Modern Application Development with DB2

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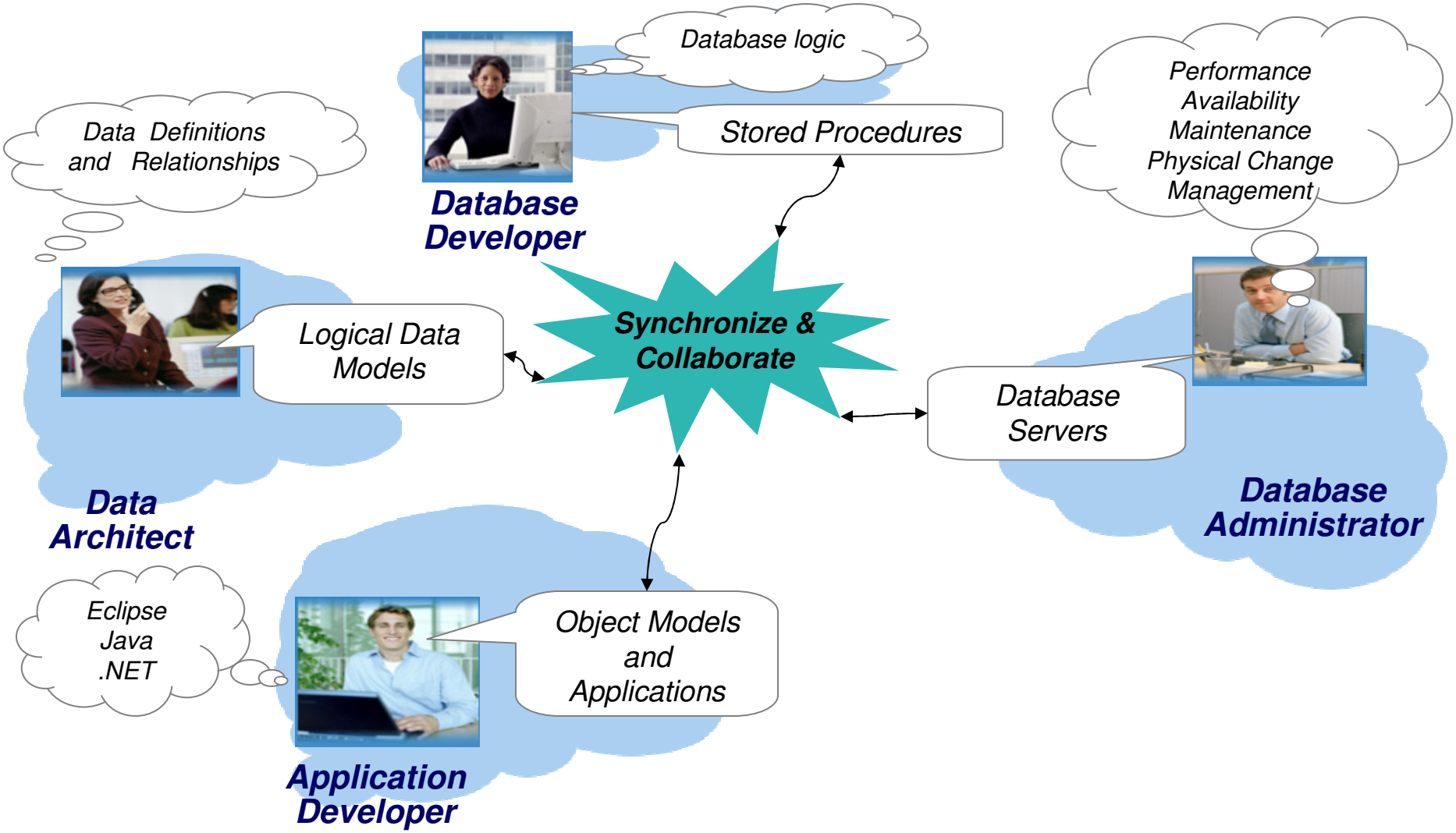
Data Lifecycle Management



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IBM Data Studio
A Foundation for Innovation

IBM Data Studio is a comprehensive data management solution

It empowers you to effectively

Design, develop, deploy and manage

your data, databases and database applications throughout the data management lifecycle utilizing a consistent and integrated user interface

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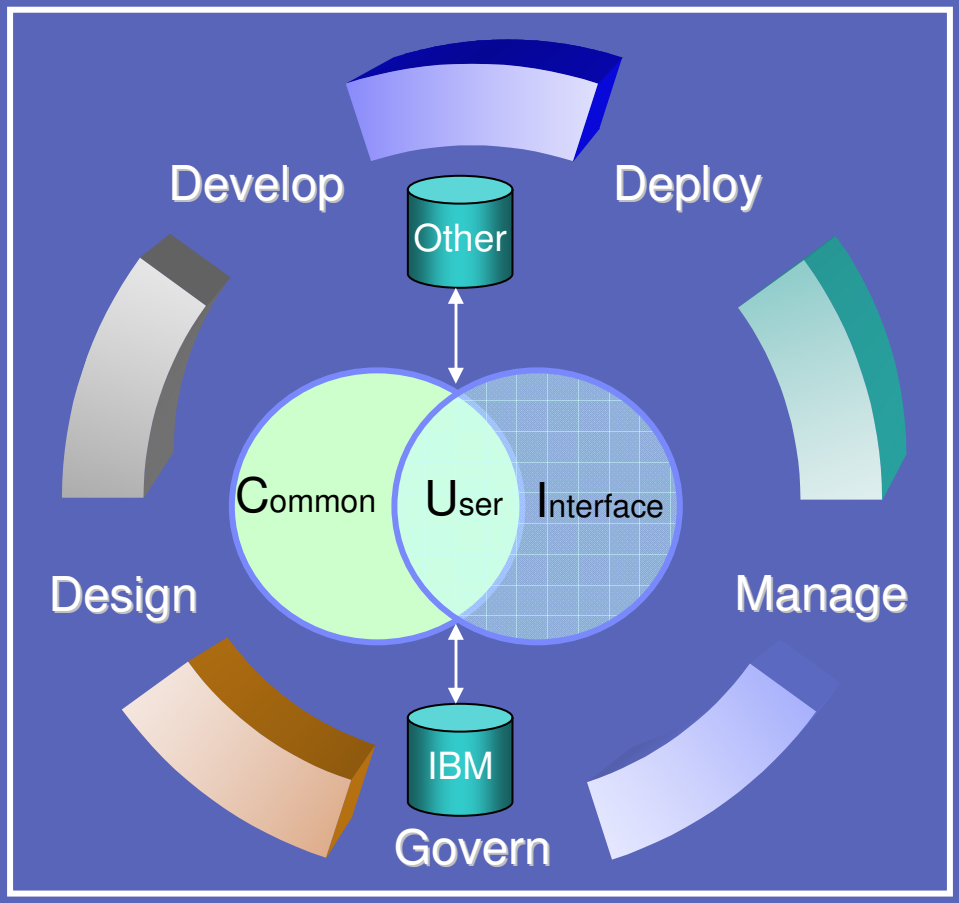
Data Architect

