

JAVA DAYS '98



Roadmap for Transforming Legacy Systems into Component Software

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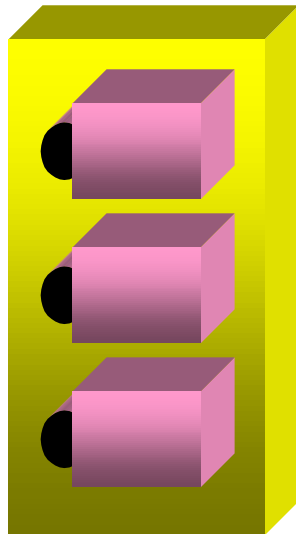
Outline

- **Key Issue: How to Integrate Java and Legacy Assets**
- **What is a Component Framework (CF)**
 - **Benefits & Examples of Enterprise JavaBeans CF**
 - **Other Component Framework Candidates**
 - **Strategy: Deploying Component Frameworks**
- **Migrating Legacy Assets to Components**
 - **Examples of Legacy Integration Middleware**
 - **Key Capabilities of Legacy Integration Middleware**
- **Strategy: Migrating Legacy Assets to Components**

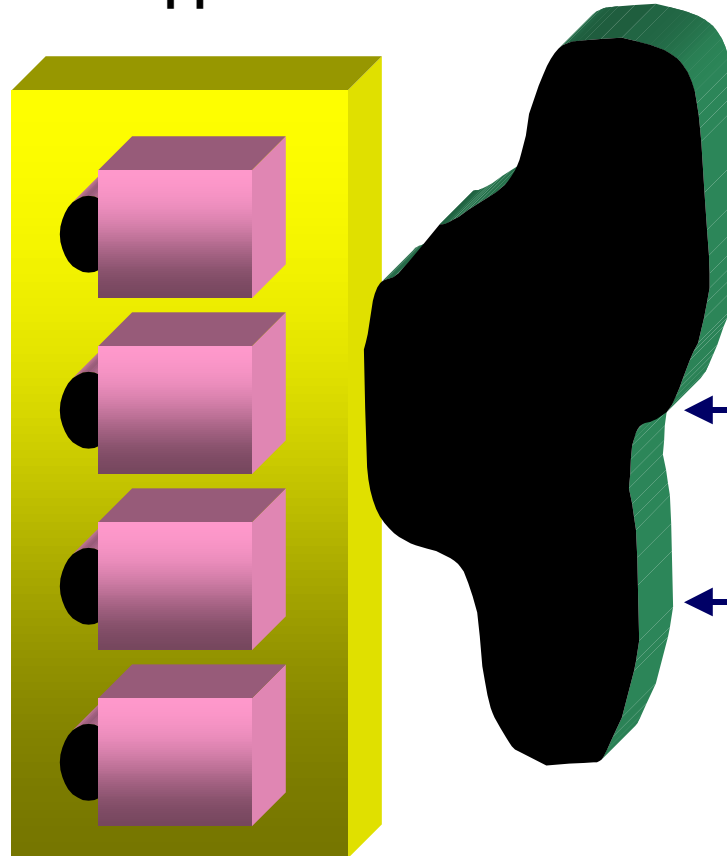


Critical Need: Legacy Integration

Desktop



Application Server



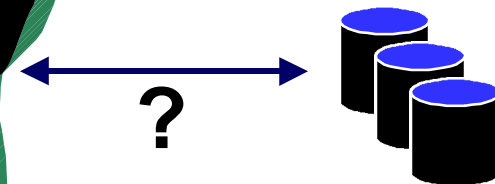
Java Business Logic
Components

Legacy Assets

1997 IT spending:

- USA: \$320 billion
- Europe: \$200 billion
- Japan: \$108 billion

total assets: \$5 trillion



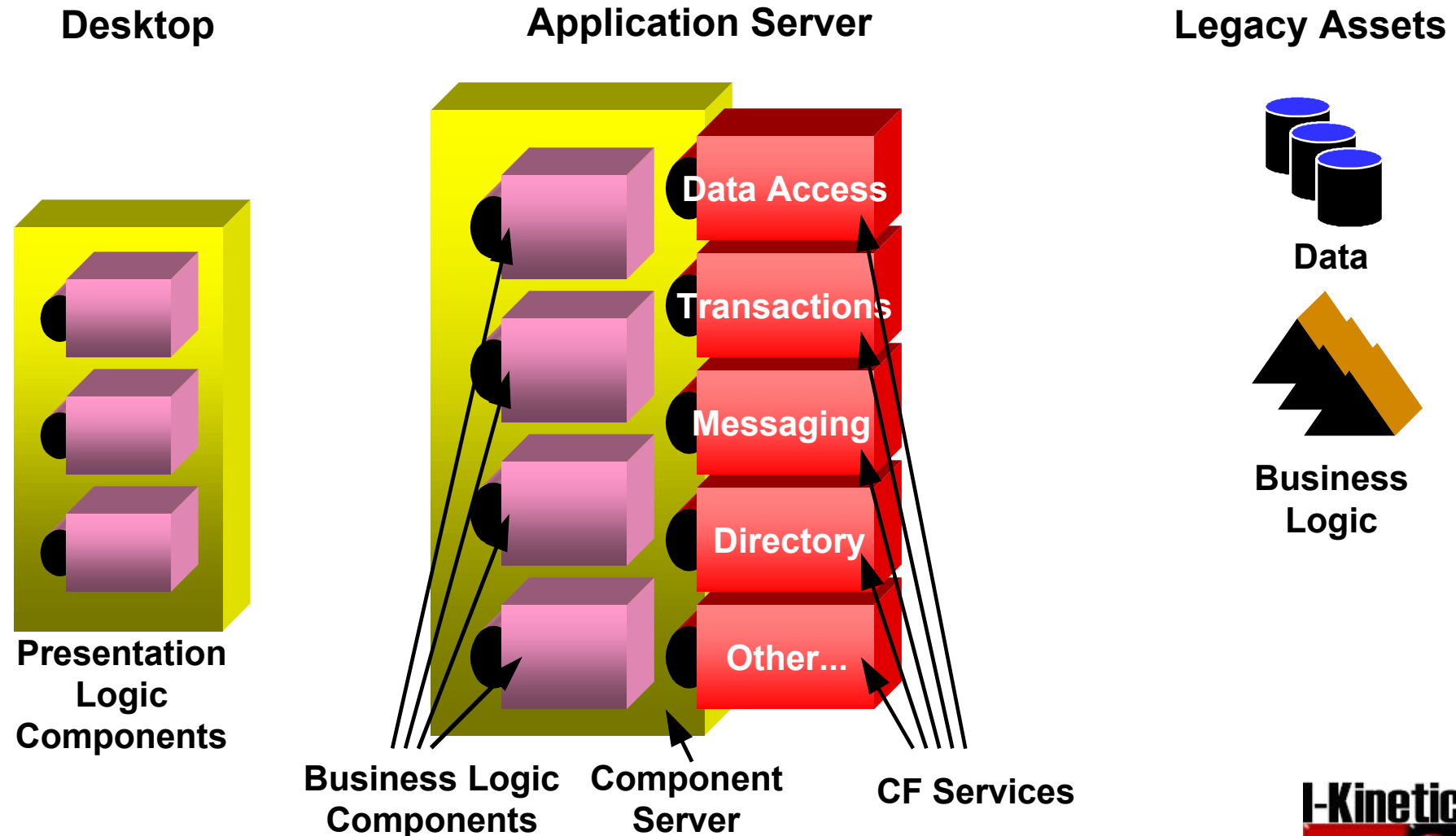
Data



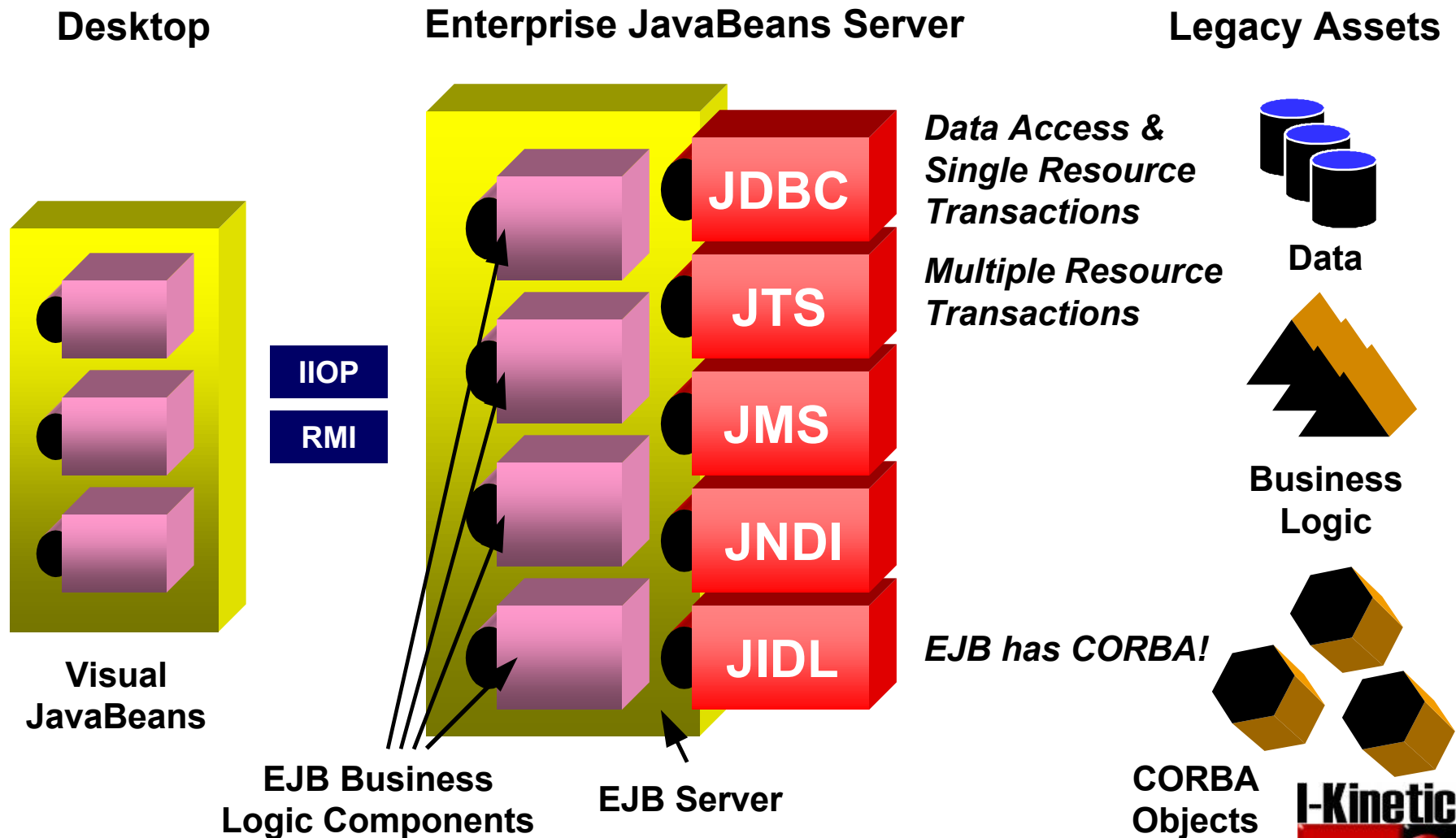
Business Logic



What are Component Frameworks (CF)?



