The Future of REXX

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Pages 34-49

The Future of REXX

"Cyberspace"
Internet

"Classic"
REXX

Object
Oriented
REXX

Networked
computing

Agents

Evolution of REXX
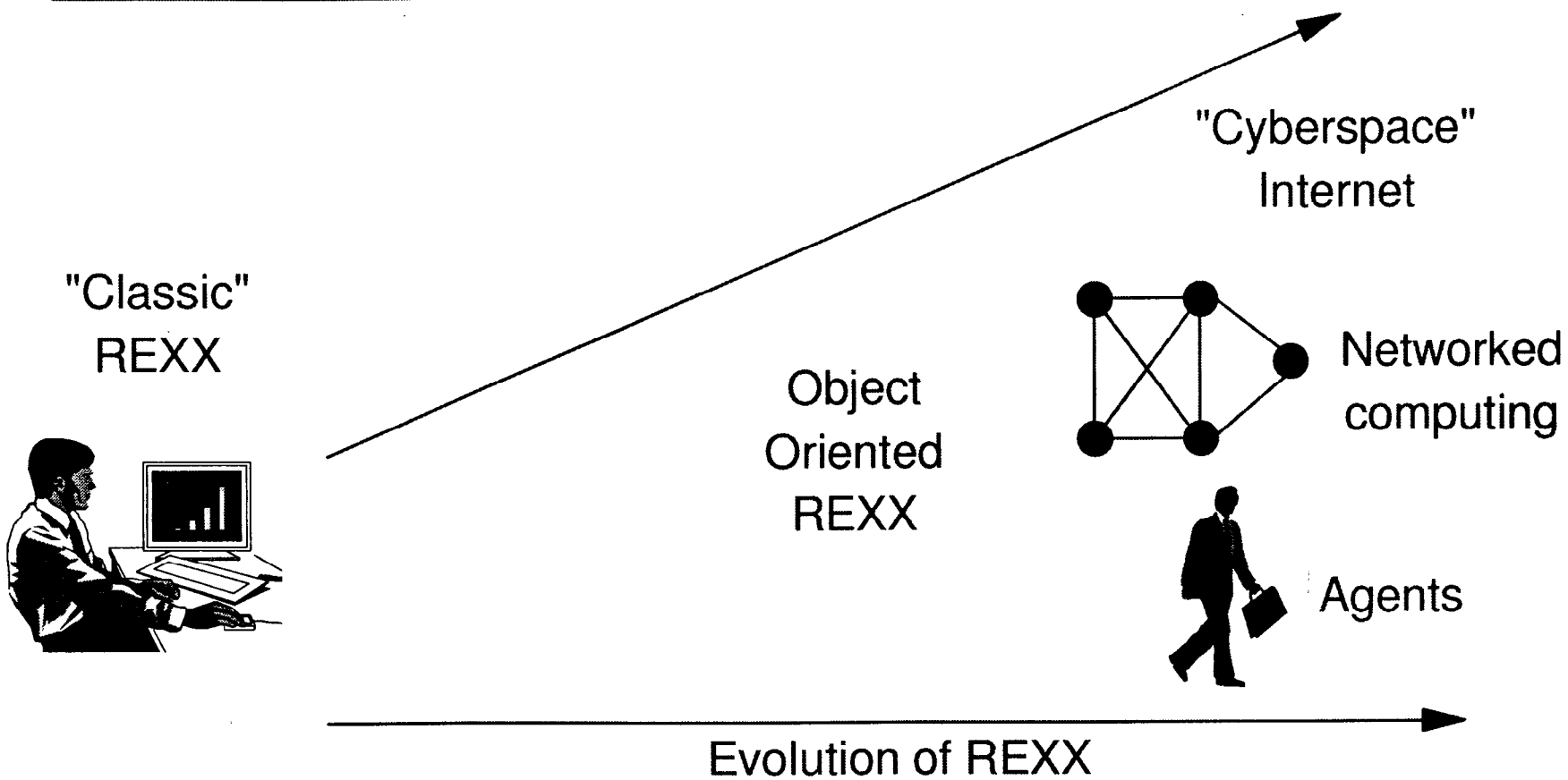
T. S. Browne   5/1/95   IBM Endicott