Design
- Logical Modeling
- Physical Modeling
- Integration Modeling

Develop
- Coding
- Debugging
- Teaming
- Testing
- Tuning

Application Developer

Database Developer



A Consistent and Integrated Solution

Database Administrator

Manage
- Database Administration
- Data Management
- Change Management
- Recovery Management
- Storage Management
- Performance Management

Govern
- Security Access
- Security Analysis
- Data Auditing
- Data Archiving
- Data Masking
- Data Encryption

Security Administrator

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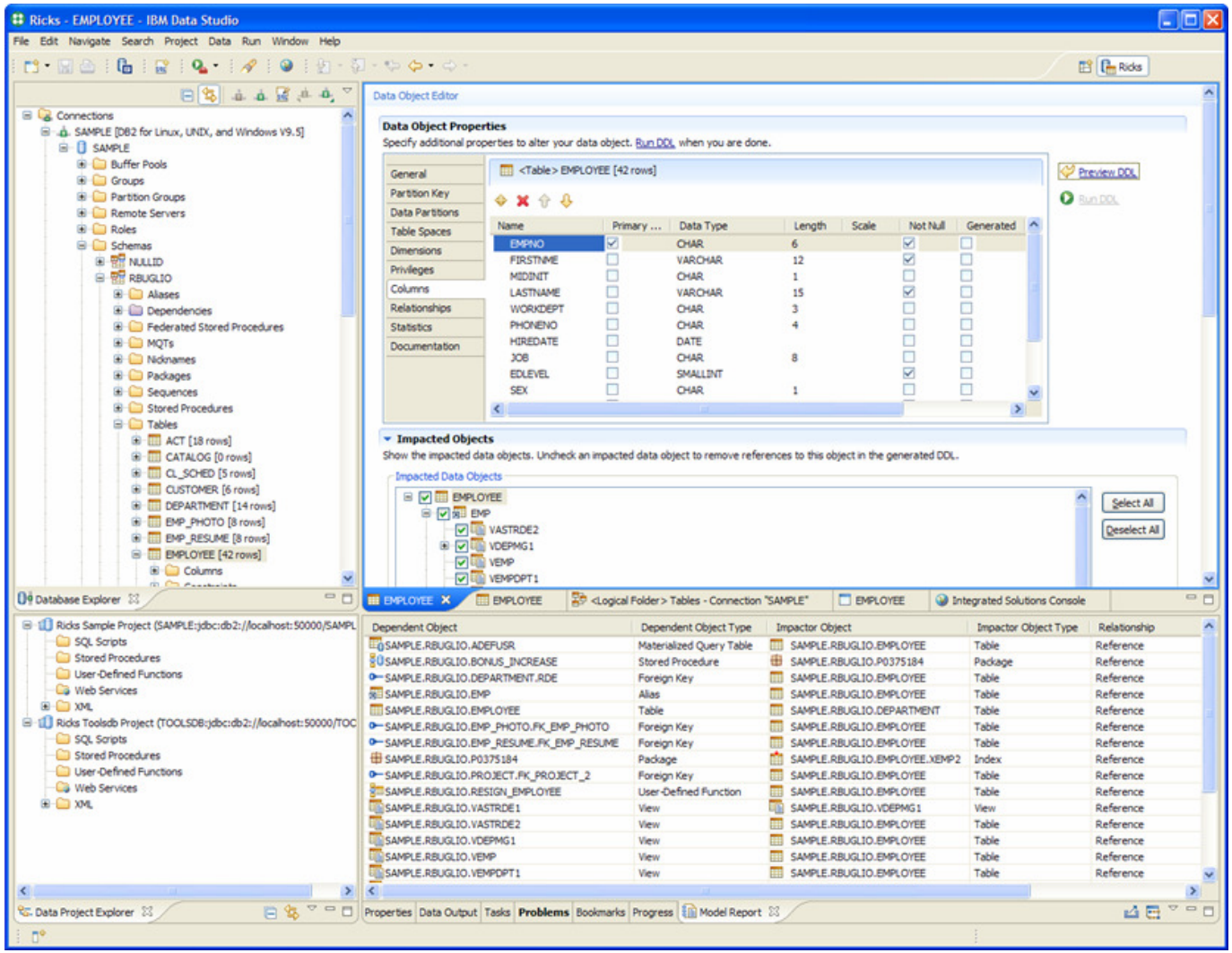
A Consistent and Productive work environment



