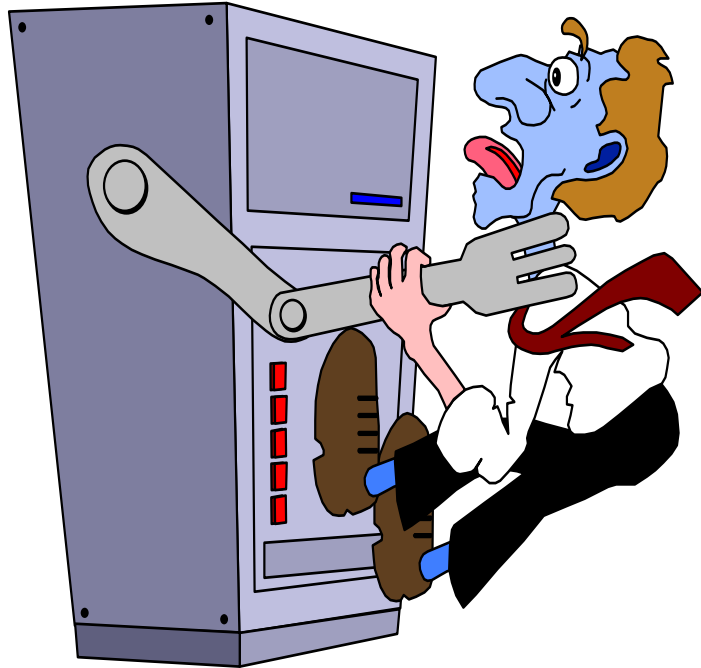


Costs and Barriers to Government Inter- Agency and Industry Data Exchange

***Richard Eastman
President
The Eastman Group, Inc.***

Hardware Centric 1960's



- LOTS OF DATA
- SOLUTION SPECIFIC
- DATA RETRIEVAL

**DRIVEN BY HARDWARE DESIGN ISSUES
MAINFRAME ARCHITECTURES**

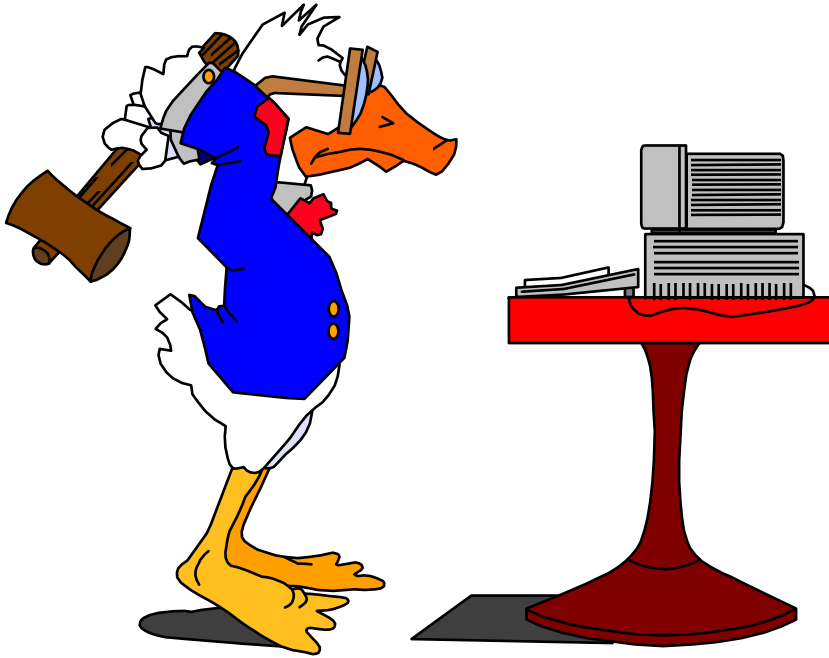
Software Centric 1970's



- DATA PROCESSING
- STRUCTURED
- “CONTAINERIZED”

