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ANSA Phase III

Trends in Distributed Computing

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Abstract

A short presentation looking at current trends in distributed computing research and in industry developments to be given to Fujitsu Laboratories, Septmeber 1995.

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TRENDS IN DISTRIBUTED COMPUTING

Andrew Herbert

September 1995

Presentation to Fujitsu Laboratories



STRUCTURE OF PRESENTATION

TRENDS

CONCLUSIONS



TRENDS IN DISTRIBUTED COMPUTING

- 1 CORBA and Distributed OLE technology convergence for electronic commerce**
- 2 Active content paradigm for electronic information**
- 3 Distributed information processing**
- 4 Syntax independent programming**
- 5 Distributed control of broadband multimedia networks**
- 6 End-to-End Security**

1: DISTRIBUTED TECHNOLOGY FOR ELECTRONIC COMMERCE

- **Distributed OLE**
- **CORBA**
- **Convergence**

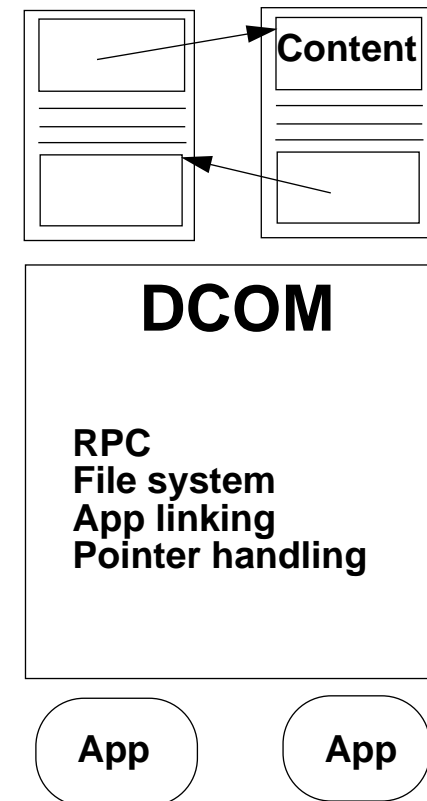
Distributed OLE

- **Document component linking**

- A file system driven view - objects are persistent data
- Infrastructure takes on many responsibilities transparently
- Will OLE and DCOM scale?

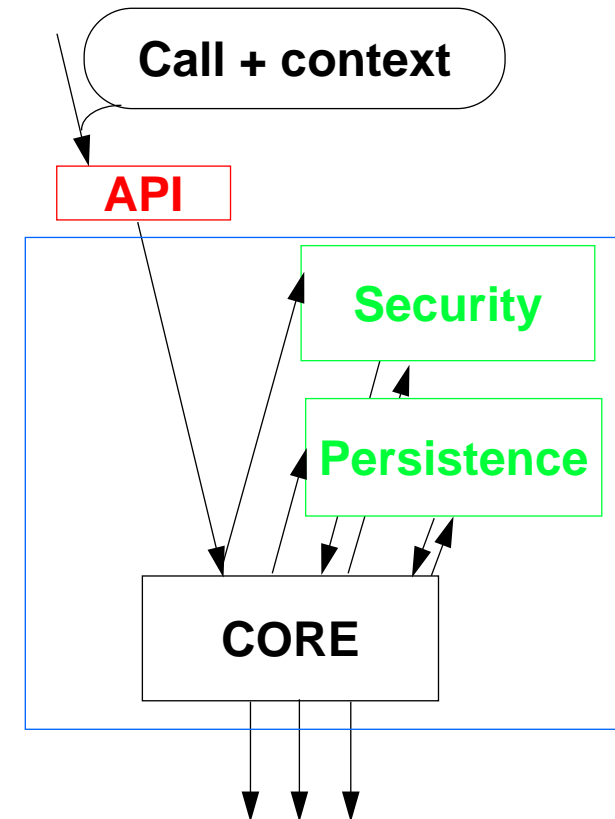
- **Applications**

- Hypertext approach to cooperative work - but can users cope with the complexity?
- How does business process automation fit in?
- Component oriented applications - but these benefit the vendor more than the user



