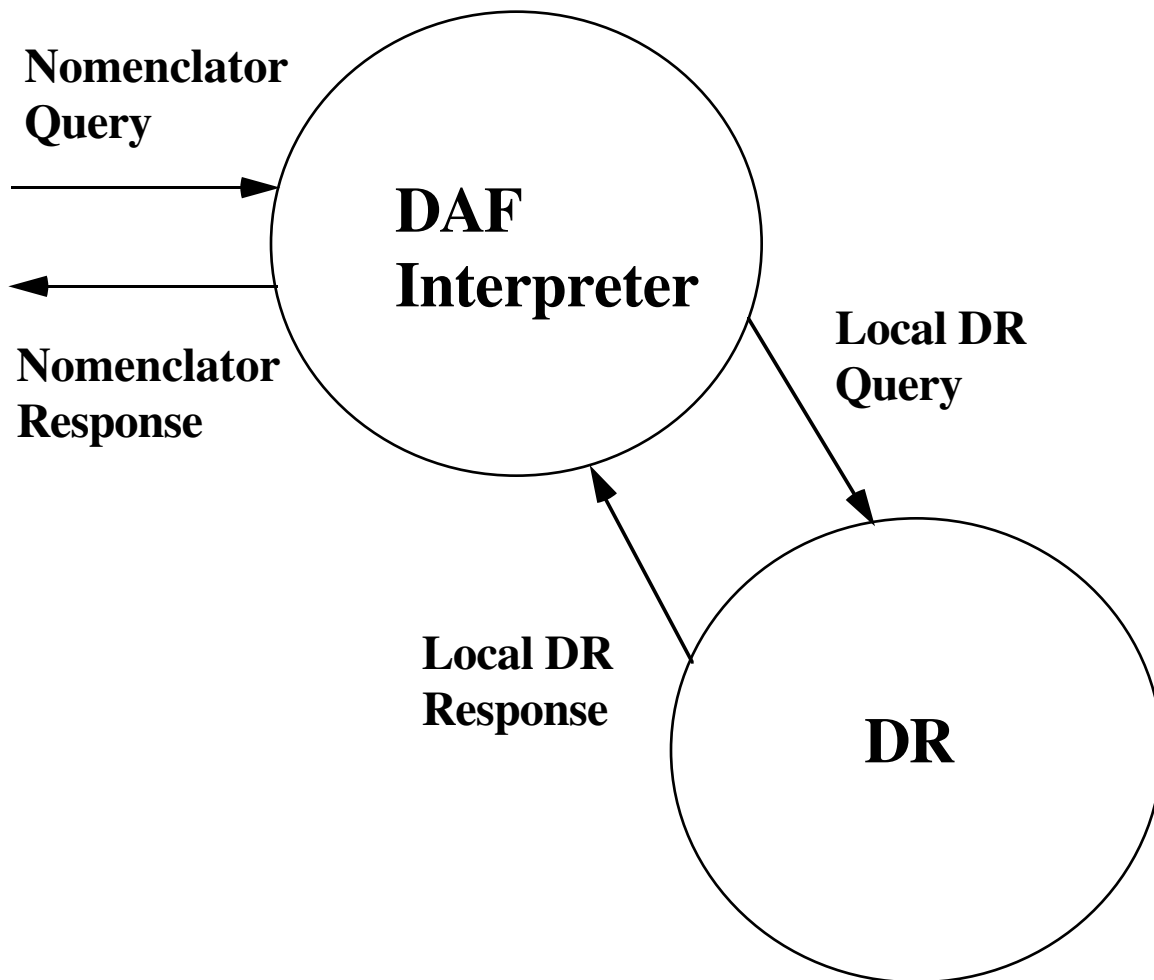
Catalog Functions with Bit Vector Filters



EXAMPLE DATA ACCESS FUNCTION TECHNIQUES CCSO Name Services

- **200+ Servers**
- **20+ Countries**
- **People, Departments, Weather**
- **Relational Style**
- **Word-Based Matching/Indexing**

EXAMPLE DATA ACCESS FUNCTION TECHNIQUES CCSO Name Services DAF



EXAMPLE DATA ACCESS FUNCTION TECHNIQUES CCSO Name Services DAF

- **Protocol Translation**
- **Schema Translation**
 - **Schema Divergence**
 - **Data Owners Specify Local to Global Mapping**
 - **Generate a Translation Program for DAF Interpreter**

CACHING

- **Meta-Data Caching**
 - **Referrals**
 - **Catalog Functions**
 - **Data Access Functions**

- **Data Caching**

IF NEW QUERY -> OLD QUERY

**THEN answer NEW QUERY from
cached result of OLD QUERY**

PERFORMANCE RESULTS OVERVIEW

- **X.500 Experimental Results**
 - **Constrain Real Search Spaces**
- **Single User Experimental Results**
 - **Single User, 1000 Data Repositories**
 - **Catalog Functions - Biggest Contribution to Improved Response Time**
 - **Meta-Data Caches Reduce Network Load**
- **Analytical Model Results**
 - **Multi-User Workloads**
 - **Catalog Functions and Meta-Data Caching Improve Scale**

SUMMARY

- **Scale**
 - **Catalog Functions**
 - **Meta-Data Caching**
 - **Data Caching**
- **Heterogeneous Data Sources**
 - **Data Access Functions**
 - **Schema Translation Language**
- **Integrated Directory Service or Enhancement to Existing Information Service**
- **Will Be Available through the InterNIC**

MORE INFORMATION

- **Anonymous ftp to [grilled.cs.wisc.edu](ftp://grilled.cs.wisc.edu)**
 - **[ordille_thesis.ps.Z](#)**
 - **[active_catalogs.ps.Z](#)**
 - **[db_challenge.ps.Z](#)**
 - **[sigcomm91.ps.Z](#)**
 - **[labyrinth.ps.Z](#)**
- **Email nomenclator@research.att.com**
 - **Volunteer a CCSO site for the pilot**
 - **Volunteer a user site for the pilot**
 - **Ask questions**