**PRIMARY/KEY BUSINESS SOLUTIONS
MINICOMPUTER ARCHITECTURES**

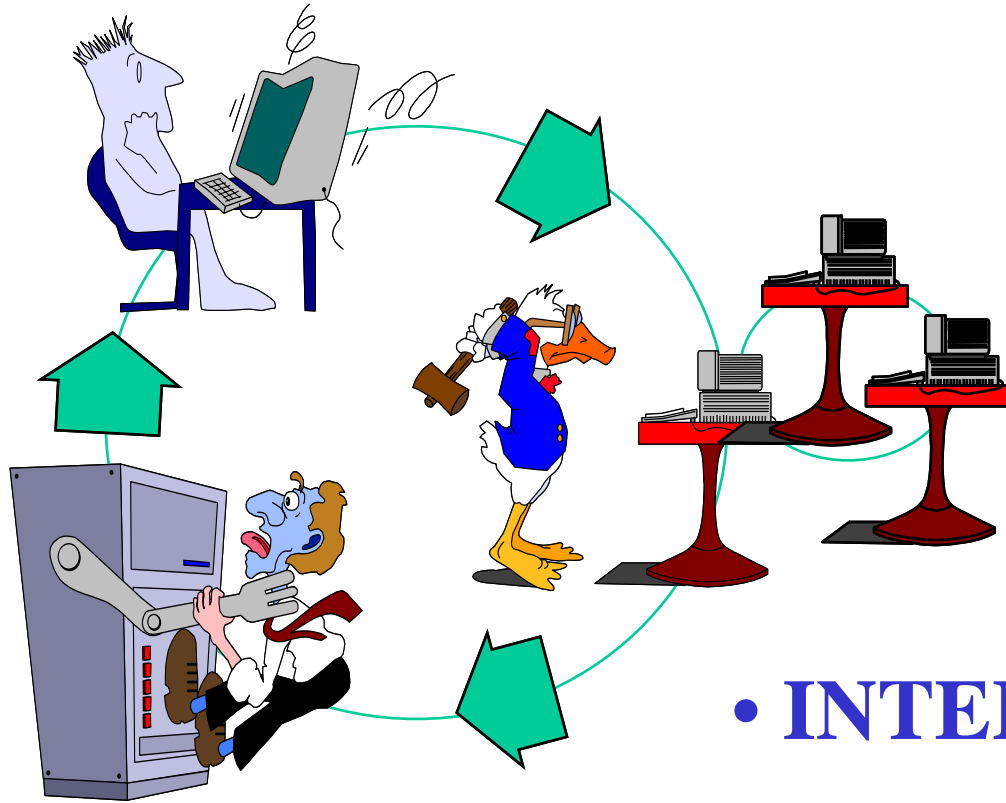
Task Centric 1980's



- TASK SPECIFIC
- ADAPTABLE
- PERSONAL USE

**INDIVIDUALIZED BUSINESS TOOLS
MICROCOMPUTER (PC) ARCHITECTURE**

Communications Centric 1990's



• TRANSPARENT

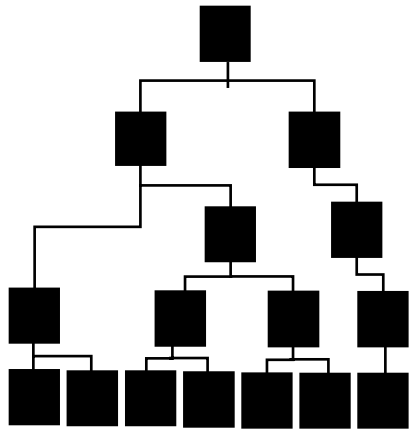
• LAN/WAN's

• INTERNET/INTRANET

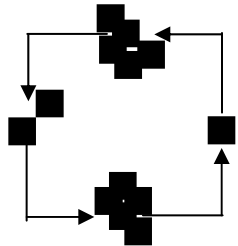
**MAKING THE DIFFERENT PLATFORMS
“TALK” TO EACH OTHER**

Transitioning Eras...