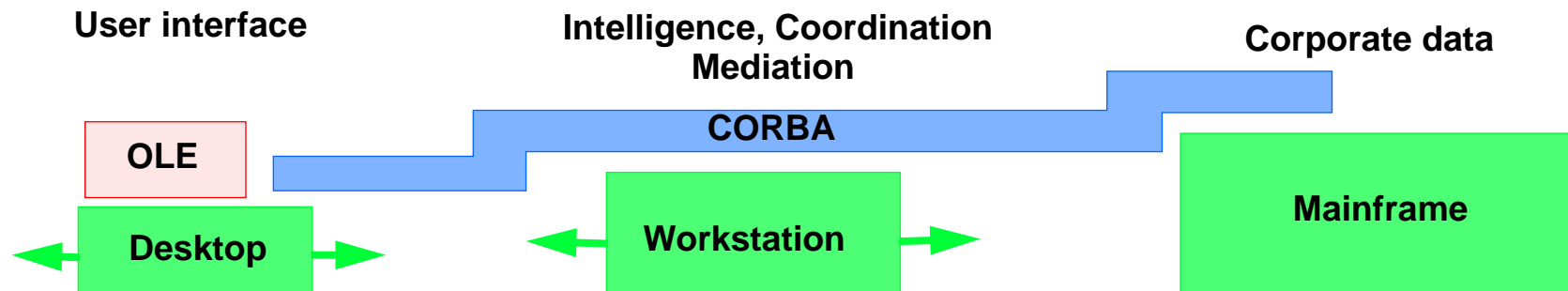
CORBA

- **CORBA supports applications integration across networks**
 - Business process driven view
 - objects manage and secure themselves
 - Infrastructure is an extensible core
 - transparency is selective
- **Applications**
 - Networked systems management
 - Networked data integration, management and distribution
 - Task automation



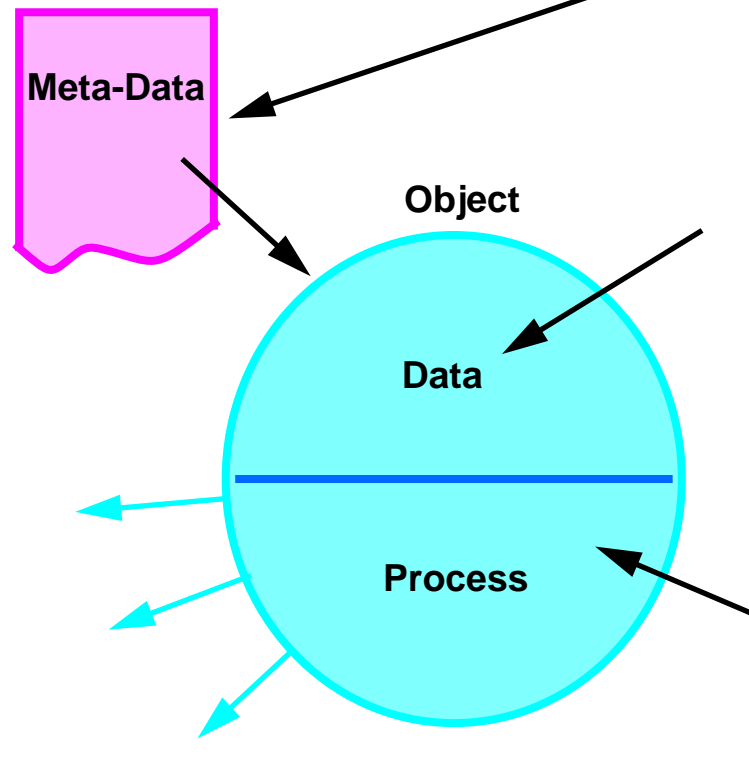
OLE / CORBA Convergence

- **OLE learns from DCE?**
 - and gains cells, management, security, transactions
- **CORBA learns from OPENdoc?**
 - and gains lightweight implementations for small objects
- **Need both for electronic commerce in wide area open information networks**
- **Outcome?**