REXX Mission

- Continue to support users of "Classic" REXX products
- Continue to evolve "Classic" REXX into Object REXX
- Make Object REXX pervasive across platforms and applications
- Align Object REXX with key technologies and standards
- Facilitate the creation of software agents and the environment they operate in
- Get others to exploit, build, and use our software agent technology

Open Scripting Products

1994 Accomplishments

- OREXX

4/94	OS/2 Beta
10/94	AIX Alpha
11/94	AIX Beta
11/94	OS/2 Developer's Connection
11/94	Windows Alpha

- Classic REXX

3/94	Netware GA
7/94	CICS GA
7/94	DOS GA
12/94	OS/400 GA

REXX Requirements Summary

Requirements#	Description	Current Status	New Status
SOUIZ91007, SALANG90203	REXX for AIX	AIX/6000: Rejected AIX PS/2 Future Objective	AIX/6000: Available as PRPQ#
SALANG90206	Remove 500 char. limit on statement length	Available on OS/2 only. Future objective on other systems	Available on all IBM REXX implentations
SOMVSE93027	IBM should provide a richer suite of debugging tools for REXX	Under study	Future Objective
SAREXX90210	Pull instruction should not type a "?"	Accepted	Available - OS/2 2.0 GA 3/92
SAREXX90211	Document PARSE rules explicity and formally	Accepted	Available
SOCMSX89023	REXX file I/OON Implement CMS REXX	Accepted	Available
SALANG89205	Extend DATE function	Long Range Consideration	Accepted
SALANG89201	Implement REXX File I/O functions that will read/write files both sequentially and randomly	OS/2 Available TSO Long Range Consideration AS/400 Future Objective VM Accepted	VM Available TSO Accepted
SALANG89204, SOCMSX89056	Allow expressions in Compound variables	Long Range Consideration	Accepted
SALAN90204	Share variables between external REXX Functions	Long Range Consideration	Accepted
SAREXX92002	Object Oriented Extensions	Long Range Consideration	Accepted
SAREXX91001	Call through expressions	Long Range Consideration	Accepted
SOCMSX89026	Traverse Stem variables	Long Range Consideration	Accepted
SAREXX91201	Improve Error Messages	Long Range Consideration	Accepted
SOCMSX89008	Passing Stems to Subroutines	Long Range Consideration	Accepted
SAA REXX	Generic Bindings	Long Range Consideration	Accepted
G05CME91003	Date processing in REXX	Long Range Consideration	Accepted

Pervasiveness

Platforms

	Classic	Complier/RTL	OO
OS/2	X		1995
PPC			1995
MVS	X	X	1995
AIX	X		1995
VM	X	X	1996
Windows			1995
LINUX			1995
NetWare	X		
DOS	X		
CICS	X		
AS/400	X		
VSE	X	X (RTL only)	

