

# ADVANCED DATABASES

CIS 6930

Dr. Markus Schneider

## GROUP - 1

Pragna Pasunuri

Jithendra Yella

Satya Krishna Priyanka Karanam

Sankeerth Reddy Mogili

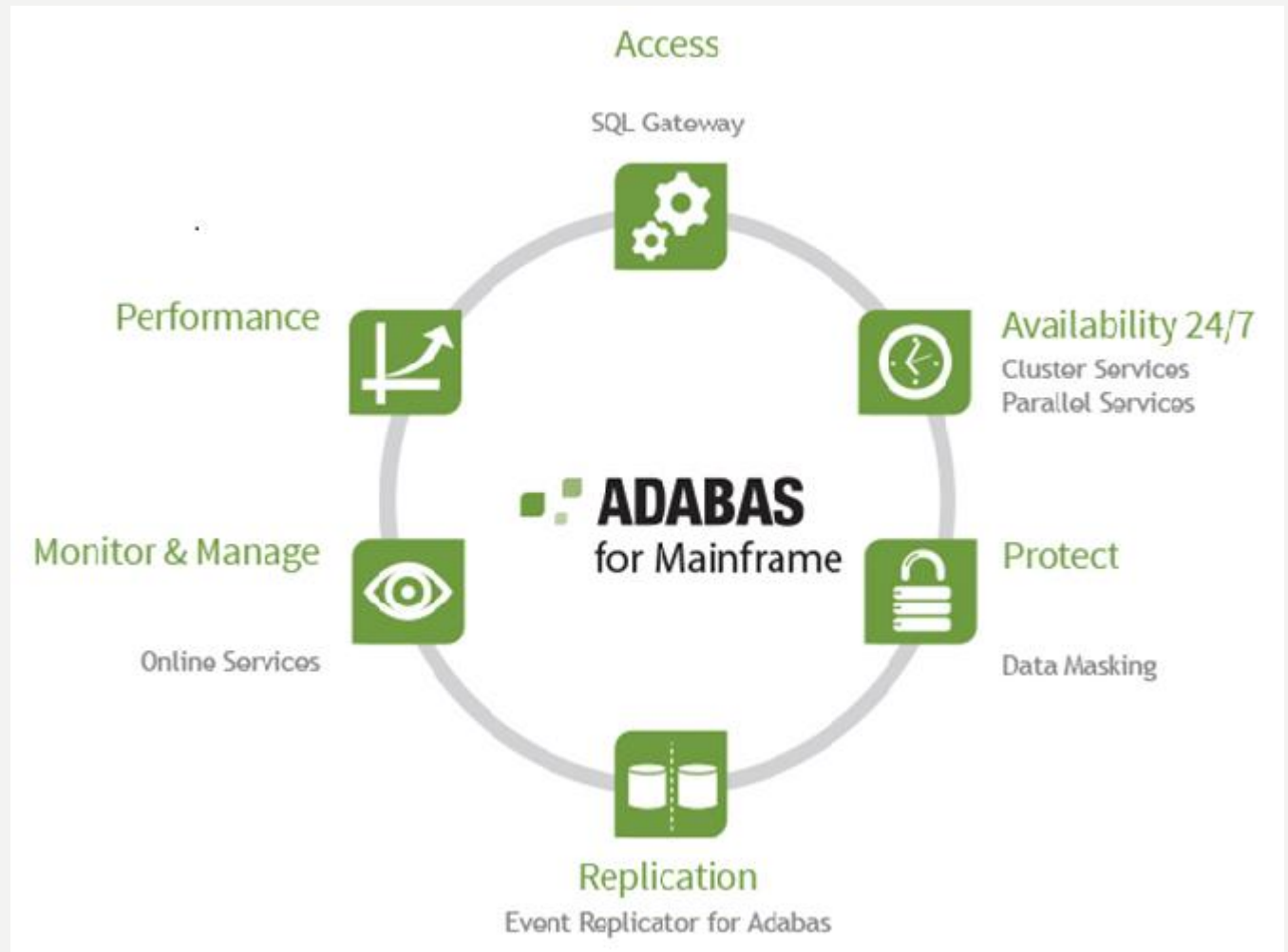
**ADABAS**

# CONTENTS

- **FEATURES**
  - DATA MODEL
  - DATA STRUCTURES
  - APPLICATION DEVELOPMENT
  - WHY ADABAS?