2: ACTIVE CONTENT

Federated Repository



- automate management, navigate, filter, monitor

Semantics-based processing

- the content
 - life > 100 years...
- protect integrity of data
 - objects protect themselves
 - objects manage themselves
 - replace / upgrade 'in service'
- choose best presentation

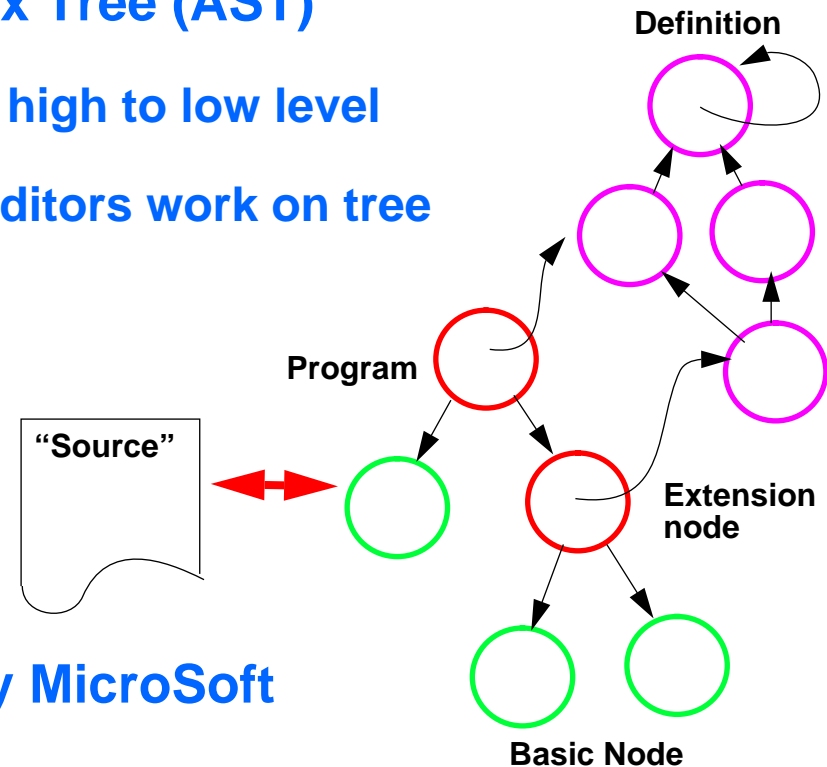


3: DISTRIBUTED INFORMATION PROCESSING

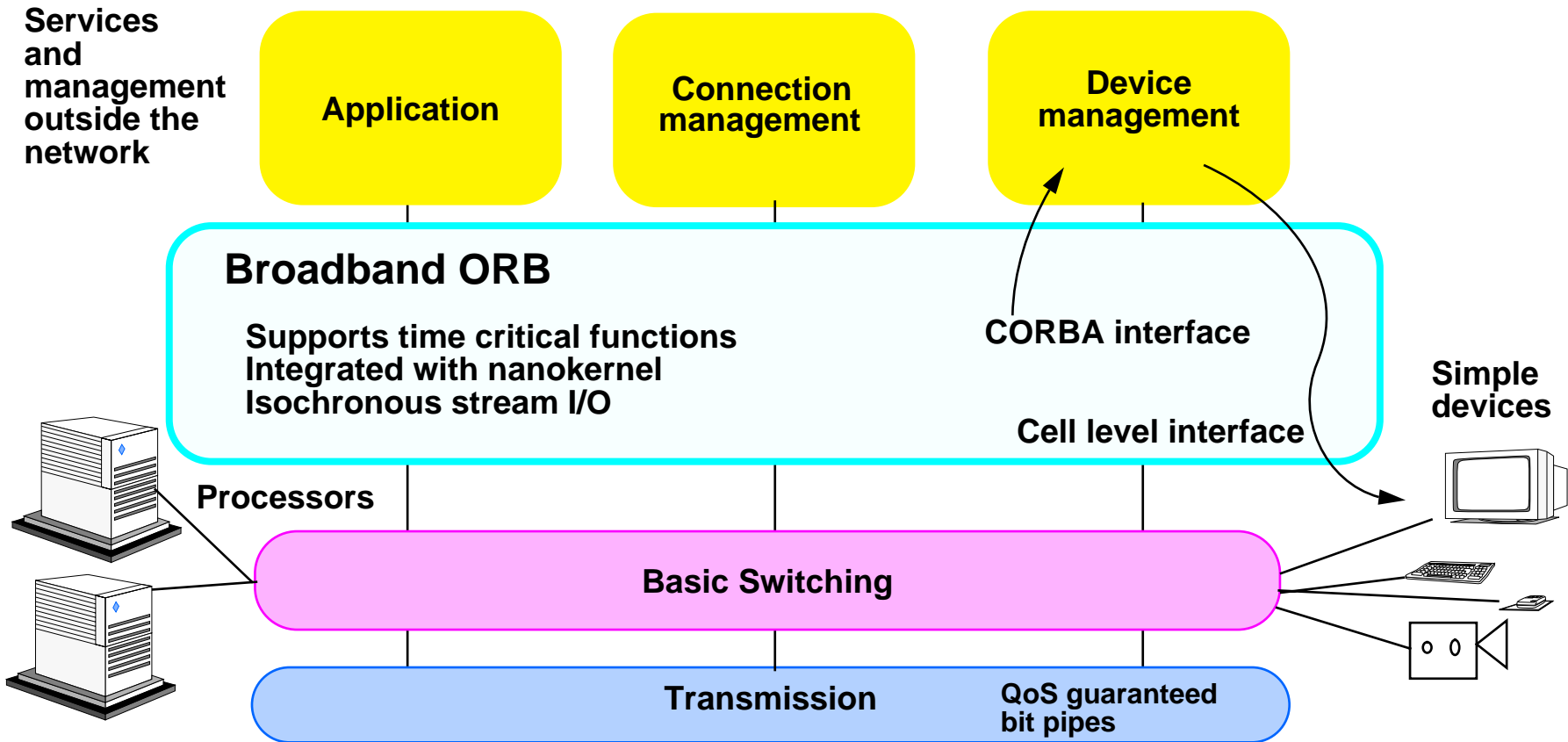
- **Business process driven (e.g. case work)**
- **Declarative (e.g. scripting, event-condition-action, deductive, ...)**
- **Semantic understanding of applications**
 - **Agent-based computing with feature interaction resolution**
 - **automatic content-based indexing, analysis and transformation and retrieval of information resources in a whole range of media**
- **Loose information consistency**
 - **robust, self healing algorithms and data models**
- **Charging and licensing services in federated systems**
- **Mobility**
 - **Detached information handling and subsequent reconciliation**

4: SYNTAX INDEPENDENT PROGRAMMING

- Store source as an Abstract Syntax Tree (AST)
 - Transformation tools convert from high to low level
 - Debuggers, checkers, compilers, editors work on tree
- Read in legacy code
- More expressive programming
- Cross-language re-use
- Called *Intentional Programming* by MicroSoft
- ASTs used in ANSA tools since 1991



5: Distributed Control Of Broadband Multimedia Networks





6: END-TO-END SECURITY

- **Secure operating systems don't scale or interoperate**
 - Move security out into the applications
 - Provide a library of security functions
 - Only require *ENCAPSULATION* from operating system
- **Principles:**
 - Develop business driven models for setting up and managing dynamic networks of trust
 - Self-defence
 - Transfer authority (delegation)
 - Transfer trust



CONCLUSIONS

- **Interoperability is more important than portability**
- **Small nanokernel to support distributed objects**
- **End-to-end management of security and quality of service**
- **Broadband and multimedia require new-style operating systems**
- **Increasing automation/intelligent help through agents**