Enterprise JavaBeans



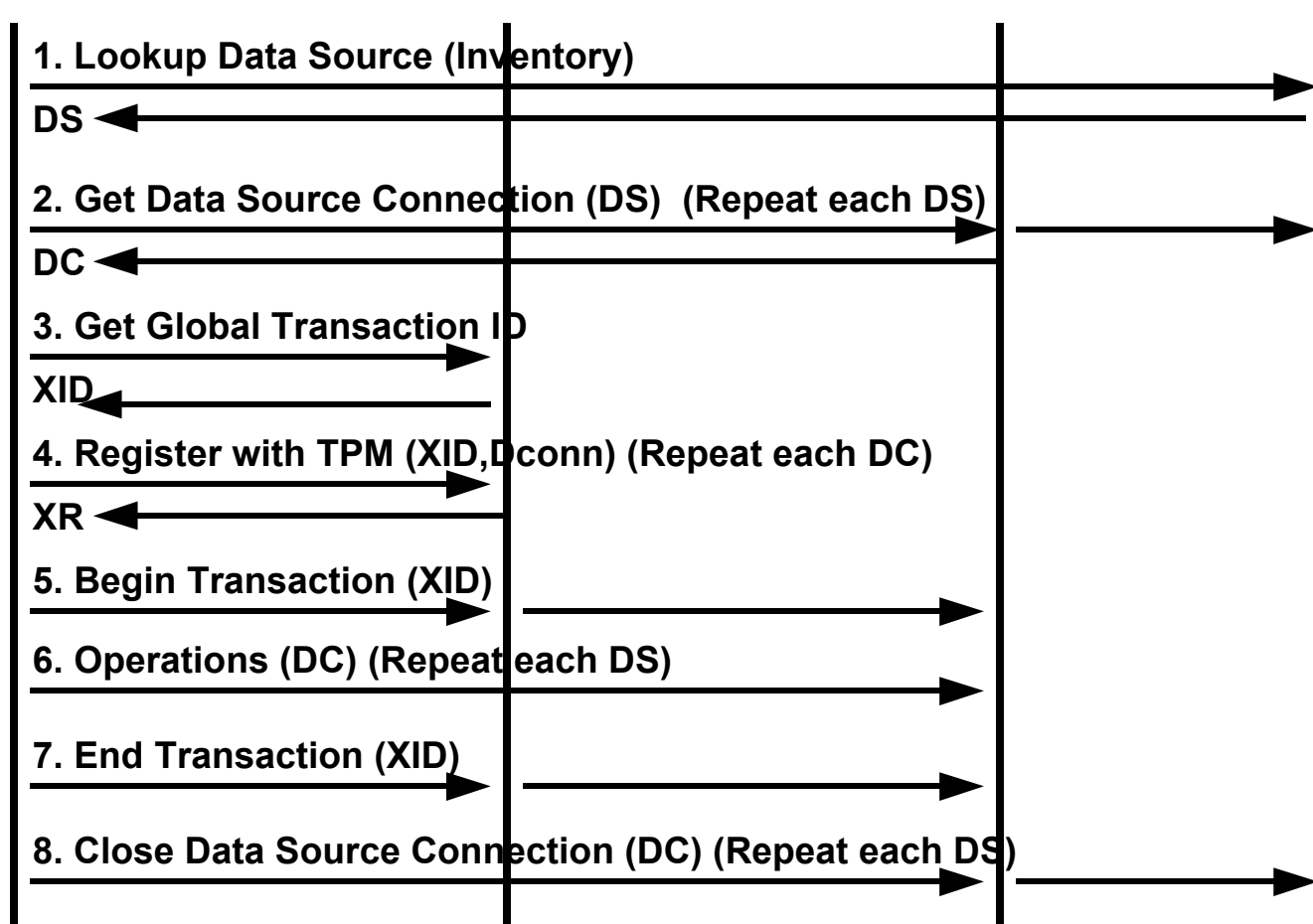
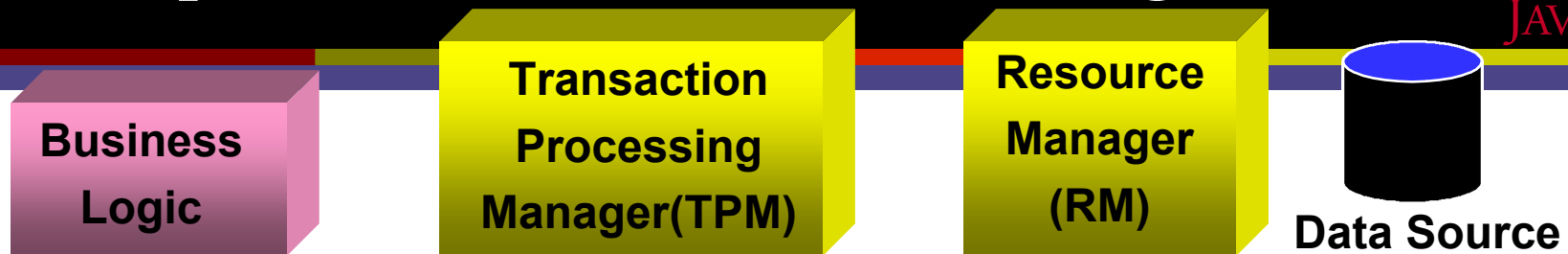


Benefits: Java Component Framework

- **Paradigm jump in development productivity**
 - **Java versus C++: 200%+ increase in productivity**
 - **Java + EJB: 500%+ increase in productivity**
- **Visual tools for component design, development, assembly**
- **Component reuse!**
 - **Yet more increase in productivity**

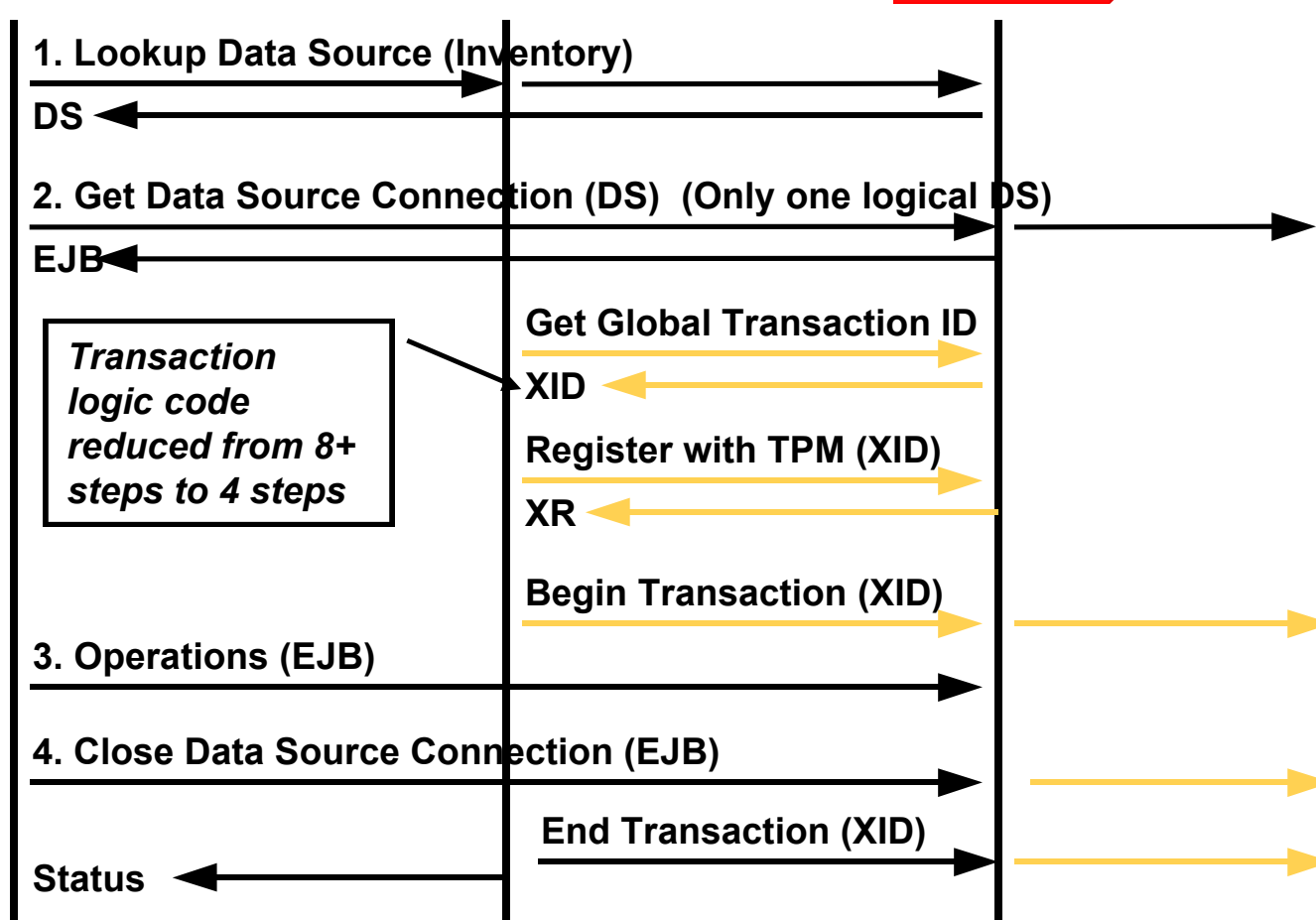


Example: Procedural Transaction Logic





Example: EJB Transaction Logic





Example: Java Code of JDBC/JTA

```
DataSource ds = lookup ("Inventory");  
Connection txbean = ds.getConnection();  
txbean.execute ( <operation>);  
... <other operations>...  
txbean.close();
```