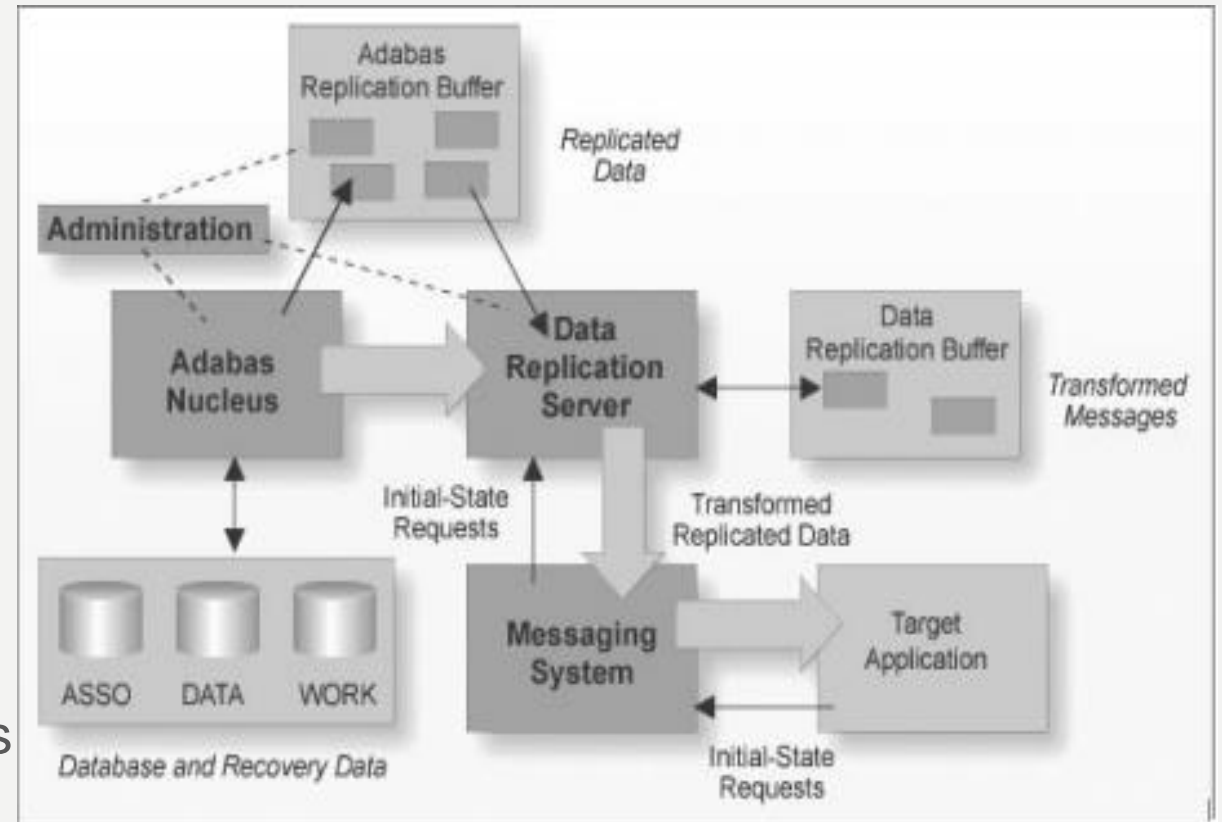
# FEATURES

- Adaptable Database System
- Fast and Reliable transactions
- Scalable
- Cross platform availability
- Flexible data integration
- Low Administration
- Disaster recovery
- High-performance



# FEATURES

- High availability
- Compliance
- SQL access
- Space Storage Optimization
- Fault Tolerance
- Multithreaded
- Interoperable
- Portability
- Continuous & cost-efficient operations
- Replication