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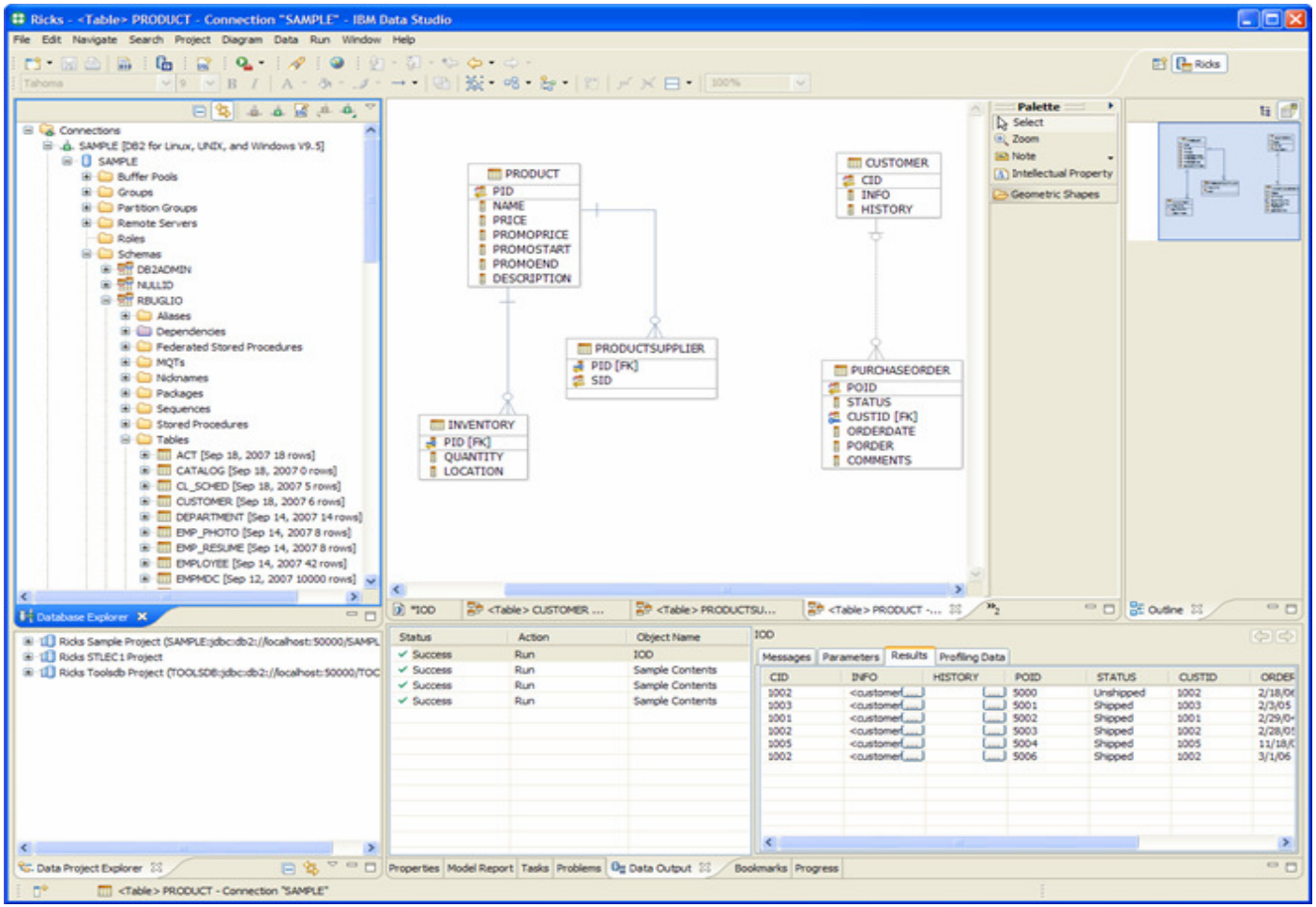
ER Diagramming

ER Diagram Viewer



Easily create, view and share ER diagrams

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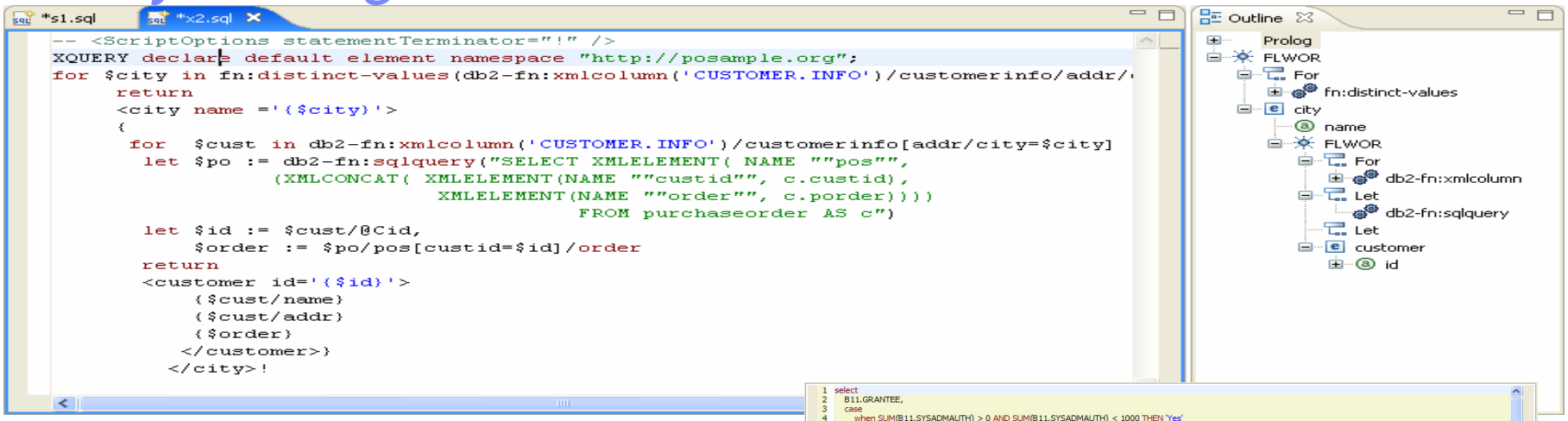
Query Management

Integrated Query Editor



- **Express yourself with optimal queries**
  - Content assistance for database objects
  - Rapid interactive end-user feedback
  - Extensible templates
  - Multiple SQL statement testing
  - SQL assistance and XQuery assistance