Industrial Age

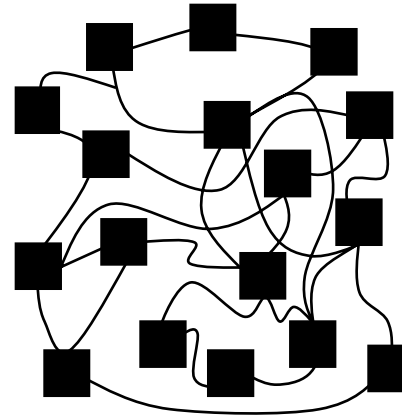


Information flows from hub-centers through controlled hubs or hosted gateways to users ...



- *Supply-Driven Information*

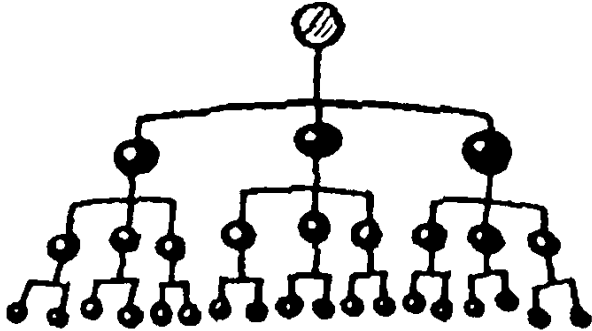
Information Age



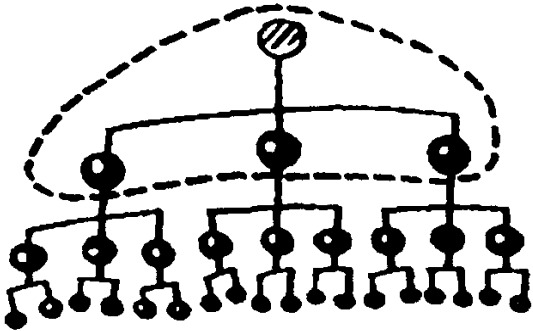
Information flows digitally and is shared by everyone ... information becomes interactive...

- *Demand-Driven Information*

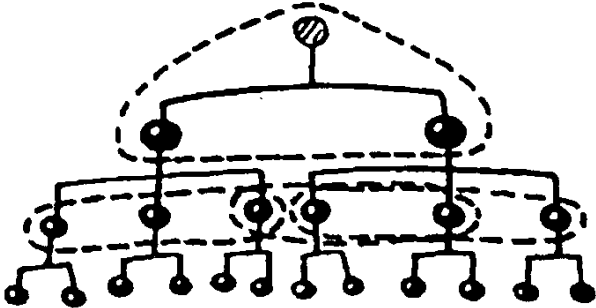
From "Imaginization" : Gareth Morgan©1997