# FEATURES

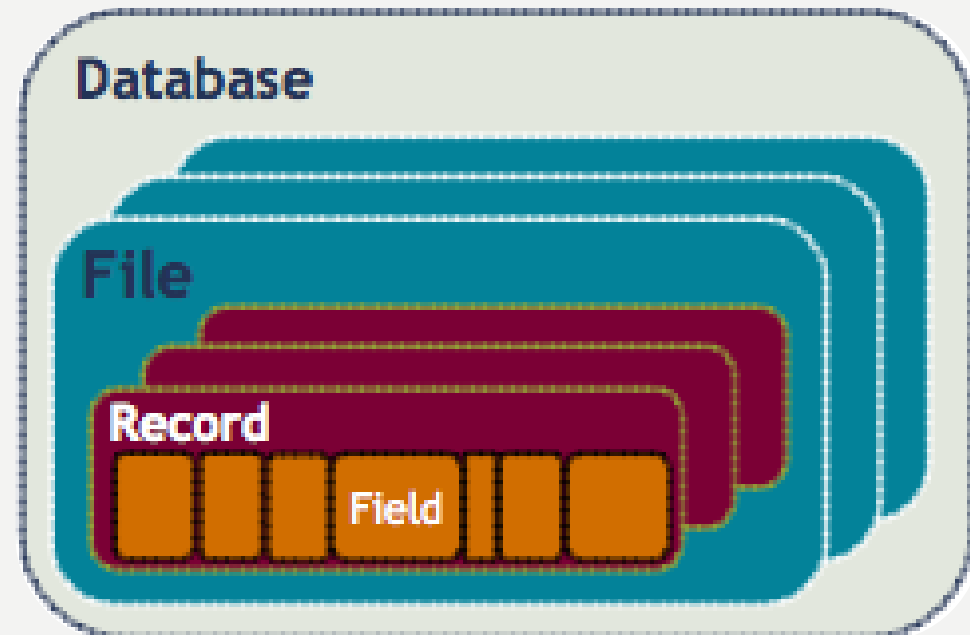
- Robust security
  - Data Encryption
    - Utilizes pre-specified key to encode ADABAS data storage
    - Encryption is by file
    - Cipher code for data access.
  - Access/update level
    - ADABAS password
    - Threshold protection levels
    - Permission levels are attached to a password
  - Value level
    - Defined for one more fields on a file
    - Different settings for access vs. update
    - Comprise multiple values

# CONTENTS

- FEATURES
- **DATA MODEL**
- DATA STRUCTURES
- APPLICATION DEVELOPMENT
- POPULAR APPLICATIONS

# DATA MODEL

- ADABAS Database
  - Database Identifier [1-255]
  - Database Name [1-16]
  - ADABAS files[1-255]
    - Multiple records in a file
      - Multiple fields in a record
- Limited database size





# DATA MODEL

- ADABAS Files
  - Collection of logically related data.
  - Data fields
  - Logical records

CU	CI	ST	CO
18568768	San Jose	CA	USA
28098783	Gainesville	FL	USA
80980909	Baltimore	MD	USA
67867868	Orlando	FL	USA

# DATA MODEL

- ADABAS descriptors
  - Subdescriptor Eg. ZIPLAST2
  - Superdescriptor Eg. STATE-ZIPLAST2
  - Phonetic Descriptor Eg. Family name
- ADABAS data field
  - Elementary field
  - Multiple-value field
  - Group field
  - Subfield
  - Superfield

CUSTOMER NUMBER	FIRST NAME	LAST NAME	PE BOC	MU BOC	STREET	CITY	STATE	ZIP
19811	Laura	Cagnetti	3	1	118 Glade	Erie	PA	16509
				2	271 Larue	Cincinnati	OH	45211
					P.O. Box 88			
				2	733 Hall	Easton	PA	19014
					P.O. Box 7			