SQL and XQuery together using an integrated editor

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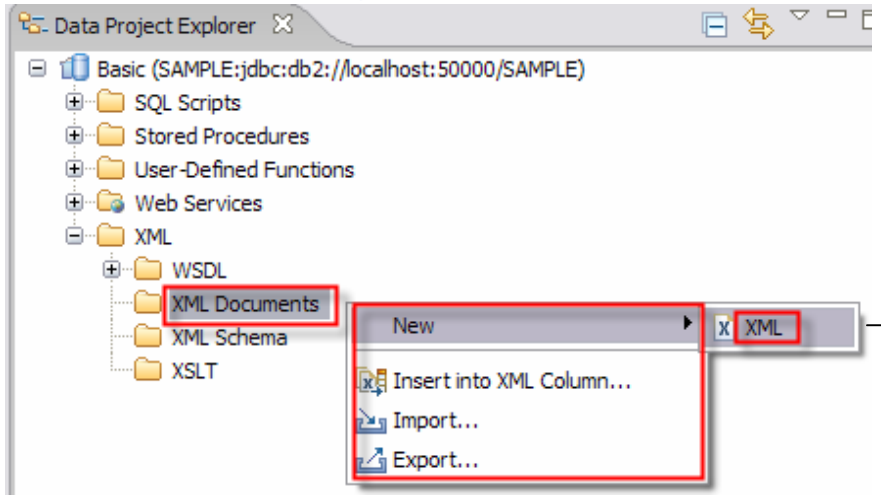
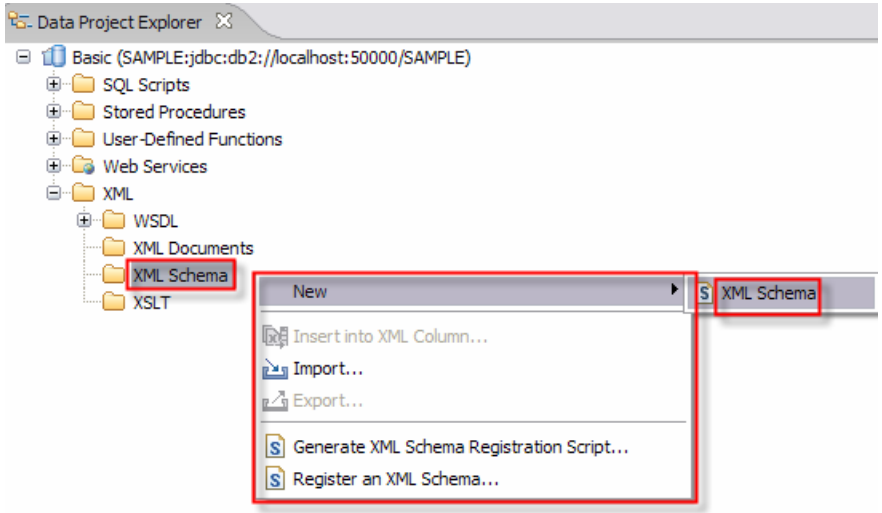
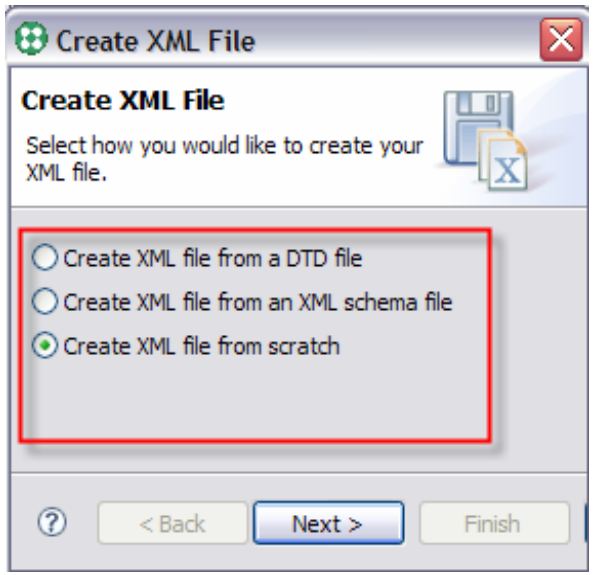
XML Management

XML Editors







- **Easily perform all your XML needs**
  - Create XML documents and schemas
  - Import and export XML documents and schemas
  - Insert XML documents into XML columns
  - Generate XML Schema registration scripts
  - Register XML Schema

Extensive XML support and capabilities

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DB2 Application Development
Programming paradigms

Java

- The IBM Data Server Driver for JDBC and SQLJ is available to support the most demanding of Java applications.
  - Driver is compliant with the JDBC 3.1 and JDBC 4.0 specifications
  - Supports type 4 and type 2 modes
  - Can be used for either client or server-side Java DB2 applications

.NET

- The IBM Data Server Driver for ODBC, CLI, and .NET is available as a small footprint runtime for deploying .NET applications.
- IBM Database add-ins for Visual Studio
  - Extends Visual Studio 2005 and 2008 IDE for DB2 application development

PHP, PERL, Python, Ruby

- **PHP**
  - Native DB2 (ibm_db2) and PDO drivers are available and maintained by IBM
    - binaries included in IBM Data Server clients
    - driver source code is available on PECL
  - Zend Core for IBM is an integrated stack
- **Perl**
  - IBM develops and maintains the DBD::DB2 driver
    - supports DBI standard and available on CPAN
- **Python**
  - IBM develops and maintains the Python DB API 2.0 driver
- **Ruby on Rails**
  - IBM develops and maintains the Ruby driver and Rails adapter
    - Binaries included in IBM Data Server client

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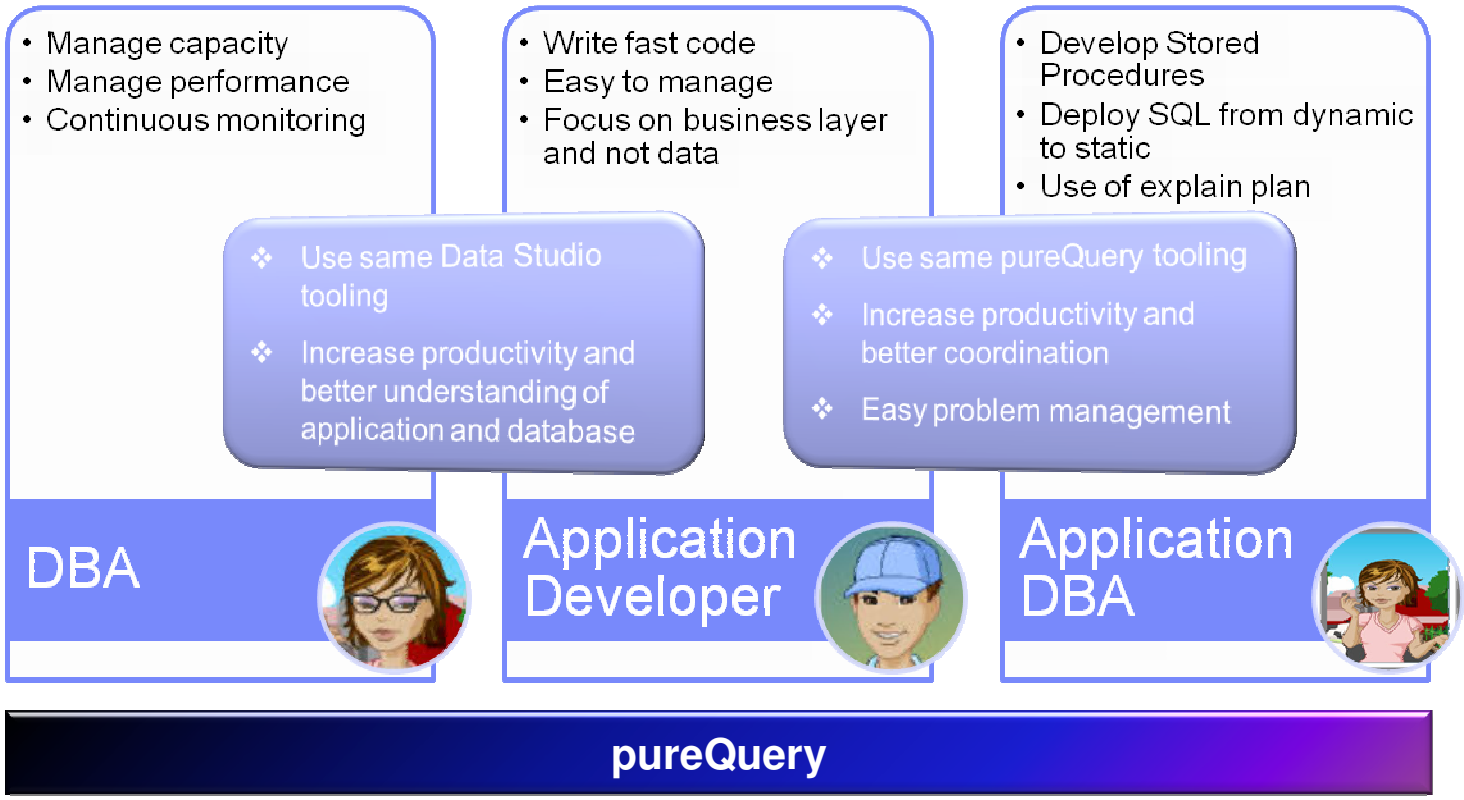
Interaction between DBA and App Developer
How does Data Studio and pureQuery Help?