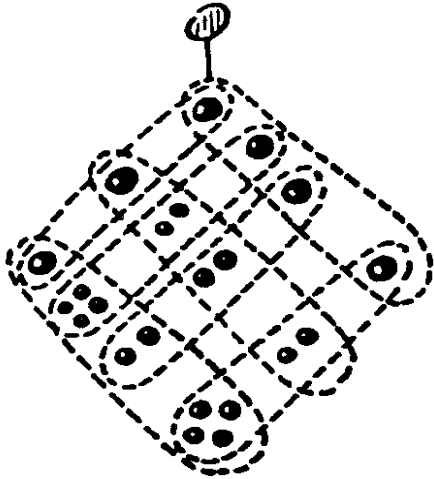
Model 1: The Rigid Bureaucracy



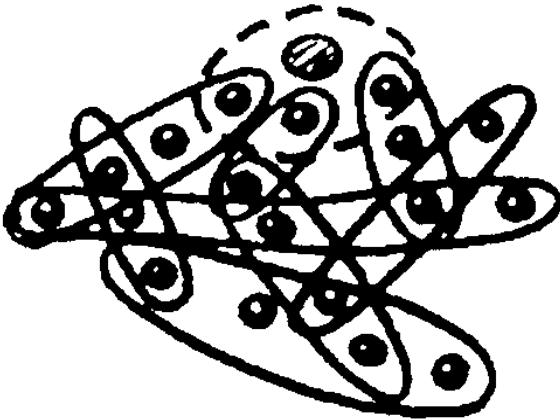
Model 2: The Bureaucracy With a Senior "Management Team"



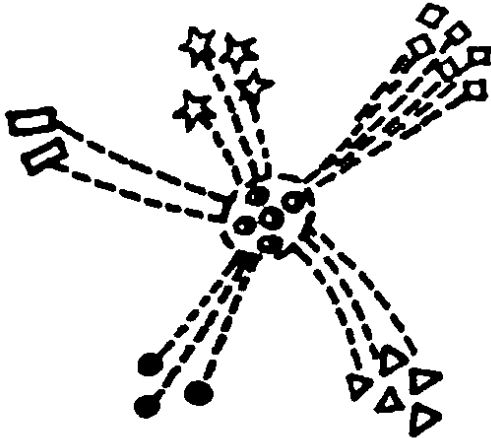
Model 3: The Bureaucracy With Project Teams and Task Forces