Categories: Component Frameworks (CF)



- **Enterprise JavaBeans**
 - Sun EJB Server, Sun NetDynamics
 - Netscape App Server
 - IBM Java Server
- **CORBA OTM (& CORBA 3.0)**
 - BEA, IBM, IONA, Inprise
- **Microsoft MTS/DCOM/ActiveX**
- **Hybrids: 30+ App server products with combinations of EJB, CORBA, DCOM**



Strategy: Deploying Components

- **Component Framework infrastructure must be mature to gain productivity benefits**
- **Critical trends**
- **Ready now: production deployment**

Strategy: Deploying Components

Critical Trends



- **EJB services (JDBC, JTS, JMS) will be available (and more mature) before EJB server frameworks.**
- **EJB integration with CORBA will be very strong**
 - **CORBA built into JDK 1.2**
- **MTS/DCOM integration with EJB/CORBA will be weak**
- **MTS/DCOM only viable on Windows NT 5.0**
 - **Microsoft tools will never be available on UNIX**

Strategy: Deploying Components

Ready now: production deployment



- **Java: JDK 1.1.6 (use JIT!) -> upgrade to JDK 1.2**
- **JDBC: DataBroker**
- **JIDE: JBuilder, VisualAge, Visual Café**
- **CORBA: Orbix, VisiBroker**

Strategy: Deploying Components

Wait!



- **Wait! -- not ready for production deployment**
 - **MTS/DCOM: wait for Windows NT 5.0 in Y2000.**
 - **EJB Server: Wait for Sun's EJB Server reference release in Y1999.**
 - **Evaluate: Java Service (JTS, JMS) products.**

Strategy: Deploying Components

Reusable Java investments



- **Y1998/1999 reusable Java investments:**
 - **buy: EJB Services (JDBC, JTS, JMS,), JIDEs**
 - **build: proprietary business logic EJBs**
 - **design, develop, maintain using Java Integrated Development Environments (JIDEs)**
 - **this investment will be reusable with future EJB Server releases**

Key Issue: Integrating Java with Legacy Assets

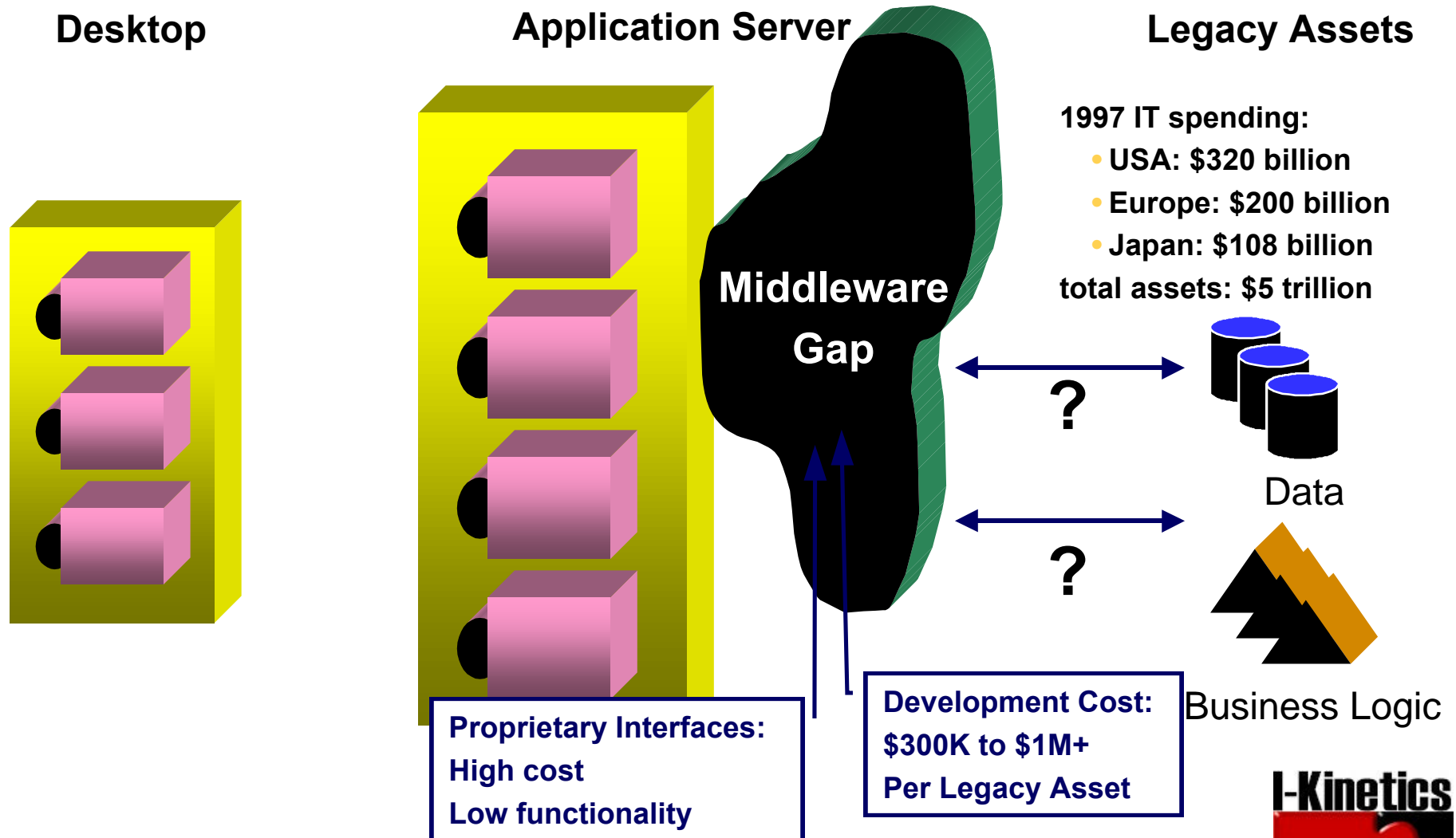


- **What is the Need?**
- **Review Legacy Integration Middleware**
- **Best Solution: Service Broker for Legacy**
- **Comparison and Examples**
- **What are Key Capabilities of Service Brokers?**

Solution:
Migrate Legacy Assets to Component Frameworks



Critical Need: Legacy Integration



Failures: Legacy Integration



- **Terminal Emulation, Screen Scraping**
- **CGI**
- **Client/Server Gateway Middleware**



Failures: Legacy Integration

- **Terminal Emulation, Screen Scraping**
 - **wasteful terminal session management**
 - **adds load to mainframe host**
 - **lowest performance, scalability solution**

**Failure cases:
flight booking, credit card transactions**



Failures: Legacy Integration

■ CGI

- **Process-based -> wastes resources, poor concurrency**
- **Poor performance, scalability**
- **Biggest problem: small transactions are very costly**

**Failure cases:
stock trading, book buying**



Failures: Legacy Integration

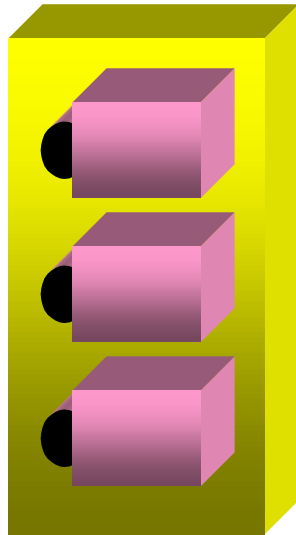
- **Client/Server Gateway Middleware**
 - **Low quality (client) interfaces: thread unsafe, memory leaks**
 - **Biggest problem: proprietary protocols blocked by firewalls**

**Failure cases:
ODBC, JDBC/ODBC Bridge**

Solution: Service Brokers Transform Legacy into Component Service

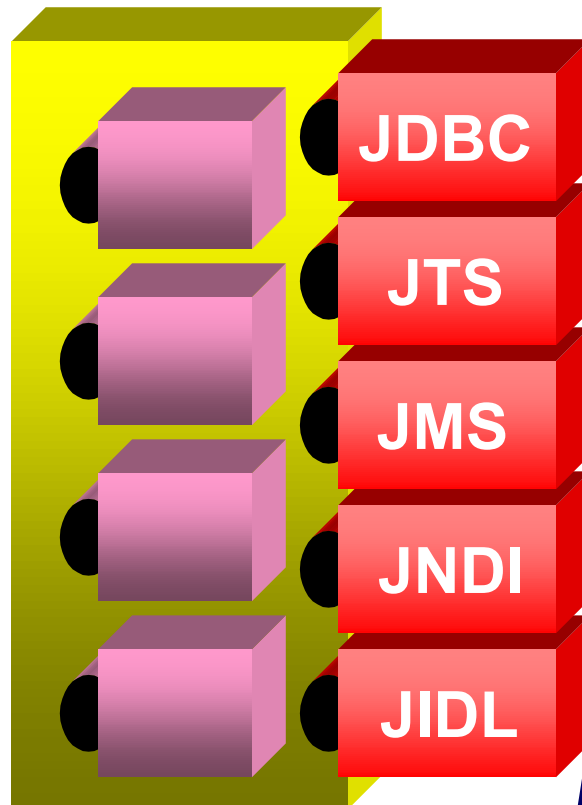


Desktop



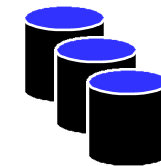
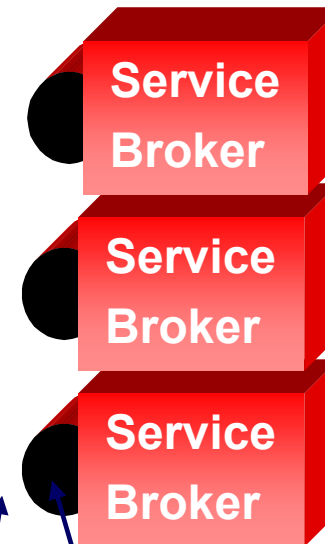
- ✓ Reliability
- ✓ High Performance
- ✓ Scalability
- ✓ Security
- ✓ Manageability
- ✓ Programmability
- ✓ Standard