Elementary Field

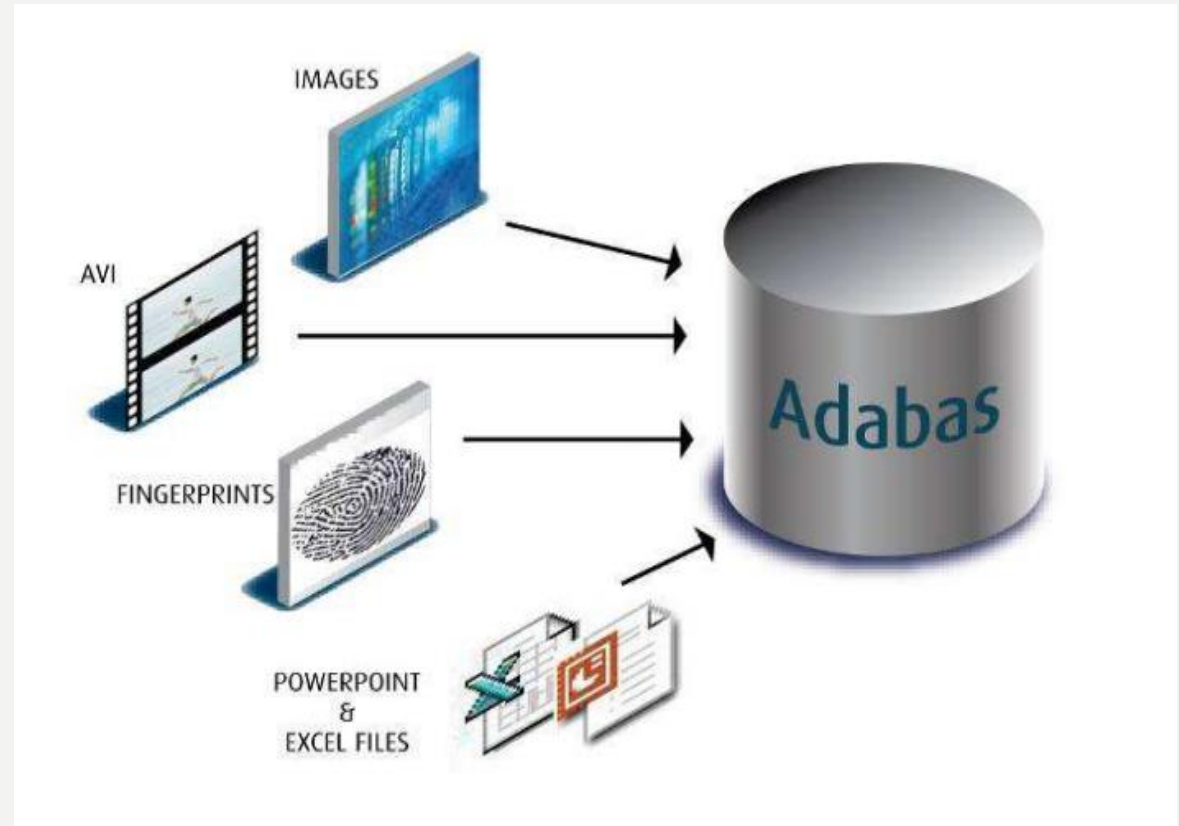
Multiple Value Field

Group Field (Name)

Periodic Group (Address)

# DATA MODEL

- Data types
  - Character, binary
  - Decimal numbers
  - Fixed point, floating point
  - Large objects(Multi-media)
- Fields can have multiple values
- Related data is kept closer



# DATA MODEL

- Linking different files via common data fields
  - No pointers between records
    - Very similar to relational model
- Read and Update occur on individual records
  - Not sets of records
- How does ADABAS exactly maintain the data?

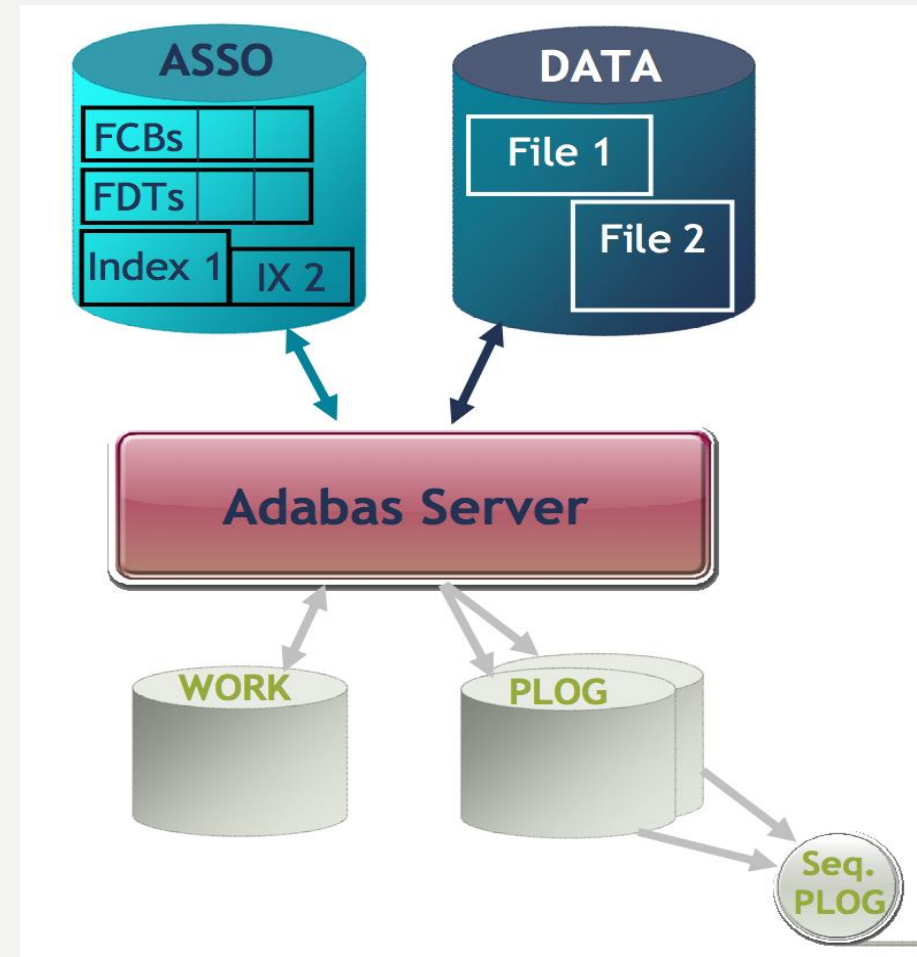
Adabas	Relational
File	Table
Record	Row
Field	Column
Descriptor	Index
End Transaction	Commit
Backout Transaction	Rollback