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IBM Data Studio
Improved Java data access

pureQuery is a high-performance Java data access platform focused on simplifying the tasks of developing and managing applications that access data

Optimizing Java database development and deployment

- Productive set of integrated tools, APIs, and runtime for Java applications
- Unified programming interface to query databases and Java objects
- Unleash the power of SQL within Java applications
- Provides infrastructure to greatly improve monitoring and problem determination for Java applications that access DB2

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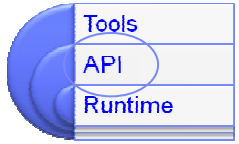
Developing with pureQuery
Flexible programming styles



pureQuery supports several programming styles

1. **Inline style – SQL in application**
   - Simplified direct data access via SQL
2. **Method Style – Encapsulate SQL in Java interfaces**
   - Annotated Method Style
     - Define SQL as Java annotations
   - Named query style – extension of Annotated Method Style
     - Define SQL in XML files

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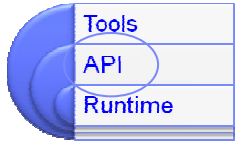
pureQuery - “Inline Style”



- SQL statements coded directly in application
- SQL can be fully declared and embedded, or constructed at execution time
- All standard SQL supported including queries, updates, DDL, CALL statements

```
import com.acme.Customer;
Connection con = DriverManager.getConnection(…);
Data db = DataFactory.getData(con);
Customer c;
int region = 123;
Iterator<Customer> customers =
        db.queryIterator("SELECT custId, name FROM Customer WHERE region=?1",
        Customer.class, region);
while (customers.hasNext()){
   c = customers.next();
   System.out.println(c.custId+" "+c.name);
}
((ResultIterator) customers).close();  // best practice
```

```
public Customer {
   @Id public Integer custId;
   public String name;
   public String addressL1;
   public String city;
   @Column(name="REGION")
   public Integer storeRegion;
...
}
```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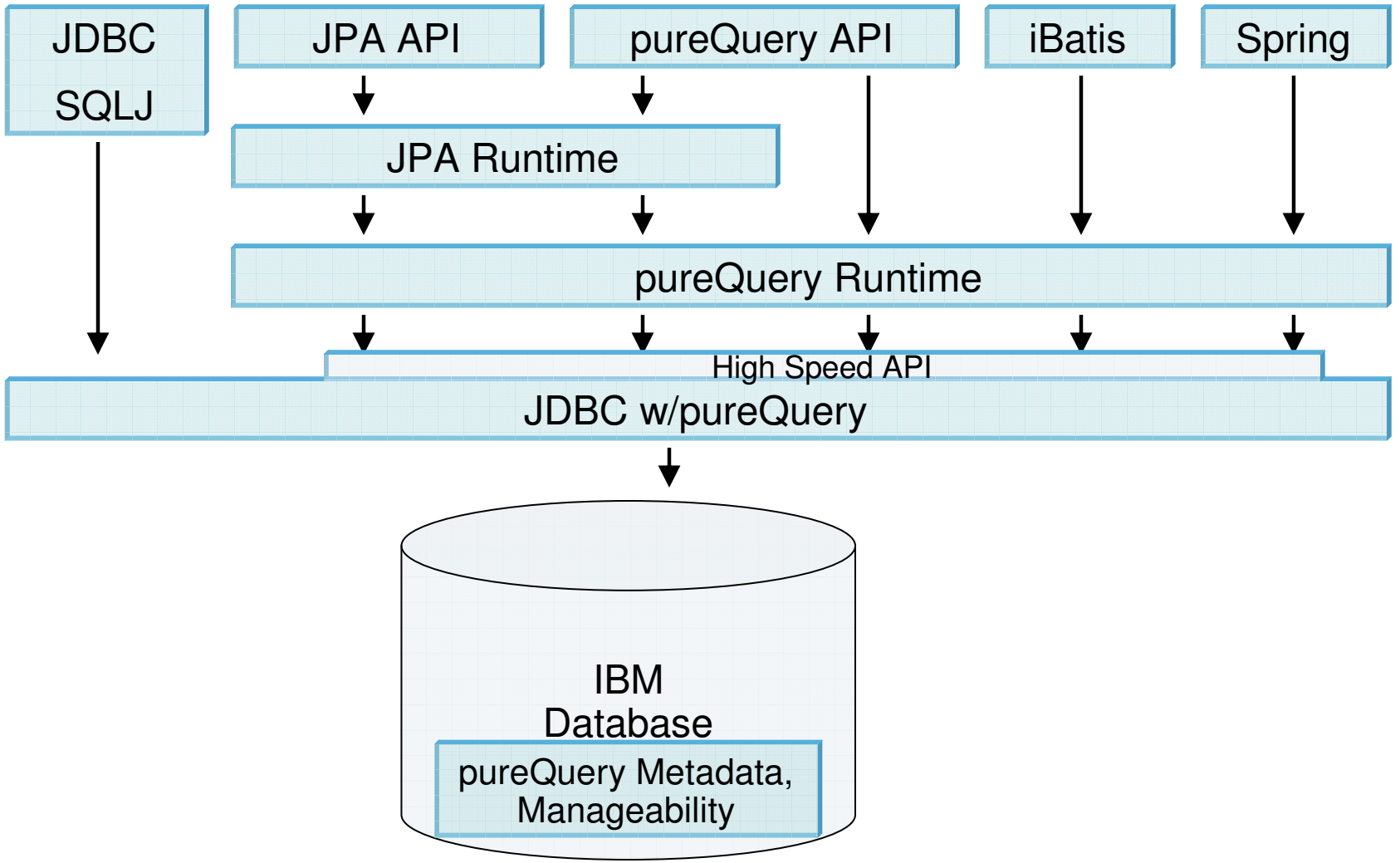
Java Persistence Technologies with pureQuery