Enterprise JavaBeans Server



Buy and install legacy broker components

Legacy Assets



Data



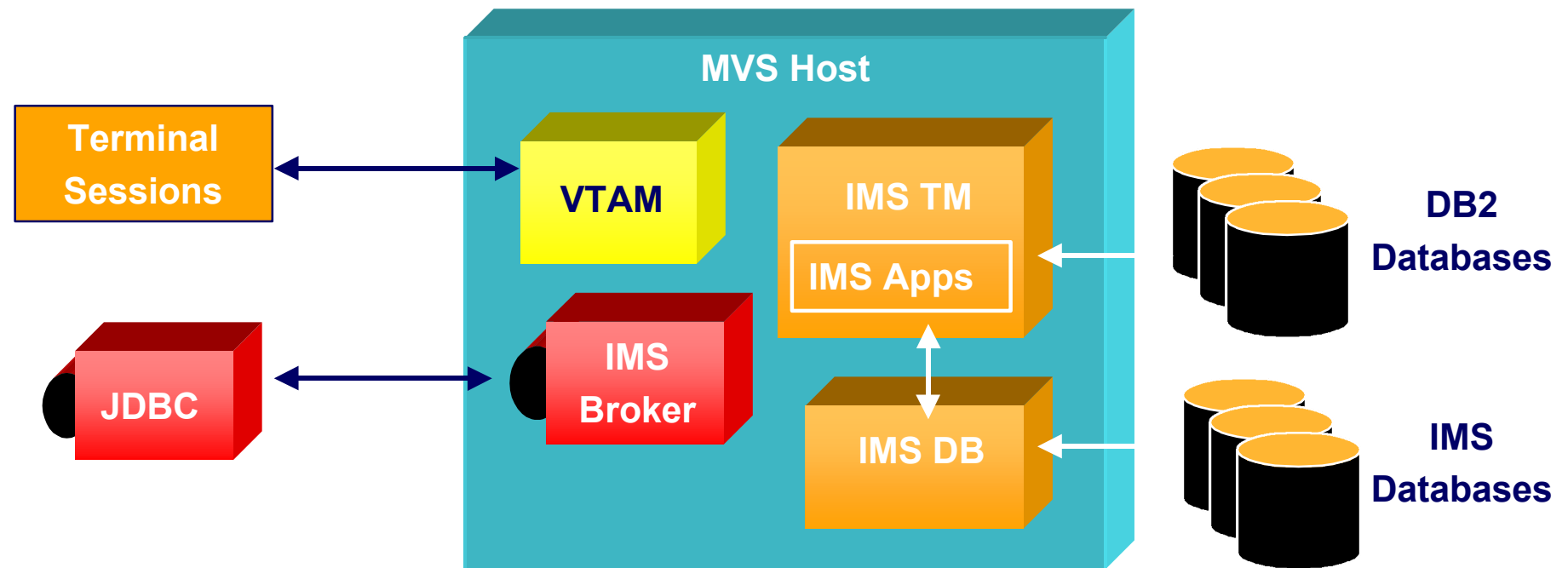
Business Logic

Legacy appears as a service
Low cost
High functionality



Example: MVS IMS

- IMS is world's #2 database and transaction monitor
- MVS CICS is #1 transaction monitor



Example: JDBC access to MVS IMS Middleware Performance Comparison



- Extract 100 rows from MVS IMS parts database:

Middleware	Process Launch (msec)	Connect (msec)	Execute (msec)	Extract (msec)	Total Time (msec)	Total Byte Transfer	OS/390 CPU (msec)
CGI/Perl/ODBC	700	350	280	54	1.384	7.680	30
FastCGI/Perl/ODBC	45	350	280	54	729	7.680	30
Java/Terminal Emulation	-	500	-	407	907	11.712	210
Java C/S IMS Gateway	-	1.700	400	135	2.235	8.320	80
JDBC/Service Broker	-	55	42	49	146	7.680	30

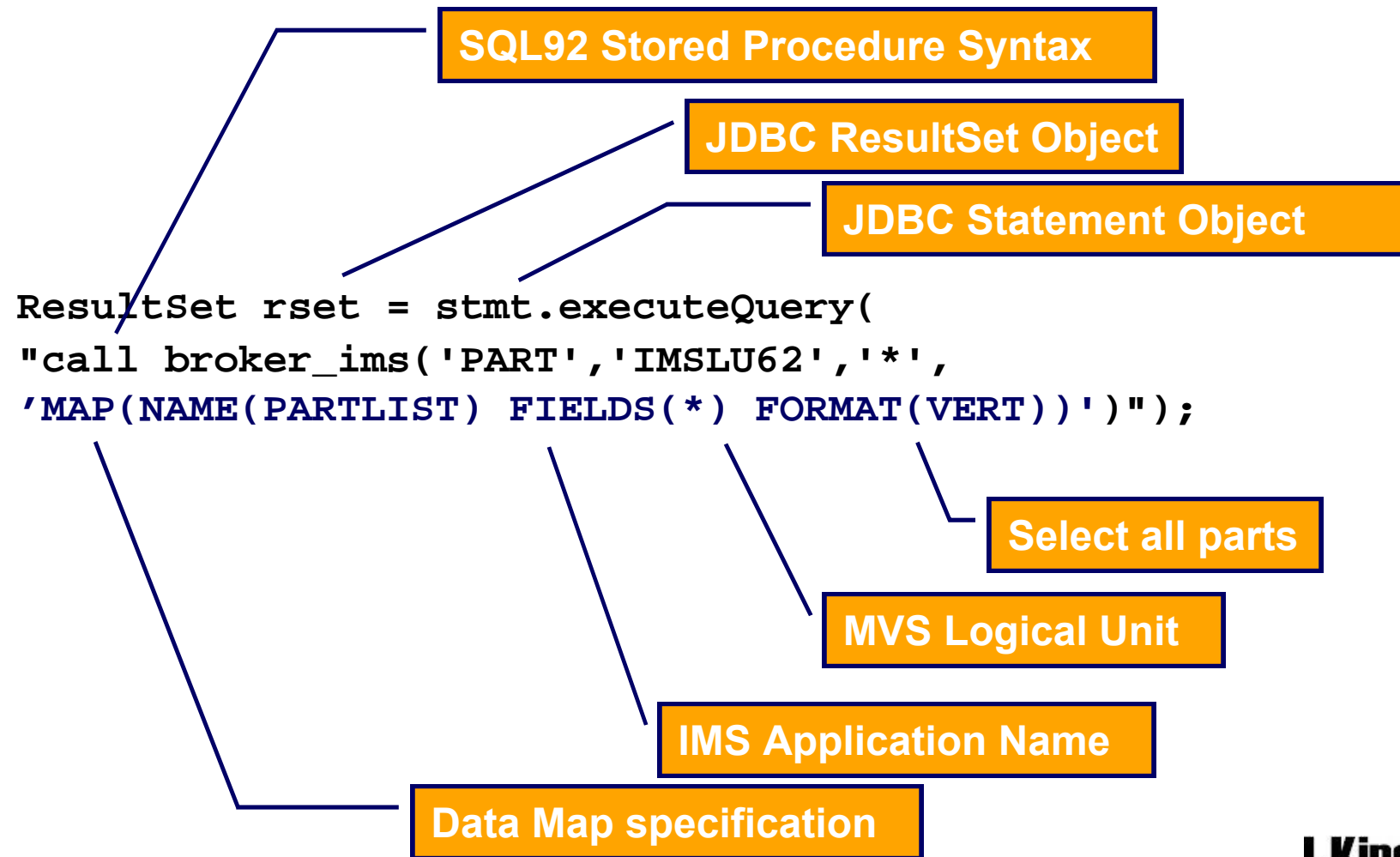
Mid-tier resource use

Host resource use





Example: JDBC Service Broker for MVS IMS Retrieve all part properties from IMS database



Seven Requirements for Service Brokers

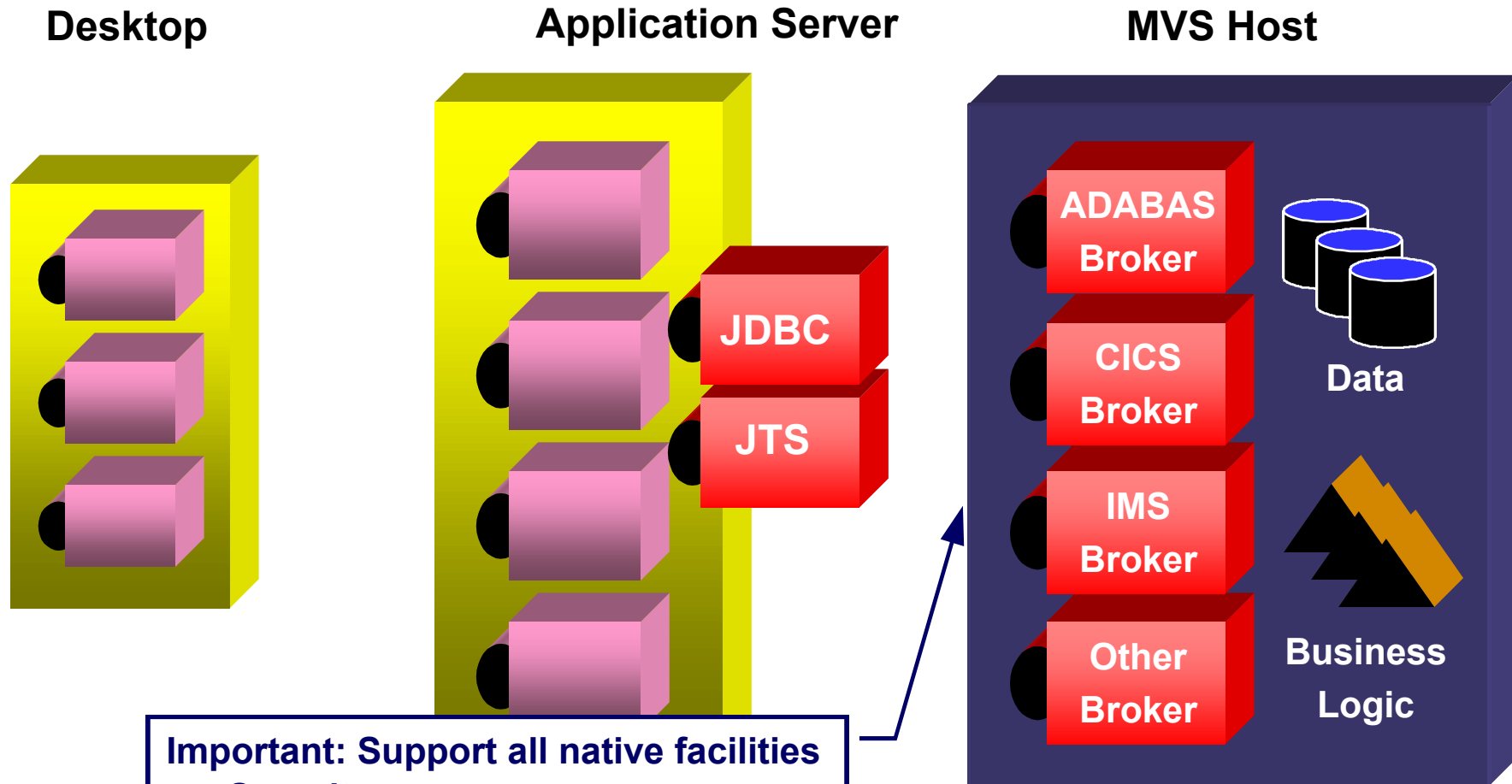


- ✓ **Reliability**
- ✓ **Performance**
- ✓ **Scalability**
- ✓ **Security**
- ✓ **Manageability**
- ✓ **Programmability**
- ✓ **Standards**