Model 4: The Matrix Organization



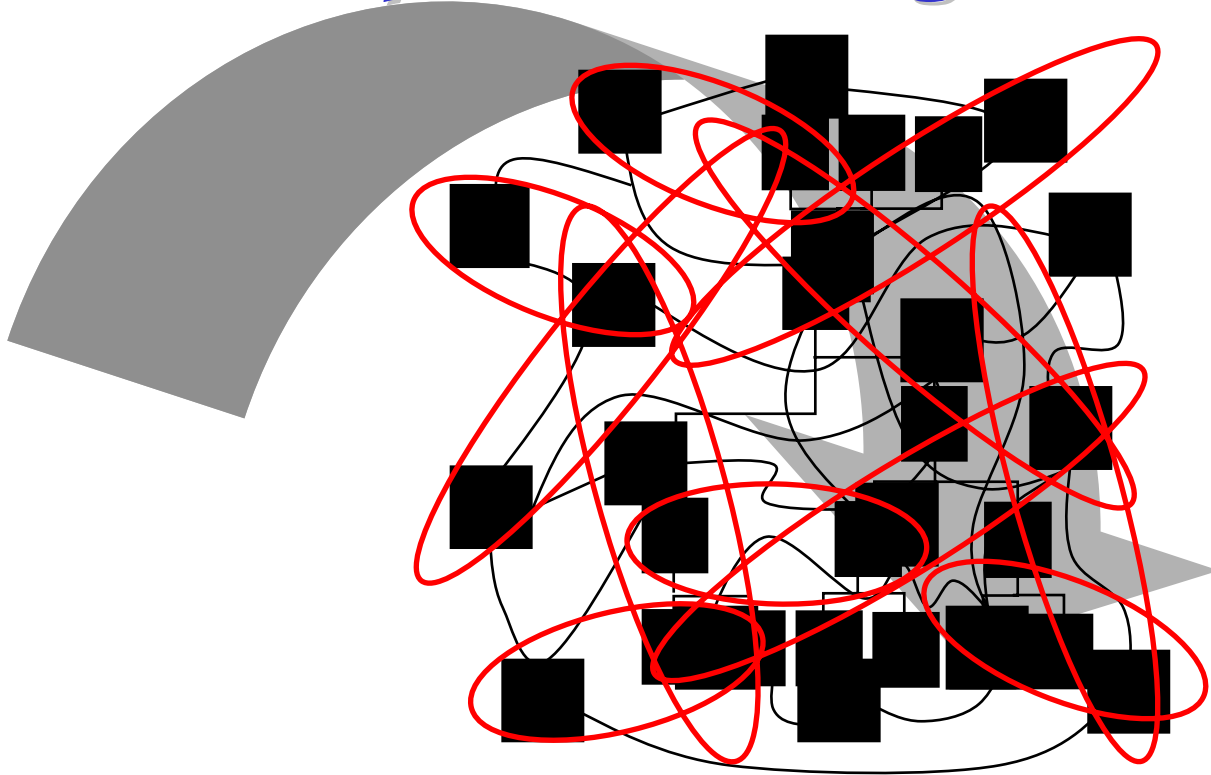
Model 5: The Project Organization



Model 6: The Loosely-Coupled Organic Network

Structures are changing the way people relate to one another

In the Information Age...



*Information flows digitally and is shared by everyone...
Transaction Processing becomes transparent...*

Humans Drive Technology
Buyers Drive Suppliers
Operations Integrate with Information
Context More Important than Content

Effecting the World ... Economics • Politics • Knowledge

Some Comparisons...



Programmer Salaries

Salaries for TPF-type or code-intensive programmers are 10-15% higher than highest comparable skills in newer programming languages¹ ...

Since most are generally “dead” languages, the learning curve is generally more than double to acquire comparable programming proficiency

Range...

Programmer Analyst

\$53,250 - \$80,500

+10% for C++

+5-15% for XML

+5% for VB

Team Leader

\$78,500 - \$108,500

+ skill-type

Assuming long term retention, normal attrition, and burden ... effective salary costs are more than 1.5 times competitive industry costs!

1. Source: Robert Half Technology

Some Comparisons...

Coding Requirements...

Count Words; Assembler 1

```
*****  
; Program to count the number of words in a file. Words are  
; delimited by whitespace  
*****  
    DOSSEG                ;select standard segment-ordering  
    .MODEL SMALL          ;code and data each fit in 64K  
    .STACK 200h           ;512-byte stack  
    .DATA  
Count    DW 0             ;used to count words  
InWhitespace DB ?        ;set to 1 when the last  
                        ; character read was whitespace  
TempChar  DB ?           ;temporary storage used by  
                        ; GetNextCharacter  
Result    DB 'Word count: ', 5 DUP (?)  
                        ;string printed to report the count  
CountInsertEnd LABEL BYTE ;used to find the end of the area the  
                        ; count value string is stored in DB  
                        ; 0dh,0ah,'$' OS fn #9 expects strings to  
                        ; end with a dollar sign  
  
    .CODE  
ProgramStart:  
    mov ax,@data  
    mov ds,ax             ;point DS to the .DATA segment  
    mov [InWhitespace],1 ;assume we're in whitespace, since  
                        ; the first non-whitespace we'll find  
                        ; will mark the start of a word  
  
CountLoop:  
    call GetNextCharacter ;get next character to check  
    jz  CountDone         ;...if any  
    call IsCharacterWhitespace ;is it whitespace?  
    jz  IsWhitespace      ;yes
```

```
    cmp [InWhitespace],0 ;character is not  
                        ; whitespace-are we currently in  
                        ; whitespace?  
    jz  CountLoop        ;we're not in whitespace, and the  
                        ; character isn't whitespace, so  
                        ; we're done with this character  
    inc [Count]          ;we are in whitespace, and the  
                        ; character is not whitespace, so  
                        ; we just found the start of a new word  
    mov [InWhitespace],0 ;mark that we're no longer in  
whitespace  
    jmp CountLoop        ;do the next character  
IsWhitespace:  
    mov [InWhitespace],1 ;mark that we're in whitespace  
    jmp CountLoop        ;do the next character  
  
; We're done counting--report the results.  
; CountDone:  
    mov ax,[Count]       ;number to convert to a string  
    mov bx,OFFSET CountInsertEnd-1 ;point to the end  
                        ; of the string to  
                        ; put the number in  
    mov cx,5             ;number of digits to convert  
    call ConvertNumberToString ;make the number a string  
    mov bx,OFFSET Result ;point to result string  
    call PrintString      ;print the count  
    mov ah,4ch           ;DOS terminate program fn #  
    int 21h              ;end the program
```

Some Comparisons...