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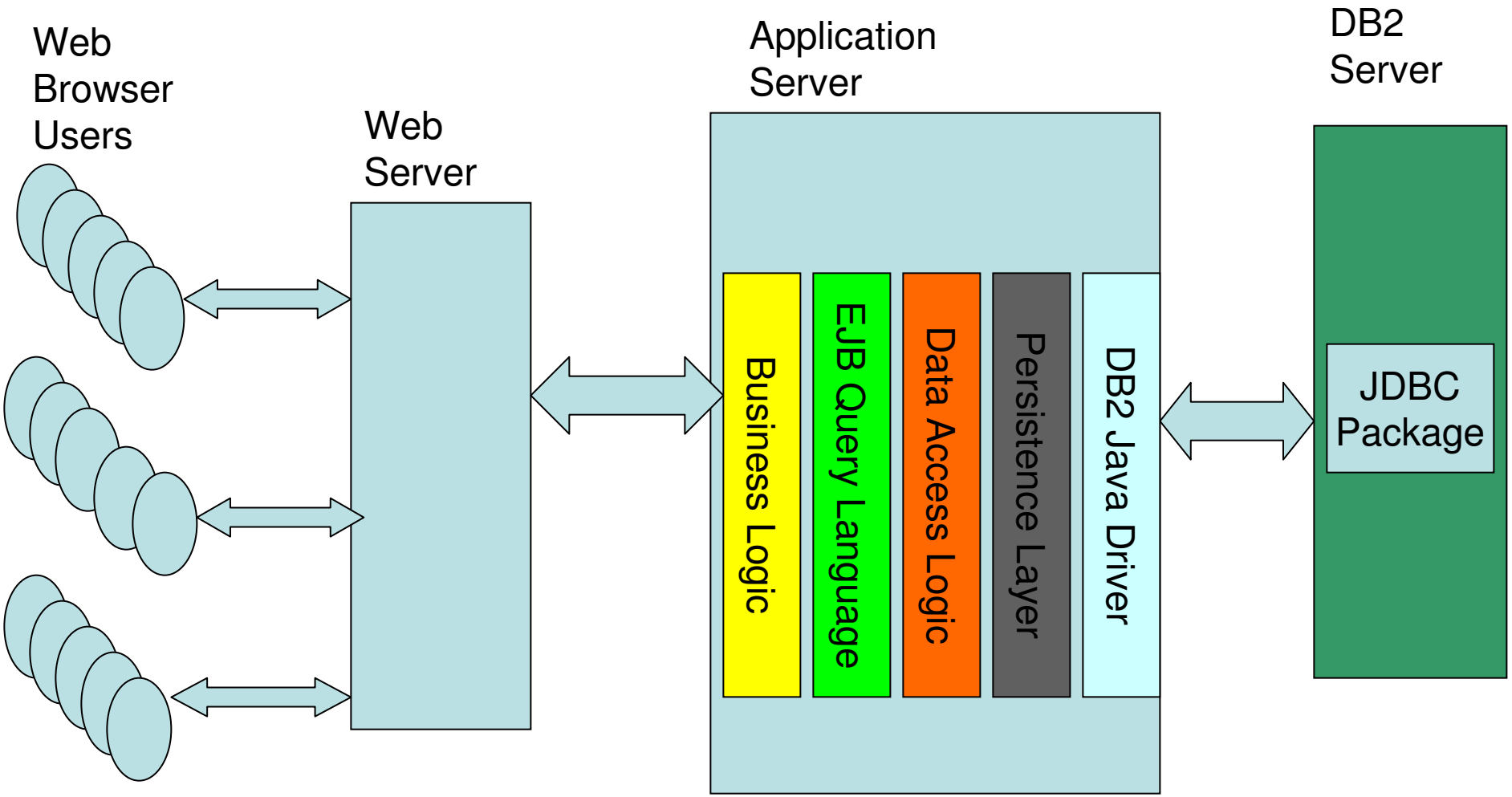
Toughest issue for Web applications – Problem diagnosis and resolution



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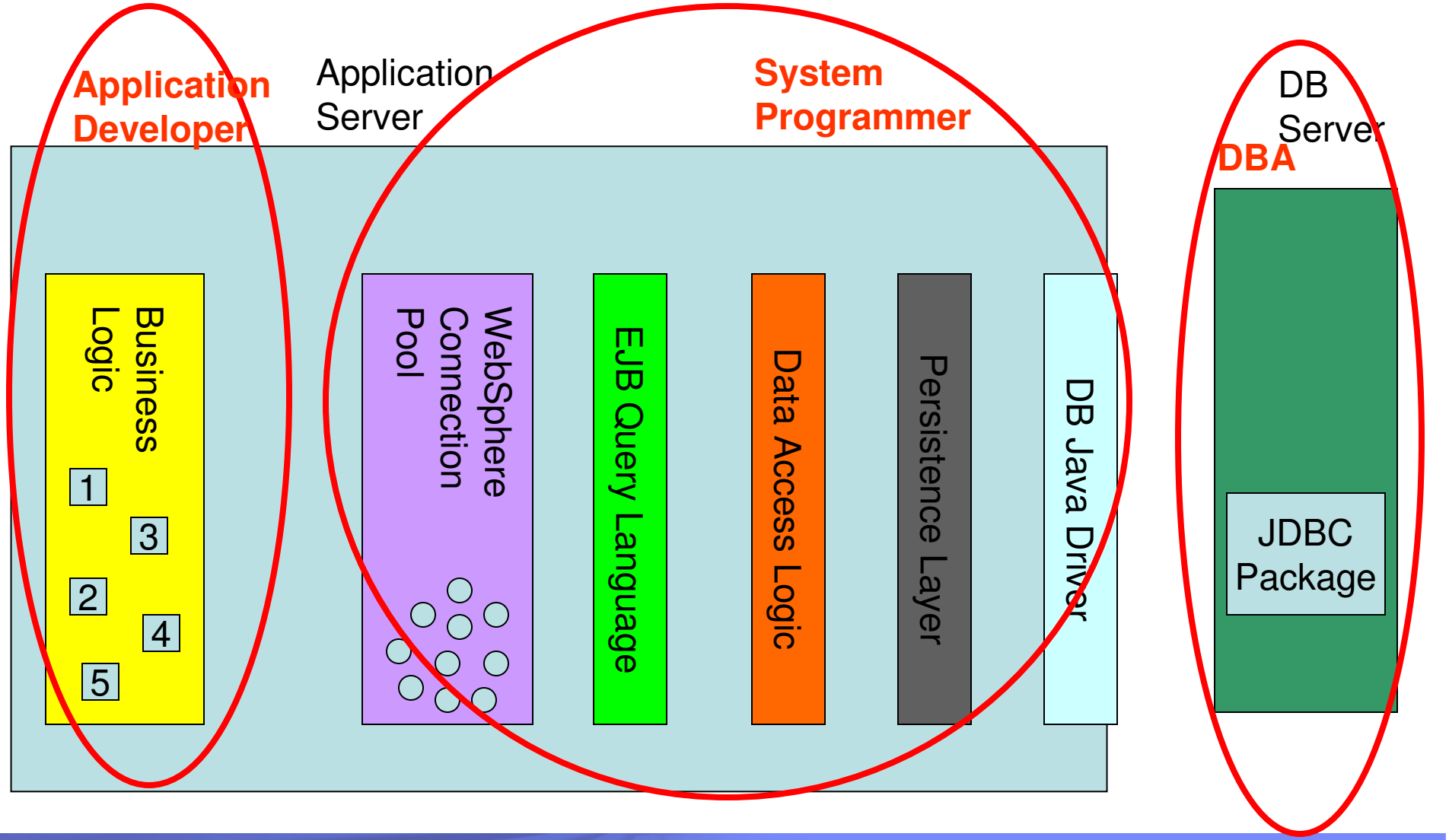
Customer Job Roles – A Barrier to a "Holistic View"