What are capabilities of Service Brokers that implement these requirements?

Audit capabilities of service brokers for mainframe legacy assets

Example: Service Brokers for Mainframe



Important: Support all native facilities

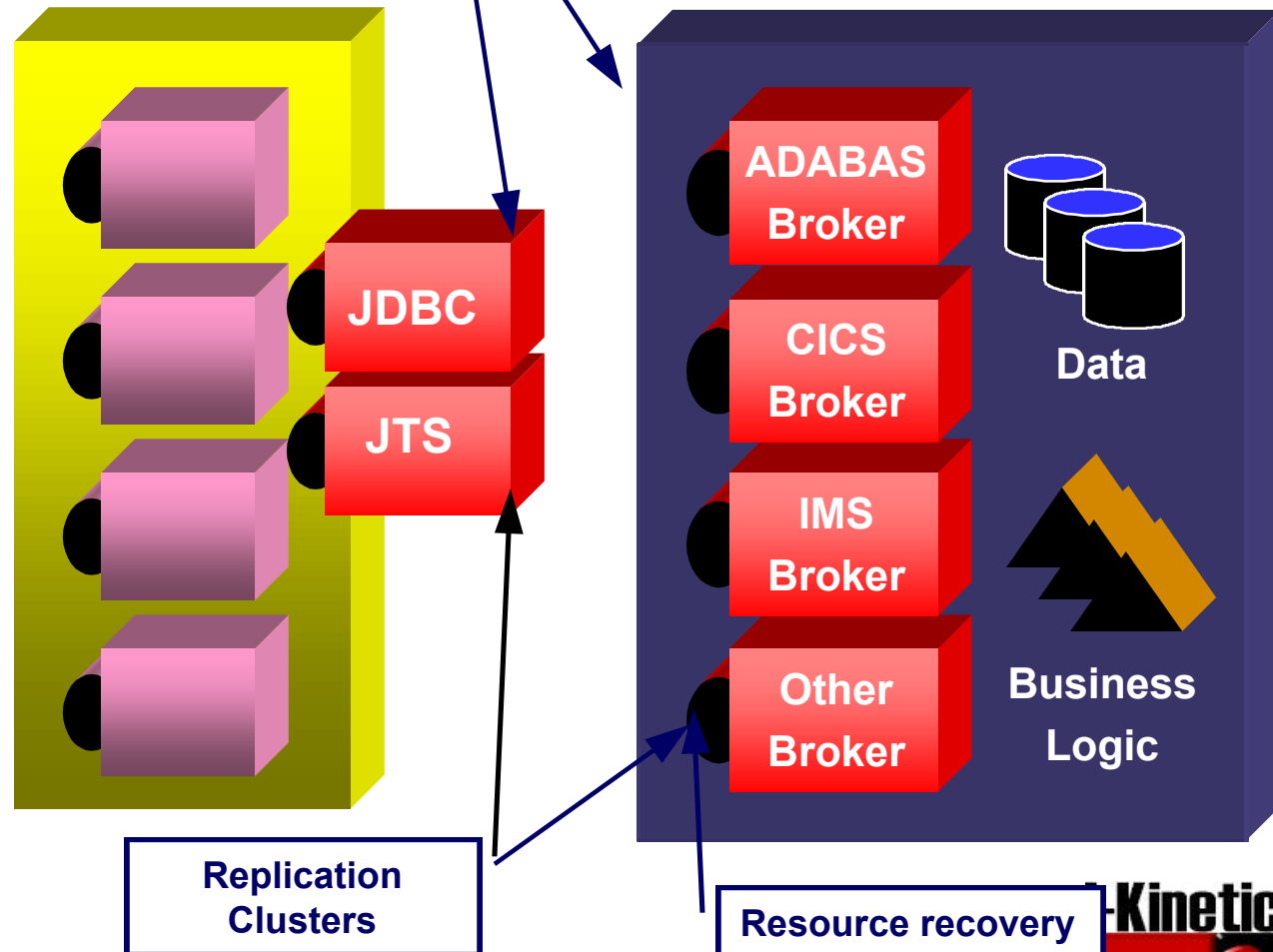
- **Security**
- **Management**
- **Accounting**



Reliability

Fault Isolation:
Failure of one won't
effect other components

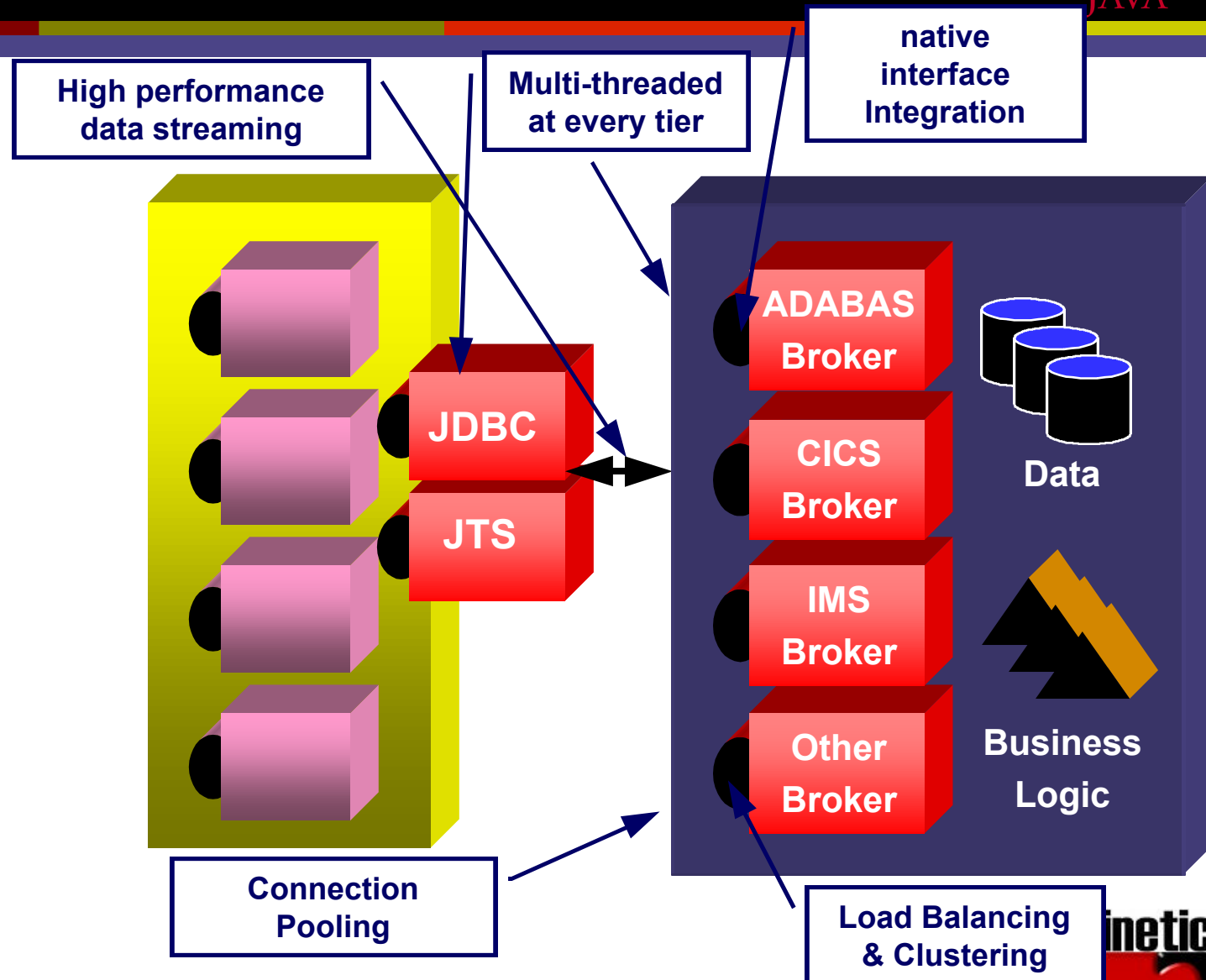
- ✓ **Replication
Clusters**
- ✓ **Component-based
Fault Isolation**
- ✓ **Resource
Recovery**