Coding Requirements...

```
; Subroutine to get the next character from the standard input.
;
; Input: None
;
; Output:
;   AL = character, if one was available
;   Z flag = 0 (NZ) if character available,
;           = 1 (Z) if end of file reached
;
; Registers destroyed: AH, BX, CX, DX
;
GetNextCharacter PROC
    mov  ah,3fh          ;DOS read from file fn #
    mov  bx,0           ;standard input handle
    mov  cx,1           ;read one character
    mov  dx,OFFSET TempChar ;put the character in TempChar
    int  21h           ;get the next character
    jc   NoCharacterRead ;if DOS reports an error, then treat
                        ; it as the end of the file
    cmp  [TempChar],1ah ;was it Control-Z?
                        ; (marks end of some files)
    jne  NotControlZ    ;no
NoCharacterRead:
    sub  ax,ax          ;mark no character read
NotControlZ:
    and  ax,ax          ;set Z flag to reflect whether a
                        ; character was read (NZ), or the
                        ; end of the file was reached (Z).
                        ; Note that DOS fn #3fh sets AX to
                        ; the number of characters read
```

Count Words; Assembler 2

```
mov  al,[TempChar]    ;return the character read
ret                    ;done
GetNextCharacter ENDP
;
; Subroutine to report whether a given character is whitespace.
;
; Input:
;   AL = character to check
;
; Output:
;   Z flag = 0 (NZ) if character is not whitespace
;           = 1 (Z) if character is whitespace
;
; Registers destroyed: none
;
IsCharacterWhitespace PROC
    cmp  al,' '        ;is it a space?
    jz   EndIsCharacterWhitespace ;if so, it's whitespace
    cmp  al,09h        ;is it a tab?
    jz   EndIsCharacterWhitespace ;if so, it's whitespace
    cmp  al,0dh        ;is it a carriage return?
    jz   EndIsCharacterWhitespace ;if so, it's whitespace
    cmp  al,0ah        ;is it a linefeed? If so,
                        ; it's whitespace, so return Z;
                        ; if not, it's not whitespace,
                        ; so return NZ as set by cmp
EndIsCharacterWhitespace:
    ret
IsCharacterWhitespace ENDP
;
; Subroutine to convert a binary number to a text string.
;
```

Some Comparisons...

Coding Requirements...

'WORDS(<ExpC1>[,<ExpC2>])

'Returns:Numeric

'Description:Returns the number of words in <ExpC> delimited by any character in optional

'<ExpC2>.The default for <ExpC2> is a Whitespace.

'Example: WORDS("This is a test of FoxTools") (returns: 6)

Public Function WORDS(ByVal cExpression As String, Optional cDelimiter = " ") As Integer

Dim lcCharacter As String

Dim lcPreviousCharacter As String

Dim InCounter As Integer

Dim InCount As Integer

Dim lcStringBuffer As String

InCounter = 0

InCount = 0

Count Words; Visual Basic

'Checking the essential parameter

If Len(cExpression) = 0 Then 'Expression is Empty

WORDS = InCounter

Exit Function

End If

'Appending a delimiter if reqd inorder to get the right word number

If InStr(cDelimiter, Right(cExpression, 1)) = 0 Then

cExpression = cExpression & Left(cDelimiter, 1)

End If

For InCount = 1 To Len(cExpression)

lcCharacter = Mid(cExpression, InCount, 1)

If InStr(cDelimiter, lcCharacter) > 0 Then

If InStr(cDelimiter, lcPreviousCharacter) = 0 Then

InCounter = InCounter + 1

lcStringBuffer = ""

End If

Else

lcStringBuffer = lcStringBuffer & lcCharacter

End If

lcPreviousCharacter = lcCharacter

Next

WORDS = InCounter

End Function

Some Comparisons...