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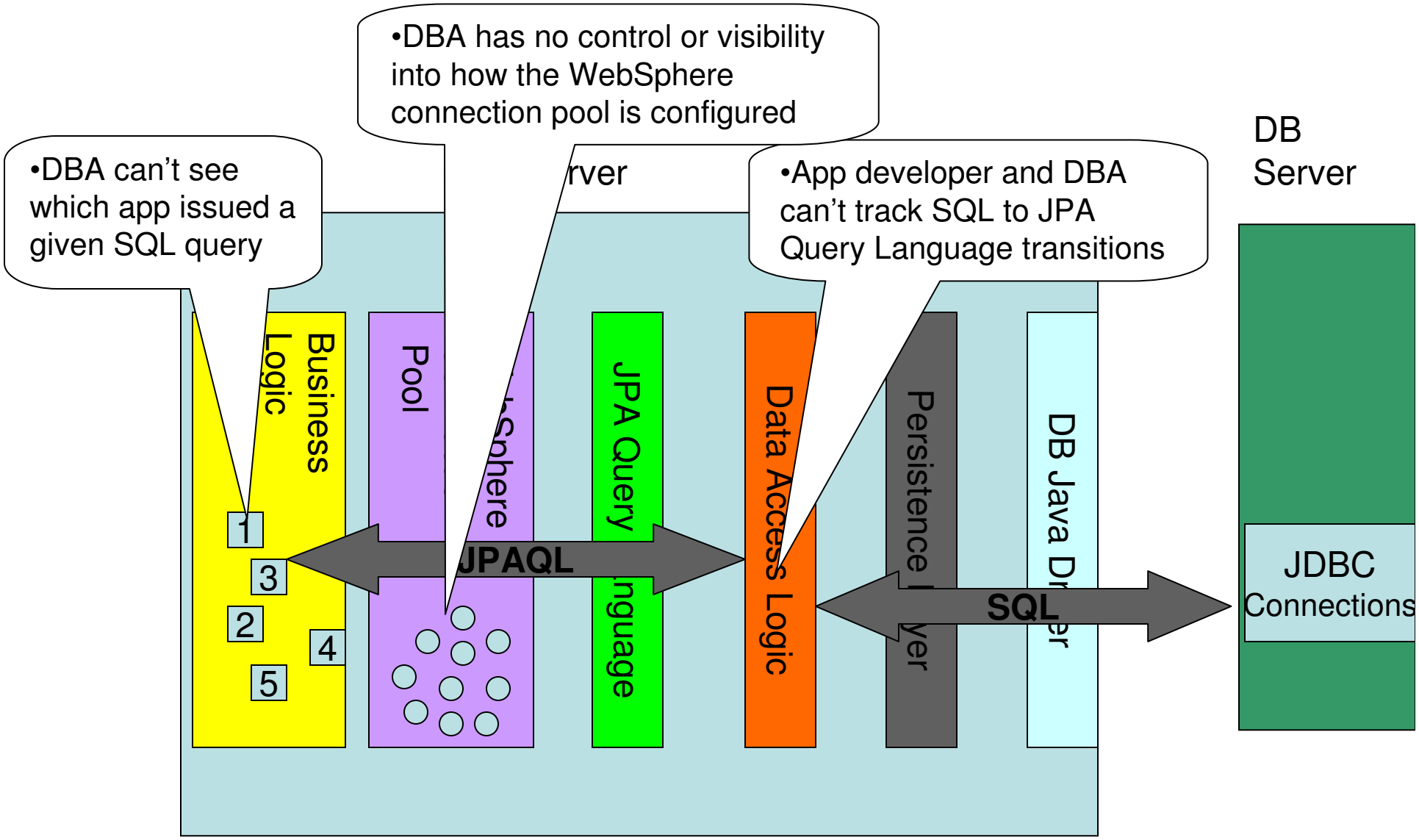
Typical Customer Pain Points