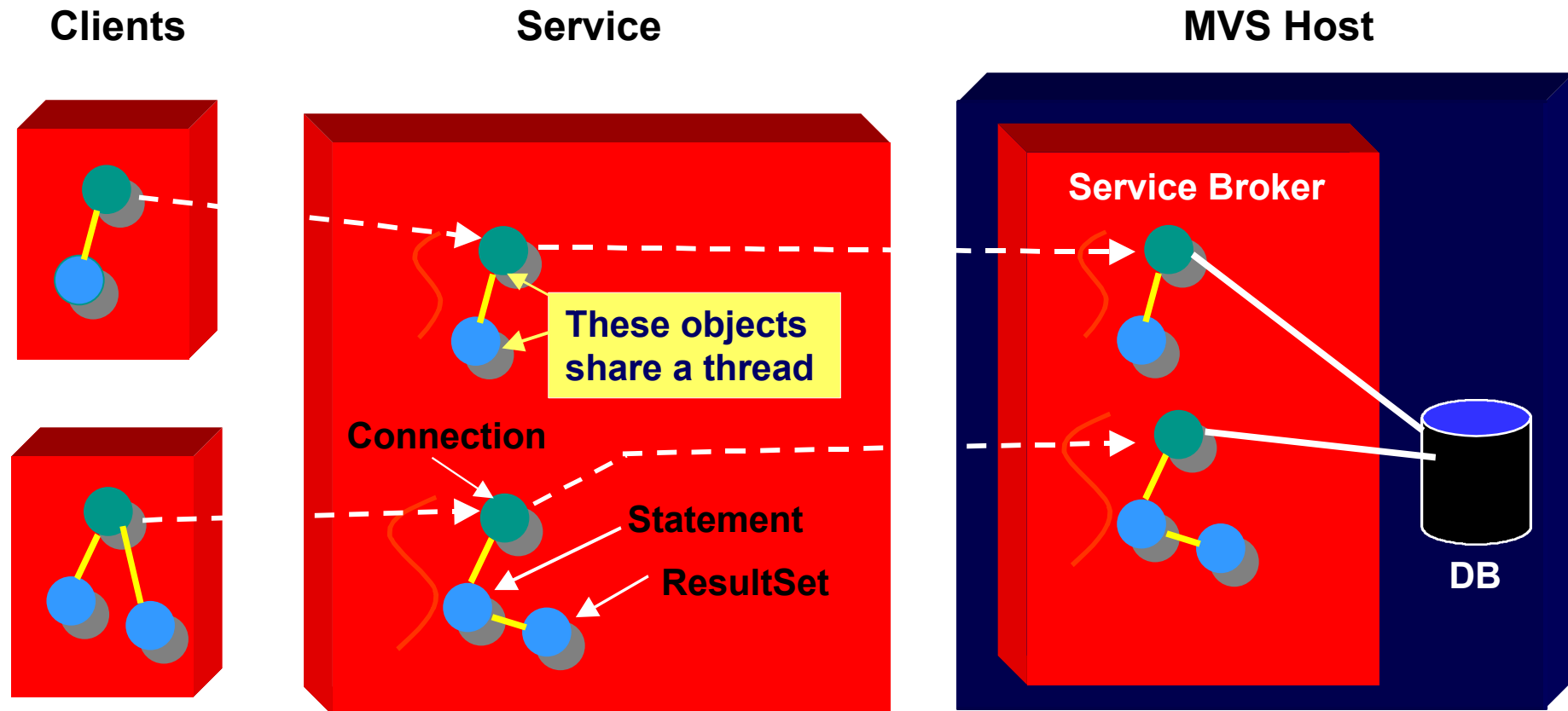
Performance/Scalability

- ✓ **Multi-threaded**
- ✓ **Load Balancing**
- ✓ **Clustering**
- ✓ **Connection Pooling**
- ✓ **Data Streaming**
- ✓ **Native Interface Integration**





Coherent Distributed Threading Model



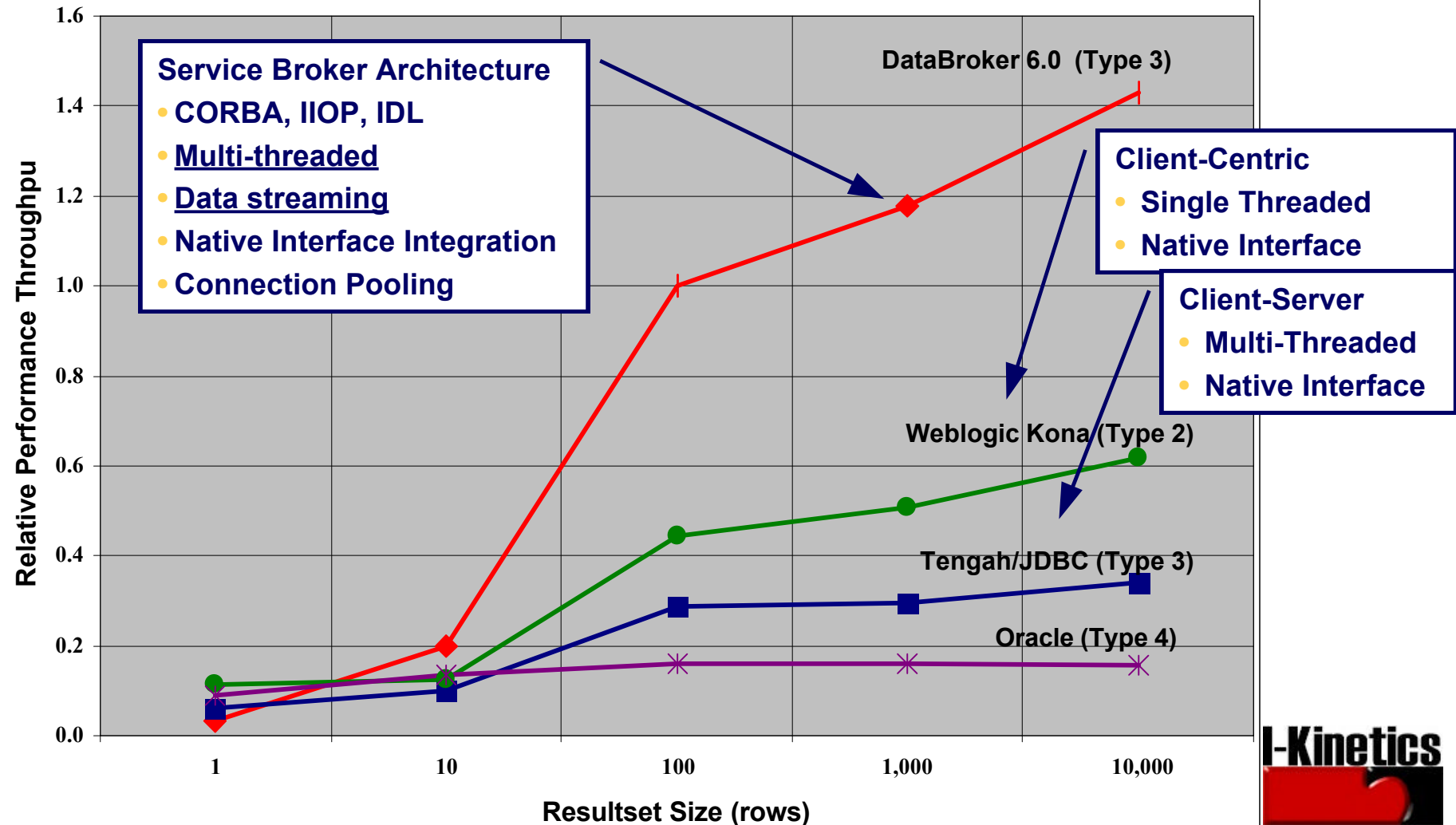
Each Connection object has its own thread. All objects owned (created) by that connection share the thread.



Example: JDBC Performance

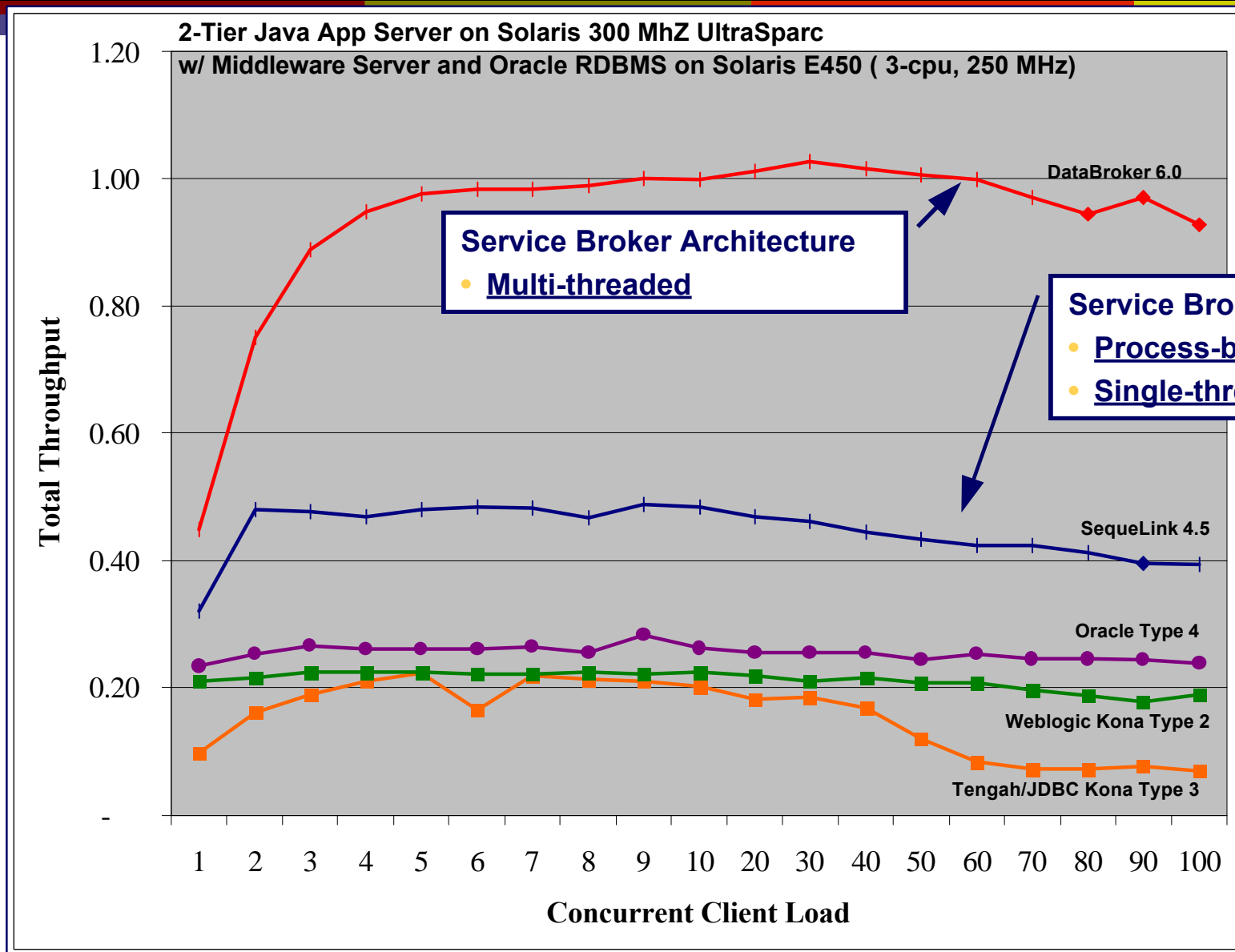
JDBC on Solaris 2.6 E450, Oracle Server 7.3.2