OEM Platforms
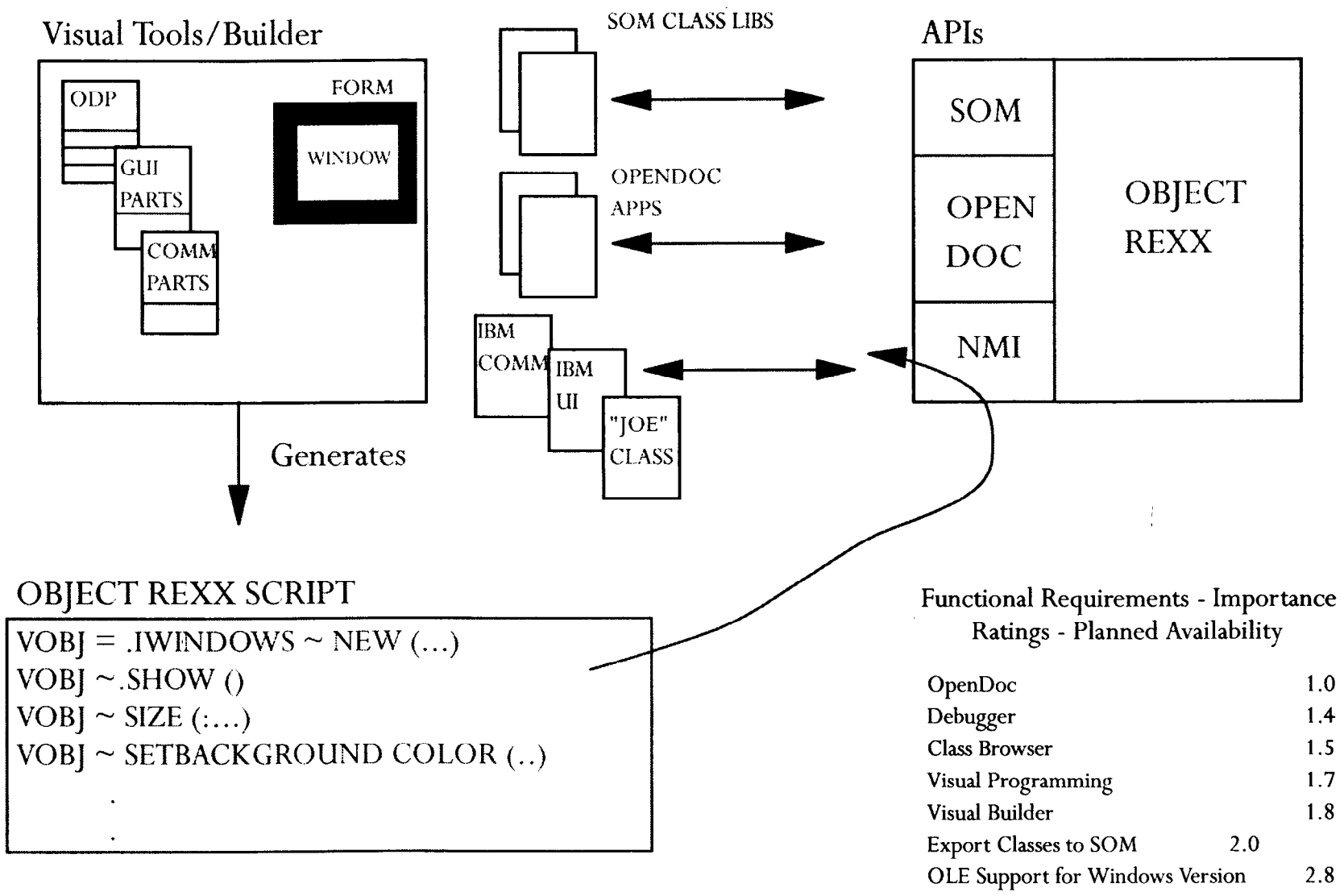
PC DOS
NetWare
Amiga
Windows
DCE/VAX