Coding Requirements...

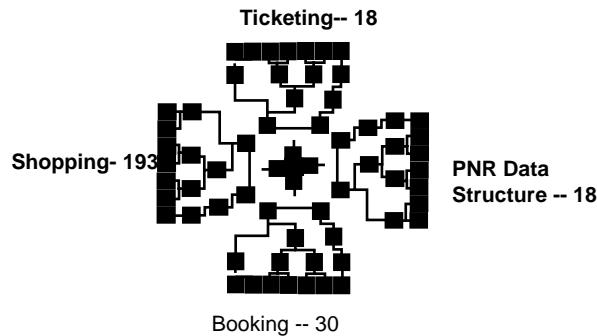
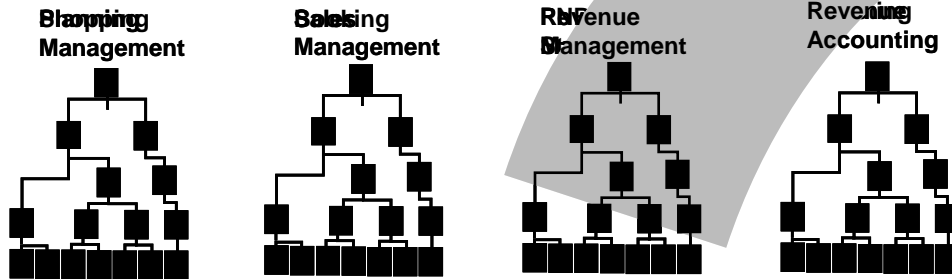
Count Words; SQL

WORDS(lcString, " ")

Some Comparisons...

Comparative Architectures

Silo Structures¹



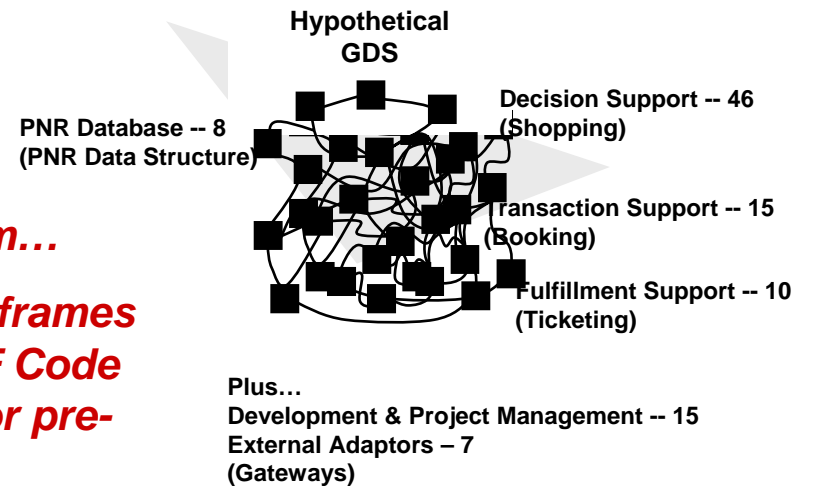
Plus ...
Development and Project Management -- 64
Front-end & Gateways -- 124

GDS Hierarchical System...