Single Client Performance Throughput for 10 Column Query (3-Integer, 3-Double, 3-String, 1-Date)





Example: JDBC Scalability



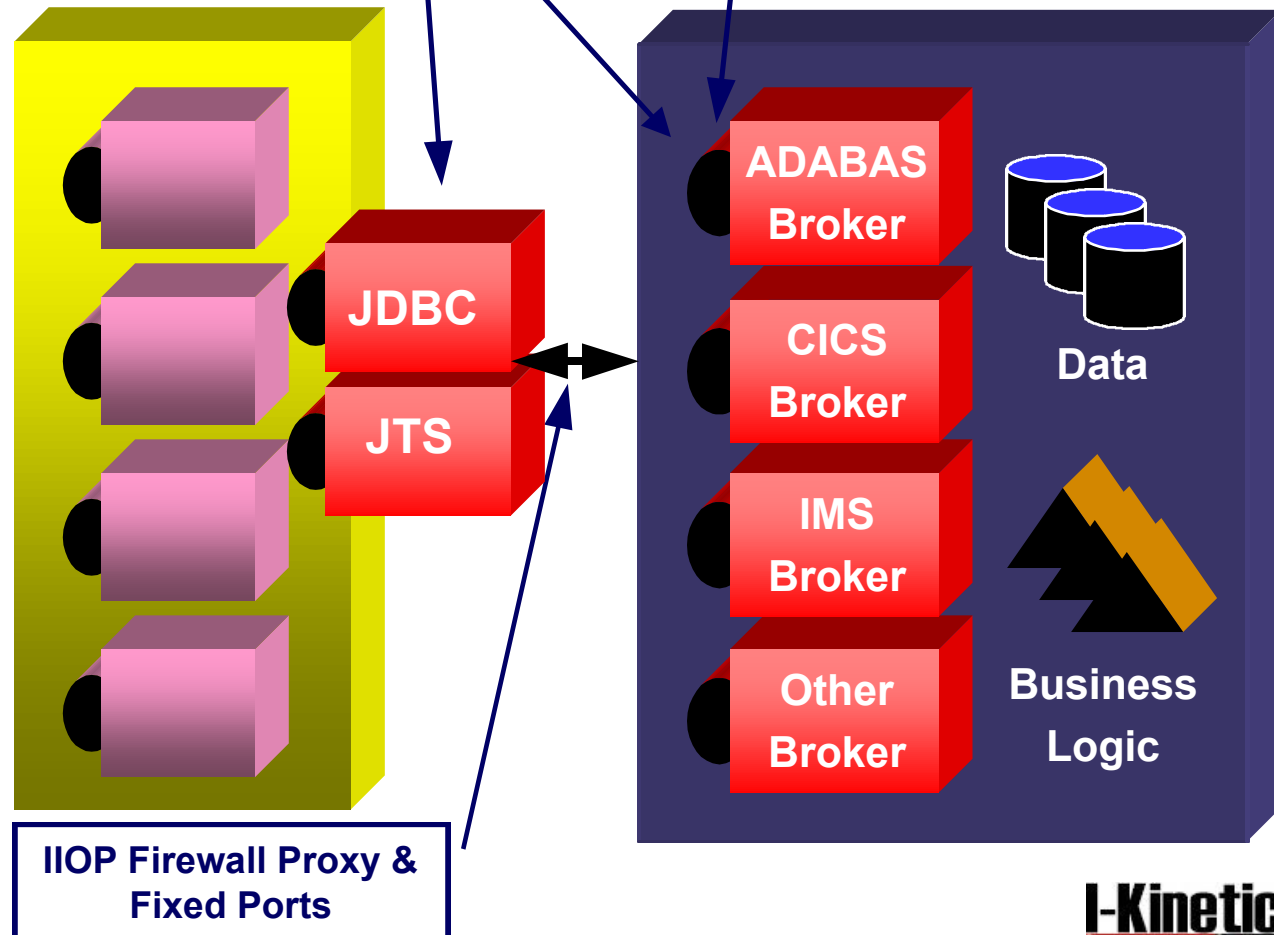
Security

SSL encryption
and certificate

Integration with MVS
security facilities
(RACF, Top Secret,
etc.)

MVS Host

- ✓ IIOF Firewall Proxy
- ✓ Fixed Ports
- ✓ SSL
- ✓ Native MVS security:
RACF, Top Secret,
etc.



IIOF Firewall Proxy &
Fixed Ports



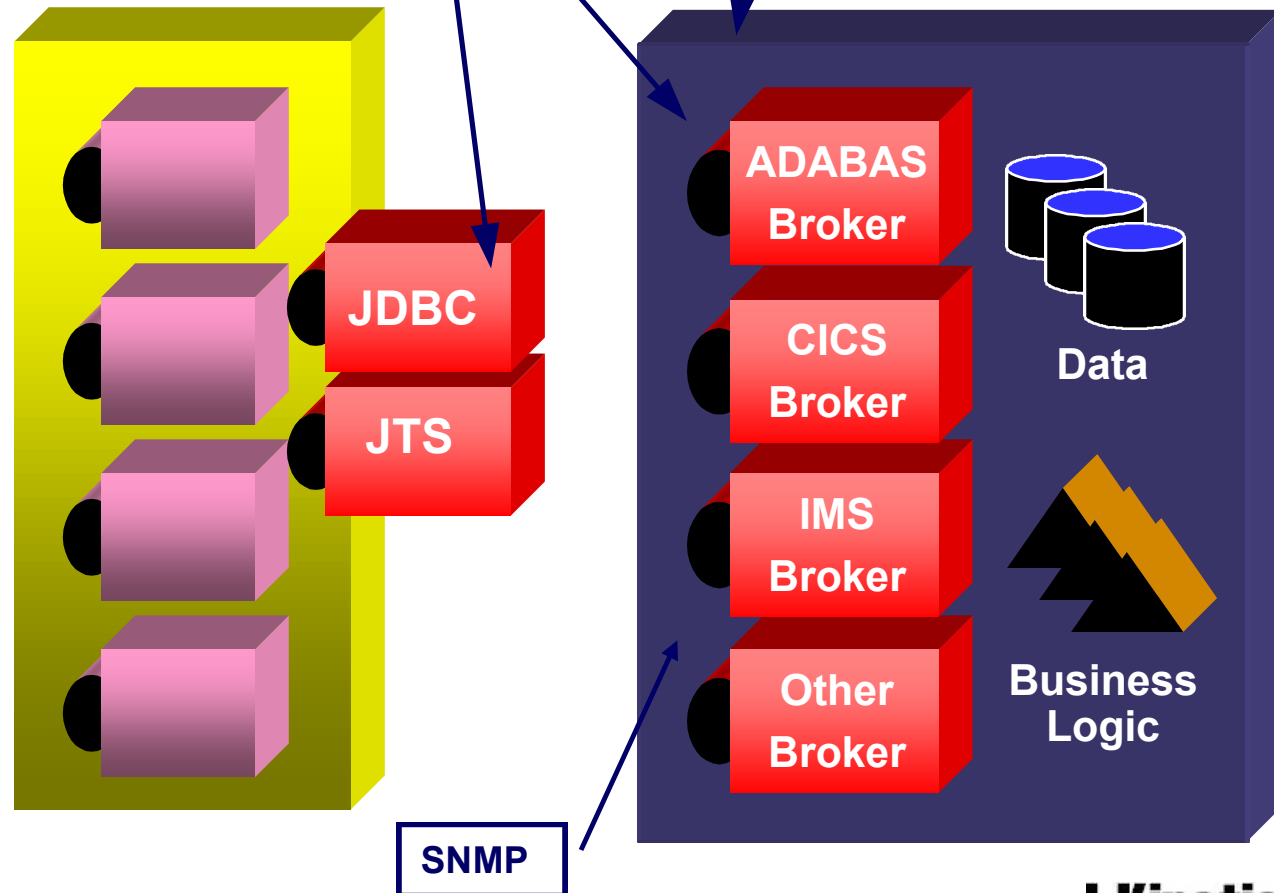
Manageability

End-to-end
monitoring and
control

Full SMF accounting

MVS Host

- ✓ **SNMP**
- ✓ **MVS SMF Accounting**
- ✓ **End-to-End Monitoring and Control of Resources**