# CONTENTS

- FEATURES
- DATA MODEL
- **DATA STRUCTURES**
- APPLICATION DEVELOPMENT
- POPULAR APPLICATIONS

# DATA STRUCTURES

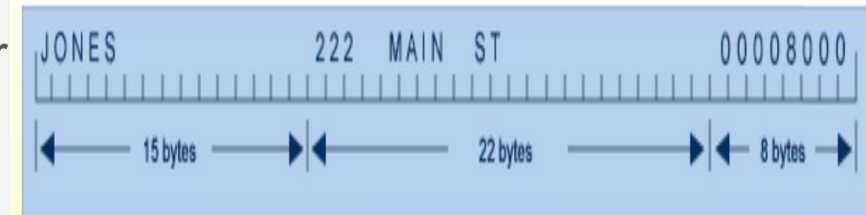
- Container files
- Data Storage(DATA)
  - Compressed form of the data
- Associator(ASSO)
  - File Directory
  - Field Definition
  - Indexes
    - Descriptor values to ISNs
  - Address convertor
    - ISNs to DS blocks
- WORK
  - Work file for temporary use



# DATA STRUCTURES

- Data Compression
  - Field data typically stored in compressed for
    - Character : No trailing blanks
    - Numeric : No leading zeros
- Compact storage , Efficient access
- Buffer Pool Manager
  - Caching database pages
  - Buffer Replacement Handling

Data Before Compression (45 Bytes)



Adabas Compressed Data (22 Bytes)



# CONTENTS

- FEATURES
- DATA MODEL
- DATA STRUCTURES
- **APPLICATION DEVELOPMENT**
- POPULAR APPLICATIONS



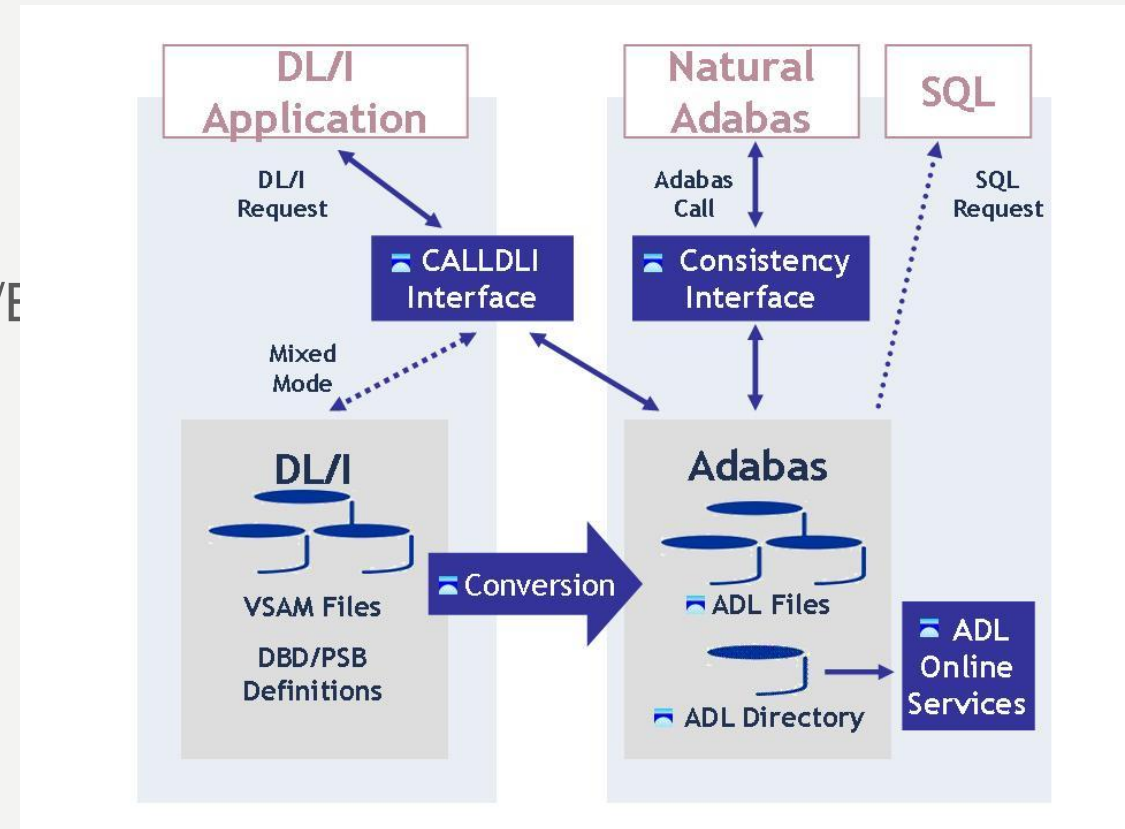
# APPLICATION DEVELOPMENT

Query Languages used for ADABAS

- Natural
- Native SQL

# MIGRATION ENVIRONMENTS

- ADABAS Bridge for DL/I
  - DL/I or IMS/DB databases to ADABAS
- ADABAS Bridge for VSAM for OS/390, VSE/E
  - Bridge for VSAM under OS/390 or z/OS
  - Bridge for VSAM under VSE/ESA.