Future Considerations

PDAs

Object REXX Exploits OO Technologies

- **Object Oriented Programming**
  - Encapsulation, Inheritance, Polymorphism
    - Object REXX supports IBM's SOM
  - Object Oriented Documents
    - Embedded, Composite documents
    - Documents as a new programming model
      - Object REXX is the OPENDOC scripting language
  - Object Oriented Visual Programming
    - Programming via direct manipulation of icons
      - Object REXX support of VisualAge
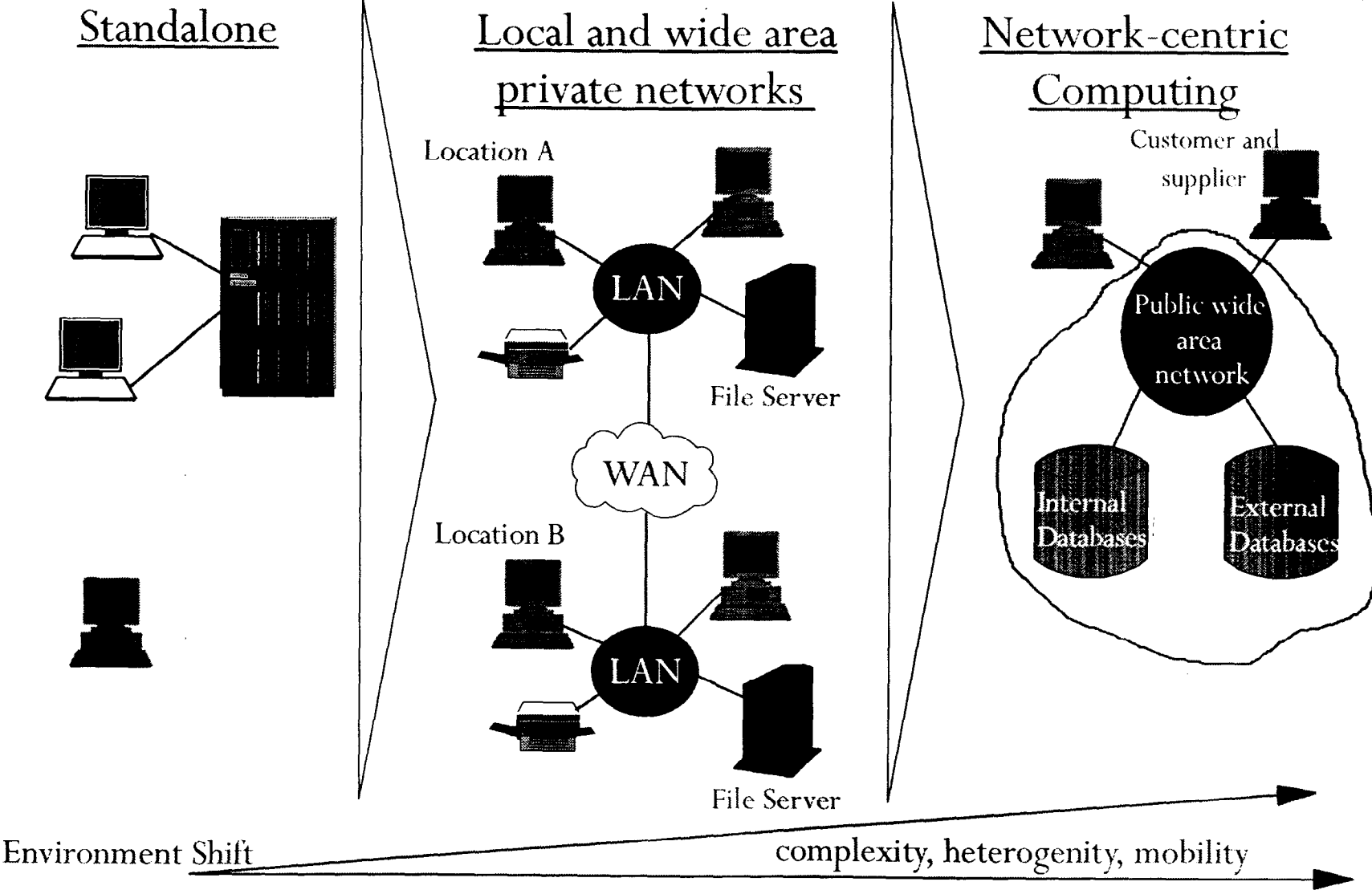
Object REXX Programming Environment

Visual Tools/Builder

ODP

GUI PARTS

COMM PARTS

FORM

WINDOW

Generates

SOM CLASS LIBS

OPENDOC APPS

IBM COMM

IBM UI

"JOE" CLASS

APIs

SOM	OBJECT REXX
OPEN DOC	
NMI	

OBJECT REXX SCRIPT

```
VOBJ = .IWINDOWS ~ NEW (...)
VOBJ ~.SHOW ()
VOBJ ~ SIZE (:....)
VOBJ ~ SETBACKGROUND COLOR (..)
```