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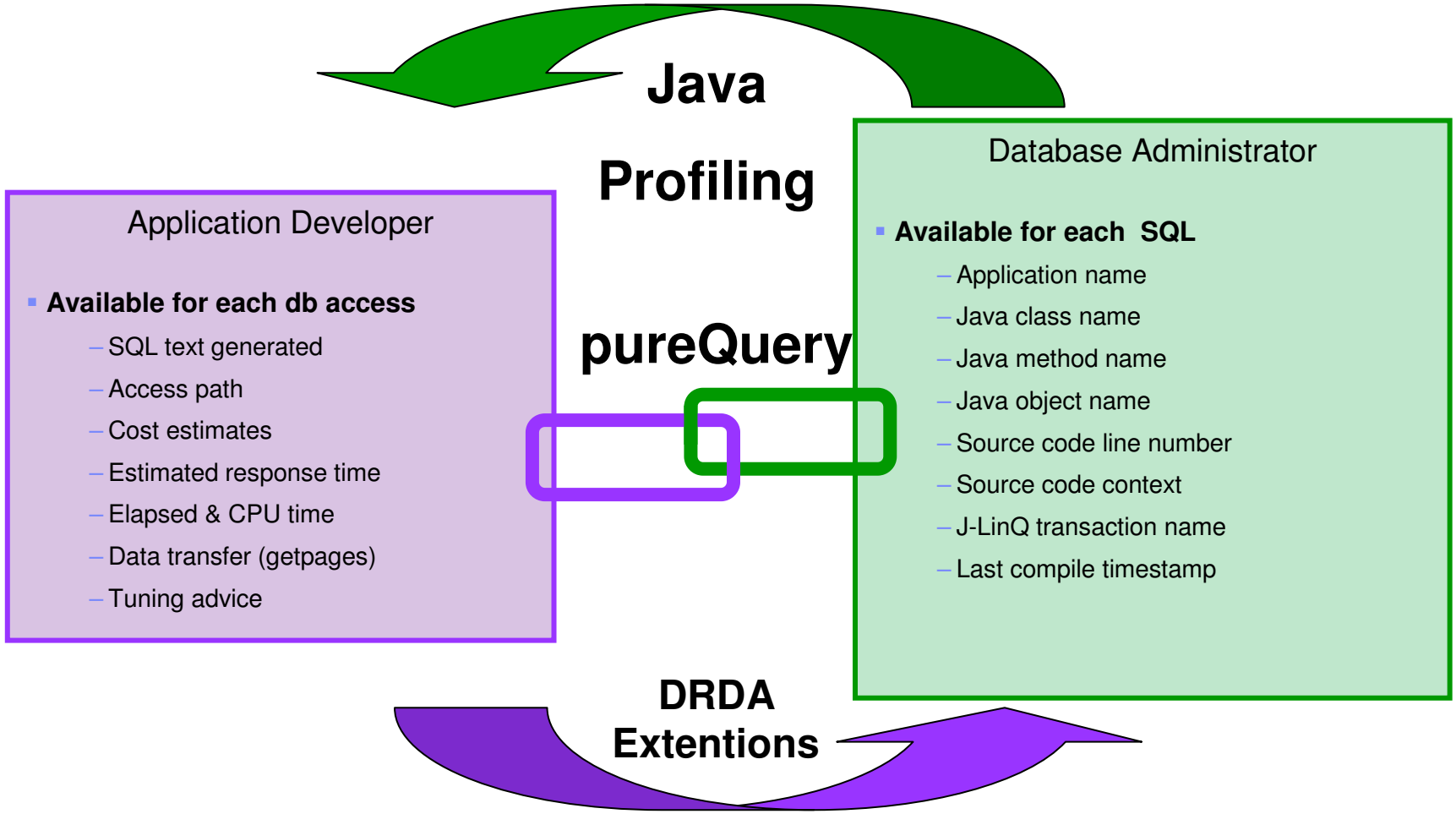
Simplifying Problem Determination Scenario



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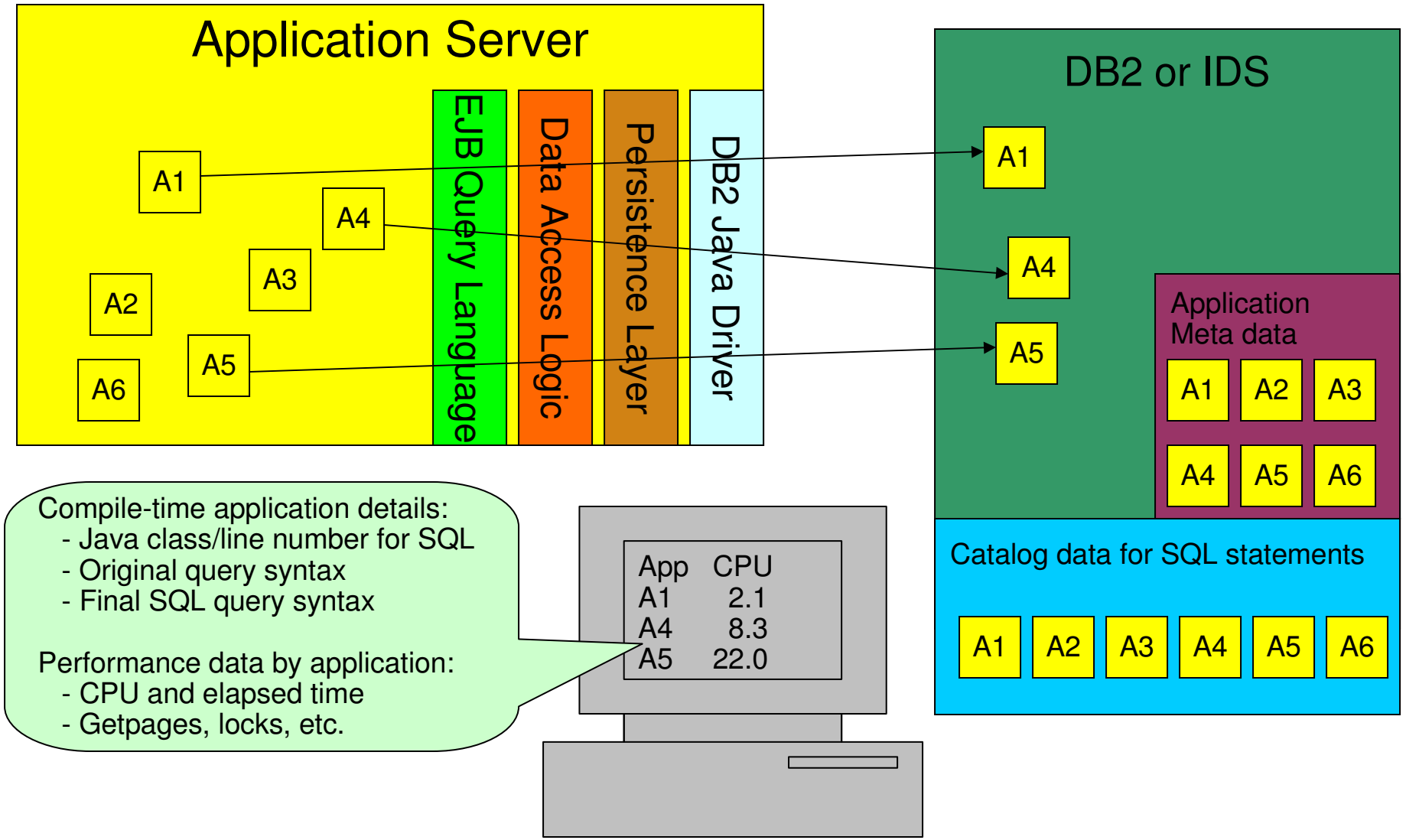
pureQuery with IBM Runtime/Tooling



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    - FAQs / Tutorials
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