# MIGRATION ENVIRONMENTS

- ADABAS SQL gateway
- ADABAS Text retrieval
  - Byte-swapping issue
  - Migrating data to UNIX or windows platform



# APPLICATION DEVELOPMENT

- Native SQL Gateway
  - Native SQL embedded in C,COBOL

```
EXEC SQL
  CREATE TABLESPACE FOR TABLE contract
  (
    DATABASE=yacht_db,
    FILE=4,
    FILENAME="CONTRACT",
    ASSOPFAC=5,
    DATAPFAC=5,
    DSSIZE=10BLOCK,
    NISIZE=10BLOCK,
    UISIZE=10BLOCK,
    MAXISN=300,
    REUSE= (ISN, DS)
  );
```

```
EXEC SQL
  CREATE TABLESPACE FOR TABLE contract
  (
    DATABASE=yacht_db,
    FILE=4,
    FILENAME="CONTRACT",
    ASSOPFAC=5,
    DATAPFAC=5,
    DSSIZE=10BLOCK,
    NISIZE=10BLOCK,
    UISIZE=10BLOCK,
    MAXISN=300,
    REUSE= (ISN, DS)
  )
END-EXEC
```

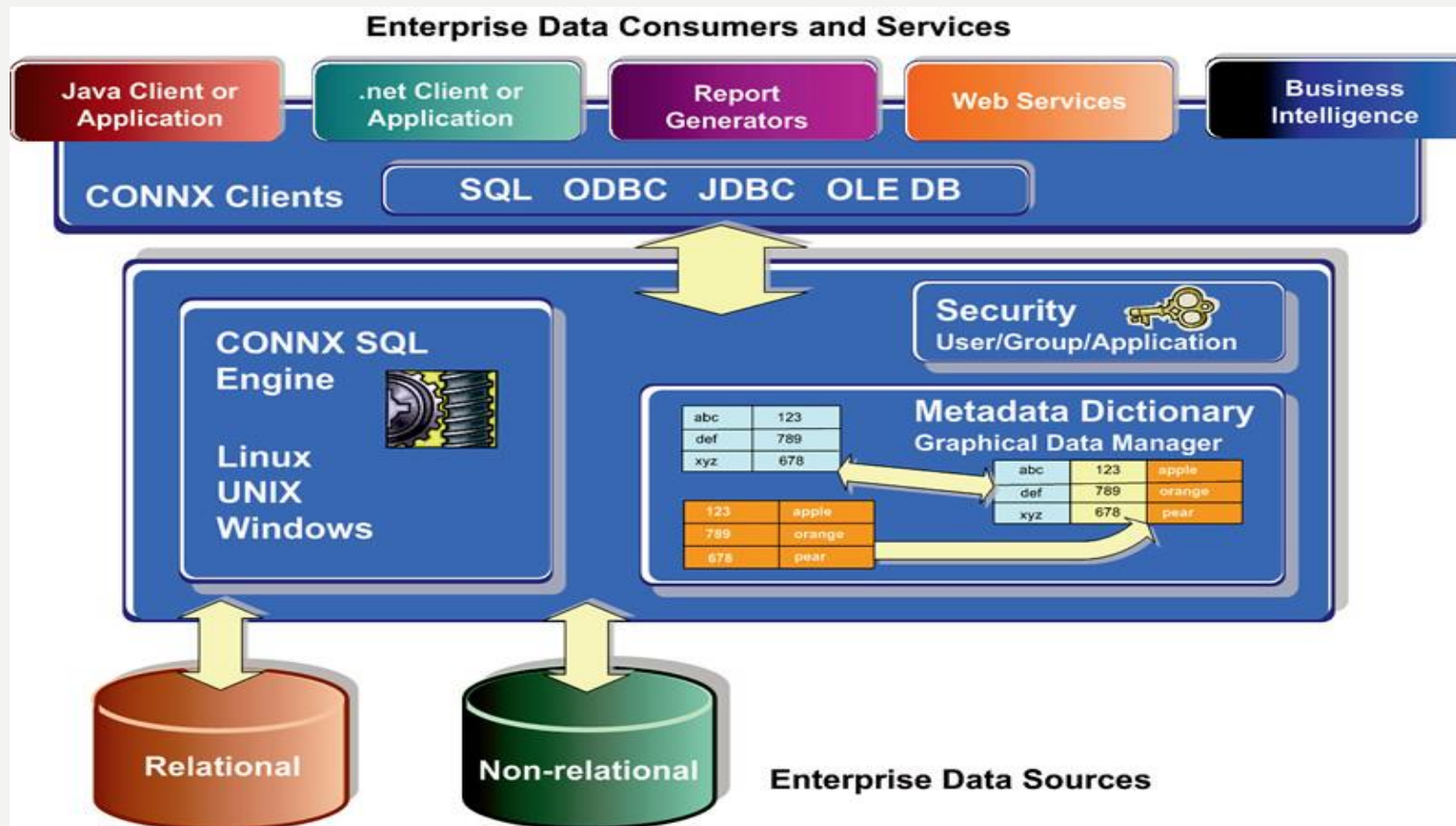
# APPLICATION DEVELOPMENT

- SOA gateway



# APPLICATION DEVELOPMENT

- CONNX SQL Gateway



# ADABAS CLIENT FOR JAVA API

- ADABAS client for java API
  - ADABAS Client Java Session
  - Transactions
  - Authentication Types
- ADABAS Data Designer
  - Creating maps
  - Creating map dialog
  - Browsing ADABAS data with maps
- ADABAS REST Interface
  - ADABAS REST Server Configuration
  - ADABAS REST server API



# ADABAS CLIENT FOR JAVA API

- ADALNK libraries to send ADABAS calls to a local ADABAS database

```