Functional Requirements - Importance Ratings - Planned Availability

OpenDoc	1.0
Debugger	1.4
Class Browser	1.5
Visual Programming	1.7
Visual Builder	1.8
Export Classes to SOM	2.0
OLE Support for Windows Version	2.8

Shift Towards Network Centric Computing

Standalone

Local and wide area private networks

Network-centric Computing

Location A

LAN

File Server

WAN

Location B

LAN

File Server

Customer and supplier

Public wide area network

Internal Databases

External Databases

Environment Shift — complexity, heterogenity, mobility

Making "The Customer" Centric in Network Centric Computing

- **Agent Services...**
  - **Personalized Information Retrieval**
    - **News Services**
    - **Mail Filtering**
    - **Internet Surfing**
      - Travel Information
      - Medical Information
      - etc.
  - **Personalized Event Notification**
    - **Network Mangement**
    - **Reservation Alerts**
    - **Personal Scheduler**
  - **Personal Transaction Services**
    - **Banking**
    - **Business Services**
      - Food Services
      - Retail Stores
      - etc.
- **Agent "Meeting Places"...**
  - **Store Fronts**
  - **Information Databases**
  - **Trading Floors**

A Model for Agents and Agent "Meeting Places"

tcp

moderators

router

agency server
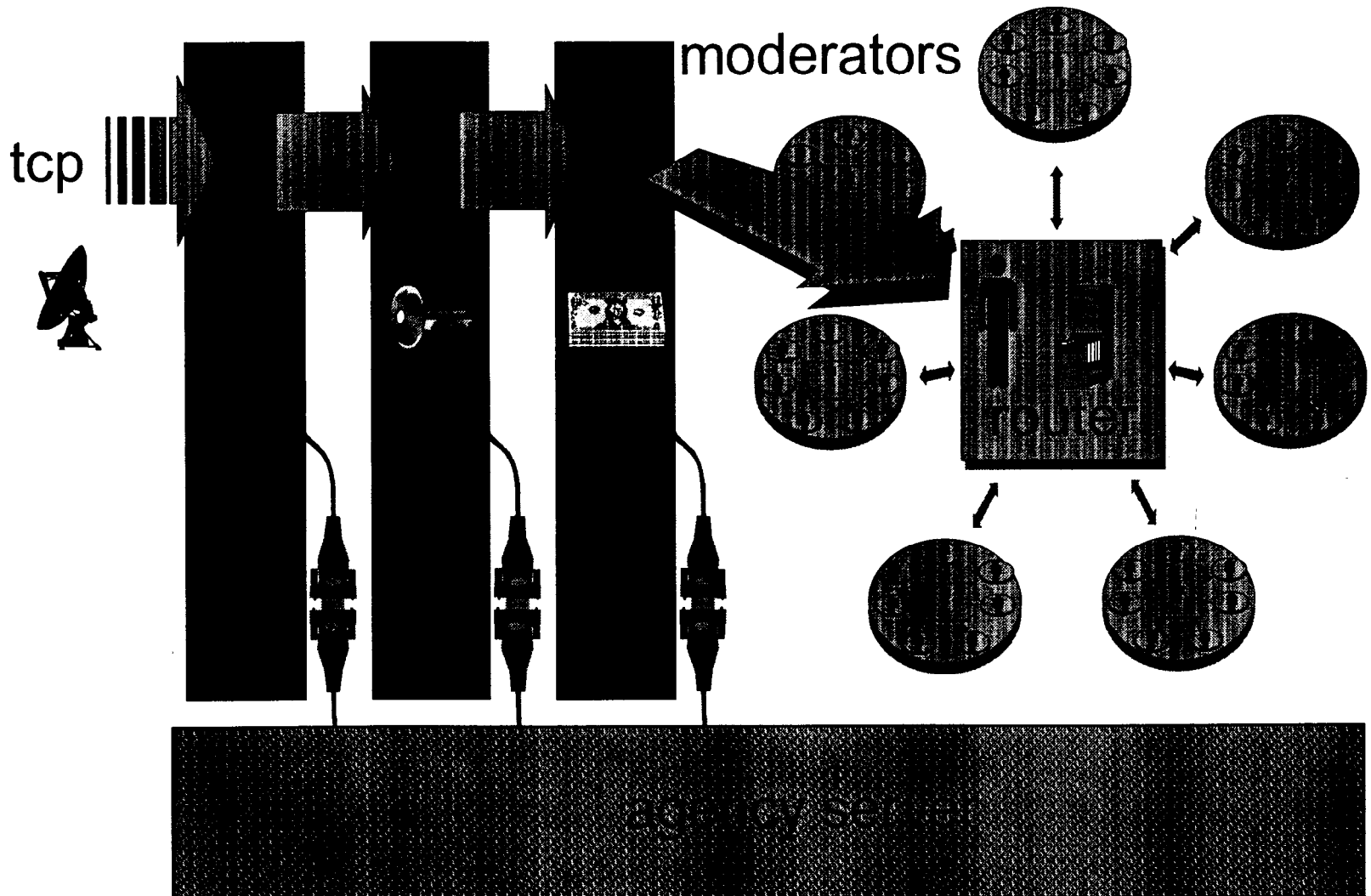
Demonstration

Moyles Auction
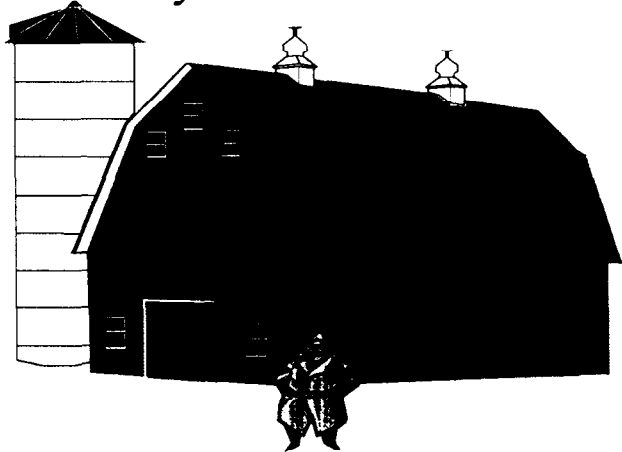
Auctioneer

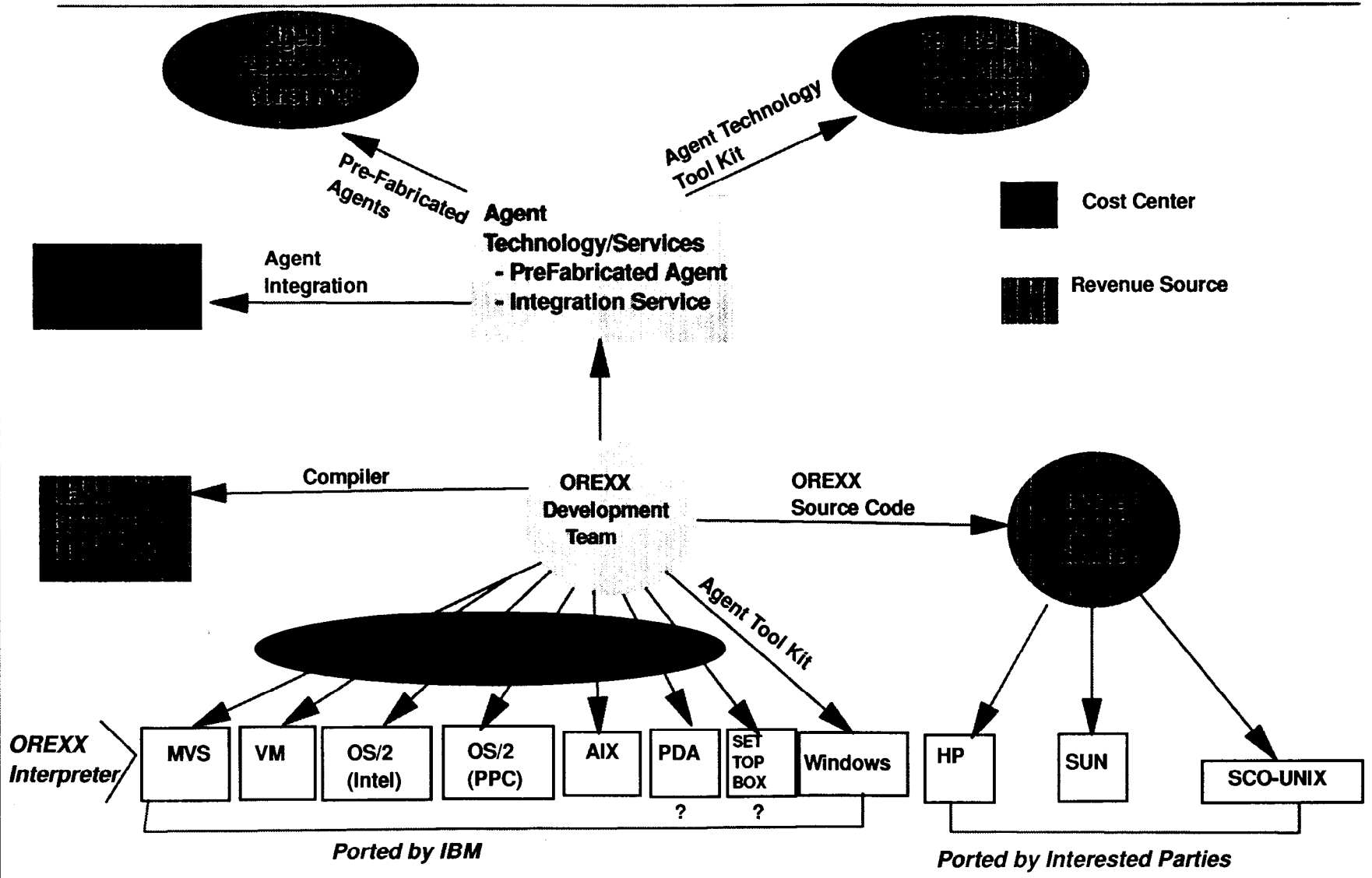Your Agent

Internet
TCP/IP
WWW Explorer

Auction is **Good Test** of Agent Technology
- Agent working on Users behalf
- Agents have guildelines ($100 maximum bid)
- Agent interaction at meeting place (bidding process)
- Value of a moderator (auctioneer)

Demonstrates
- Agent Technology
  - Mobile Agents
- Meeting Place
  - Cooperative Processing

REXX Business

Cost Center

Revenue Source

Agent Technology/Services
- PreFabricated Agent
- Integration Service

Pre-Fabricated Agents

Agent Technology Tool Kit

Agent Integration

Compiler

OREXX Development Team

OREXX Source Code

Agent Tool Kit

OREXX Interpreter

MVS	VM	OS/2 (Intel)	OS/2 (PPC)	AIX	PDA	SET TOP BOX	Windows
					?	?	

HP	SUN	SCO-UNIX

Ported by IBM

Ported by Interested Parties

TSB00004-14   04/28/1995

Summary

- **REXX has a bright future:**

  - Substantial progress made against existing requirements

  - REXX language is being extended to other platforms

  - REXX is evolving it's application development role for network centric computing

Problems "the Shift" Creates

- **Access to needed information is:**
  - **Difficult due to complexity of the environment**
    - numerous network services with a multitude of online services
    - mobility in work force increasing

  - **Not always timely and/or relevant**
    - information overload
    - insufficient technology

  - **Labor and effort intensive**
    - manual

Our Approach to the Problem

- Provide "Agent Technology" where agents act on behalf of end users
- Turn data sources into "Meeting Places" where agents go to perform assigned tasks
- Turn end-users into information consumers rather than information seekers