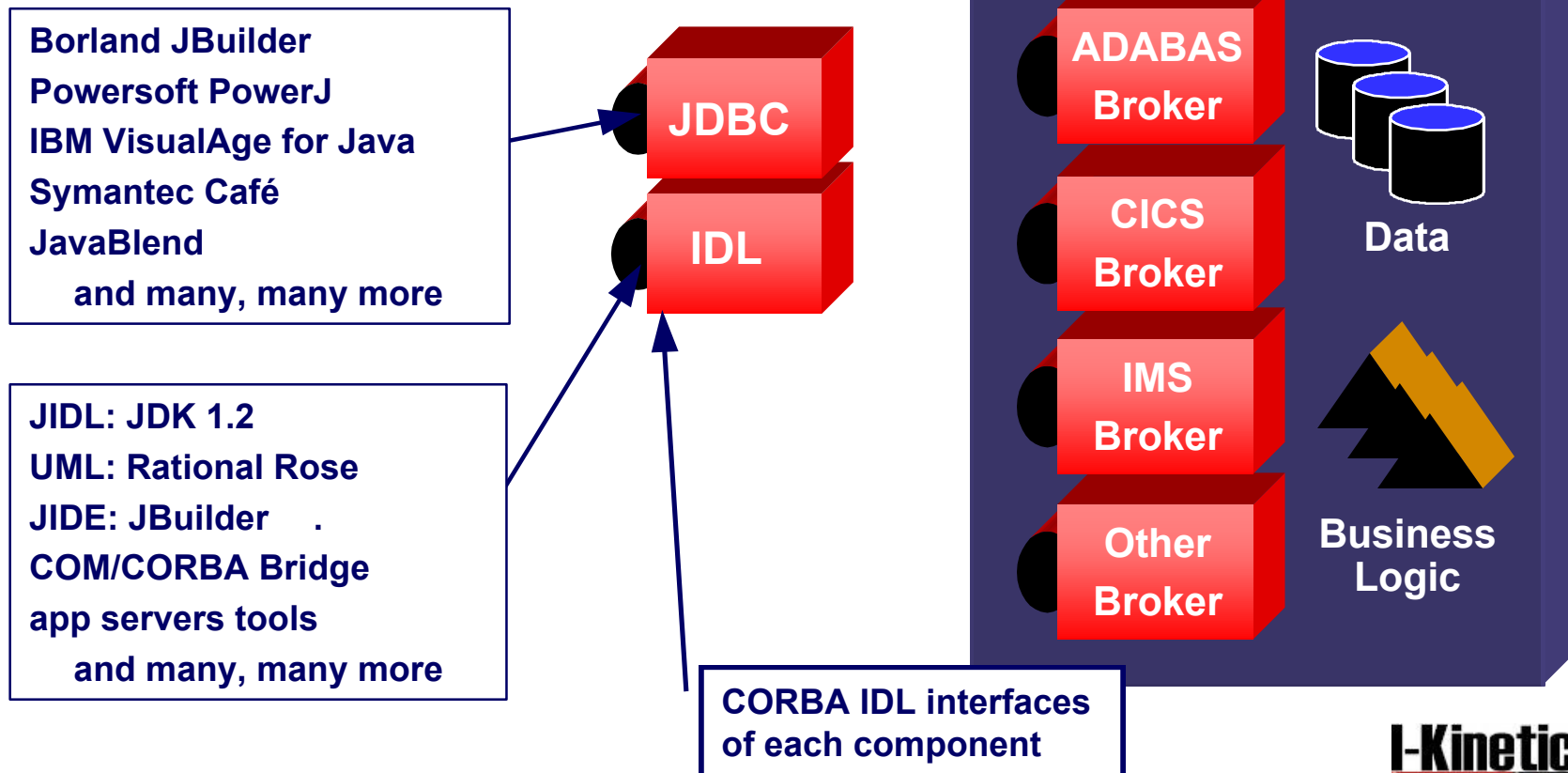


SNMP



Programmability

✓ Standard APIs -> Tool Support





Strategy: Integrating Legacy

- **Evaluate Legacy Middleware by Seven Requirements**
- **Web-based applications will have large and rapidly increasing user loads**
- **Reliability, Performance and Scalability are key risks for legacy integration**
- **Determine and test performance and scalability requirements before purchase**
- **Standard service APIs (JDBC, JTS, etc.) have the highest return on investment (ROI).**



Summary

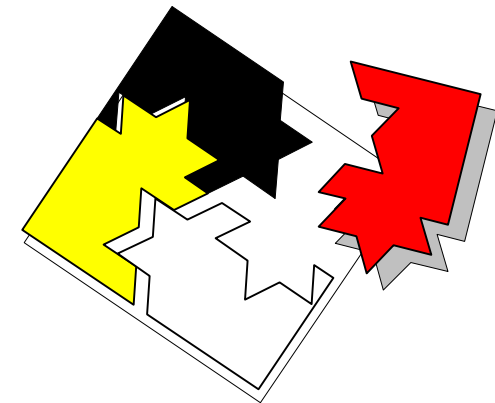
- **Key Challenge: Emerging component frameworks must integrate existing information technology assets (\$5 Trillion worldwide!)**
- **Can start integrating legacy assets with Java, JDBC, UML, CORBA**
- **Package legacy as Service Brokers to obtain Seven Enterprise Requirements**
- **Investment now is reusable later when component frameworks are mature for production deployment**



Resources: CUC 98

- **3rd Component User's Conference™**
12 - 15. July 99, München, Germany
 - www.teleport.com/~goldman/jell/cuc.html
Proceedings by SIGS Publications 1-884842-57-7

- **ComponentWare® Consortium**
 - www.componentware.com





Resources: Java and CORBA

- **EJB, Java Enterprise APIs**
 - <http://www.javasoft.com/products/>
- **The Essential Distributed Objects Survival Guide**
 - Robert Orfali, Dan Harkey, and Jeri Edwards, ISBN: 0-471-12993-1, John Wiley and Sons, Inc., 1996.
- **Client/Server Programming with Java and CORBA**
 - Robert Orfali and Dan Harkey, ISBN: 0-471-16351-1, John Wiley and Sons, Inc., 1997.
- **Enterprise Component Software Roadmap**
 - <http://www.componentware.com/wp/cwvision/cwvision.htm>





Resources: JDBC

■ Universal Data Access

- http://developer.netscape.com/news/viewsource/cottman_JDBC.html
- <http://www.i-kinetics.com/wp/wp.htm>

■ OPENjdbc & DataBroker Eval Download

- <http://www.i-kinetics.com/EVAL/regeval.htm>

■ JDBC Database Access with Java

- Graham Hamilton, Rick Cattell, Maydene Fisher, ISBN: 0-201-30995-5, Addison Wesley Inc. 1997.

■ Database Programming with JDBC and Java

- George Reese, ISBN: 1-56592-270-0, O Reilly & Assoc. 1997.





Resources: Legacy Migration

■ Migrating Legacy Systems to CORBA

- http://developer.netscape.com/news/viewsource/morin_corba/morin_corba.html
- <http://www.I-kinetics.com/wp/wp.htm>

■ Implications of Distributed Object Technology for Reengineering

- N. Weiderman, L. Northrop, D. Smith, S. Tilley, K. Wallnau, CMU/SEI-97-TR-005 / ESC-TR-97-005, June 1997.
- <http://www.sei.cmu.edu/products/publications/97.reports/97tr005/97tr005title.htm>





Capacity Planning

- **JDBC Performance Study Whitepaper**
 - Obtain from I-Kinetics
- **Sun Capacity Planning WWW Site**
 - <http://www.sun.com/sun-on-net/performance/index.html>
- **www.capacityplanning.com**
 - Excellent capacity planning resource site
- **Benchmark Resources**
 - <http://www.benchmarkresources.com/>
- **Intranet/Externet Toasters**
 - <http://www.news.com/News/Item/0,4,26430,00.html>



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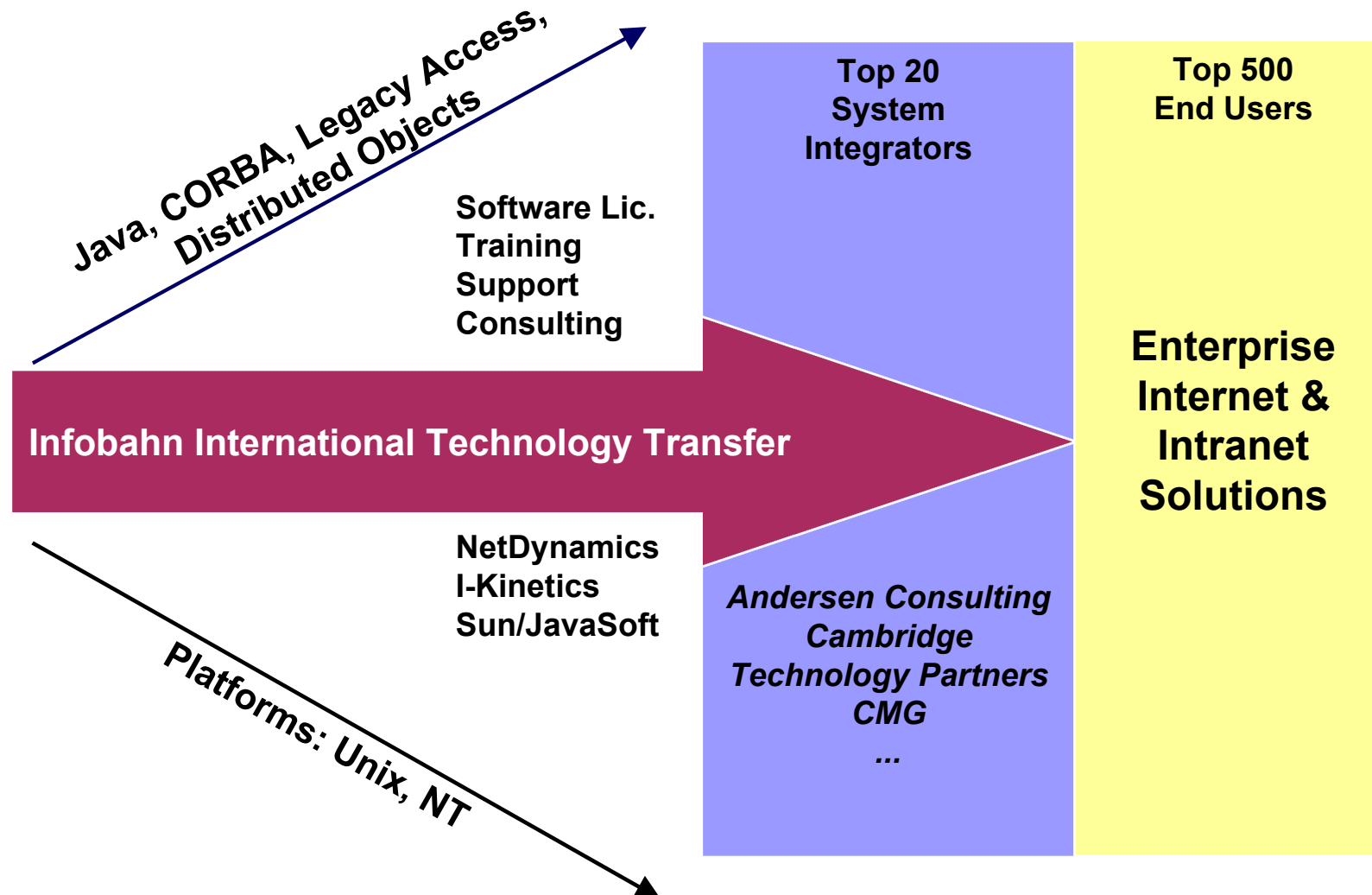
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**Infobahn International ist ein CORBA/Java
Technologietransfer-Unternehmen, spezialisiert auf
Enterprise Integration Software / Middleware**



Technologie-Transfer



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