/* simple Adabas Database target definition (dbid) */  
AdabasTarget target = new AdabasTarget(dbid);  
target.open();  
  
/* Create read request using the database target file number */  
ReadRequest request = new ReadRequest(target, ADA_FILENR);  
  
/* Set list of Adabas short name fields for read request */  
request.queryFields(ADA_DATA_FIELDS);
```

- Entire Net-Work used to access remote ADABAS database

```
AdabasTarget(int dbid, java.lang.String url)  
Adabas Target definition with an Entire Net-Work remote URL reference.
```



# ADABAS REST INTERFACE

- ADABAS REST Interface

**Adabas Client for Java - REST Interface Example** BY SOFTWARE AG

This example reads data out of an Adabas database. The request uses a JSON transfer format. The data is read using the Adabas Client for Java Rest Interface

Queries | Free Form | Modify Record | Design Model | References | About

Select demo database : 4 Help

JSON queries: Employee list request Refresh

Offset: 0

Nr. of Entries: 20

Remove group tree:  (flatten)

Search in AC  startWith  Offset:

---

Rest Interface URL: [http://localhost:8190/rest/db/4/11?fields=AC,AE,AS\[N\]&limit=20](http://localhost:8190/rest/db/4/11?fields=AC,AE,AS[N]&limit=20)

Result: [{"NrRecords":20,"FileRecords":-1,"Records":[{"ISN":1,"AB":{"AC":"SIMONE","AE":"A....

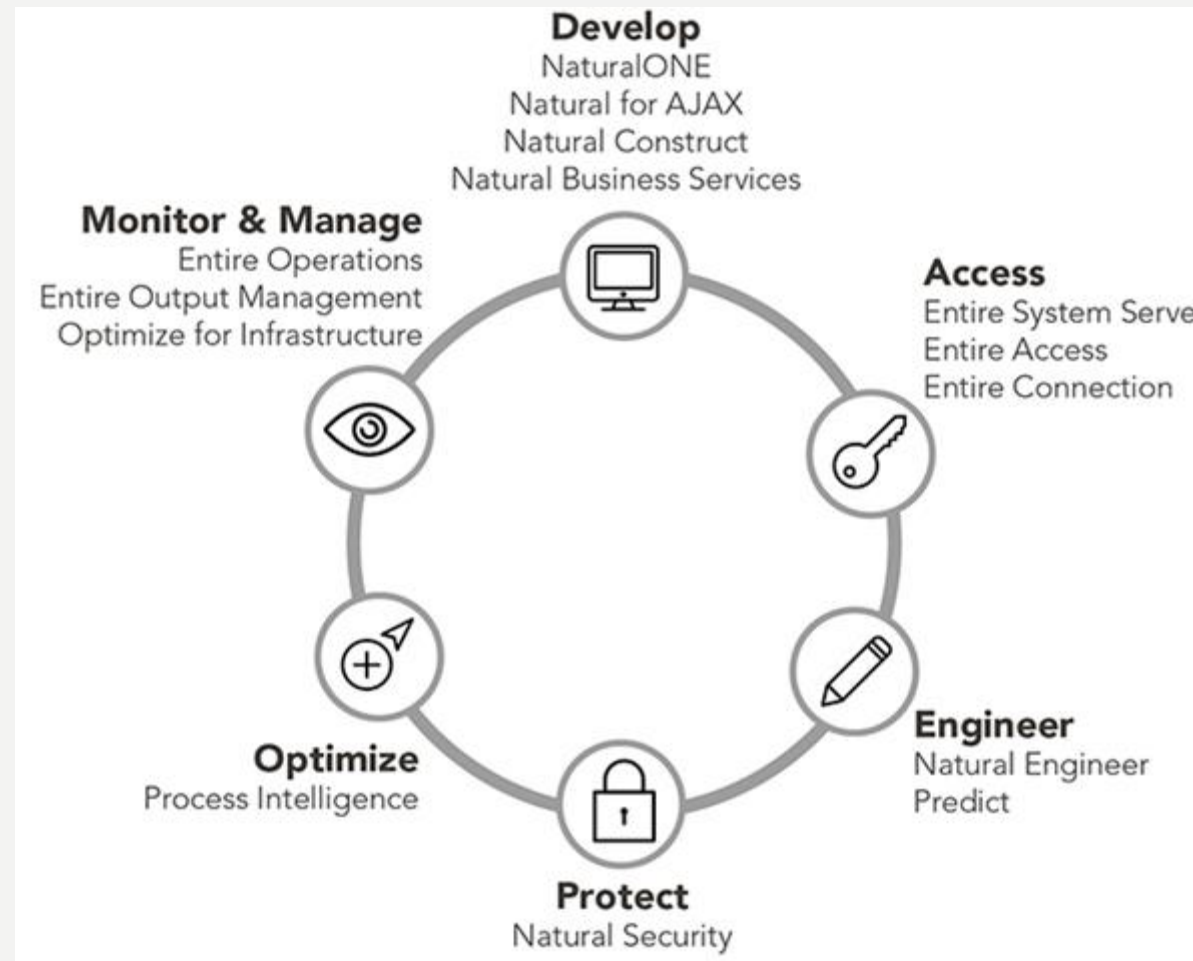
---

ISN	AB	AQ
1	AC=SIMONE AE=ADAM	AS 963
2	AC=HUMBERTO AE=MORENO	AS 998

# CONTENTS

- FEATURES
- DATA MODEL
- DATA STRUCTURES
- APPLICATION DEVELOPMENT
- **POPULAR APPLICATIONS**

# WHY IS (WAS) ADABAS SO POPULAR?



# WHO USES(USED) ADABAS?

- FBI
- State Governments
  - Colorado
  - Idaho
- UPS
- Banks
  - Chase
- Insurance Companies
  - American Community Mutual Insurance Company

# AAFMAA



- Non-profit Insurance Company
- >\$1.2 Billions in assets
- With just 75 staff members
  
- Results
  - Mobile services to 120,000 users
  - Cost Reduction

# CA – DEPARTMENT OF TECHNOLOGY



- Highest State IT budget
- bulk processing of census data, consumer statistics, tax collection
- Serves ~40 Million Citizens and processes billions of transactions each week.

# FOLLETT



- US based Ware house distribution application
- For Order Entry to Packing and Shipping
- Results:
  - Scalable Database
  - Incredible response times
  - Securely processes 261M commands per day

# DUCKS UNLIMITED CANADA



- Non-profit Environmental Conservation Company from Canada
- Using NaturalONE, auto generated 85% of the HTML code with models, wire framing etc.,
- Results:
  - Auto code generation
  - Plugin Integration
  - Reduced bounce backs.



# WHY ADABAS FAILED TO COMPETE?

- NF<sup>2</sup> – non First Normal Form
- Example:

<code>client_id</code>	<code>account_numbers</code>
3256	54165452
2345	95184753, 68537142, 85693125
9514	26159483, 85632914
8524	62561981
3698	56321479, 864126208, 84095632
7532	36987412, 5698112

# SOLUTION (SEMI)

- ADABAS D – a relational database management system
- Running on Parallel on both the Hierarchical and Relational Databases
- But:
  - Maintenance Costs
  - Personnel and Training Costs
  - ADABAS dev. blocks overall architecture
  - Licensing cost in case of Infrastructure changes

# SOLUTION - MIGRATION

- Modern Systems
- ATERAS
- Anubex
  
- Provide Migration solutions like Converting the ADABAS to SQL database

THANK YOU!