14 Clustered IBM Mainframes
6.2 Million lines of TPF Code
4 Tandem Himalayas for pre-processing structured message formats
437 Programmers/Analysts

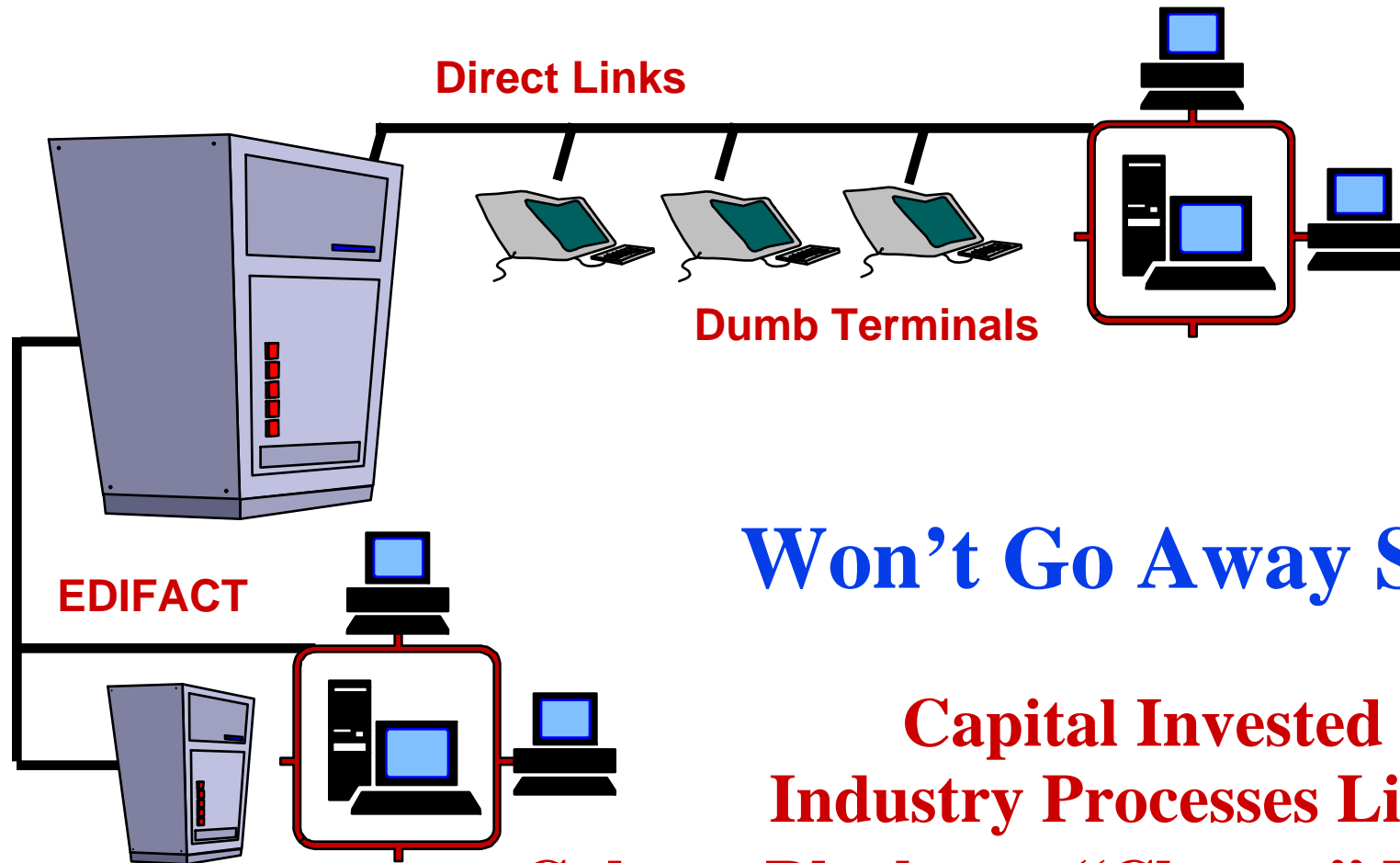
Comparable Nodal-Network²...

5-7 Clustered Sun Servers
40%-50% Licensed Code
500 Intel Pentium Processor Nodes running Linux
101 Programmers/Analysts



- A. Hardware replacement costs estimated at under 25% of current IBM Environment.
- B. Using similar salary costs, ongoing support is also under 25% of current base.

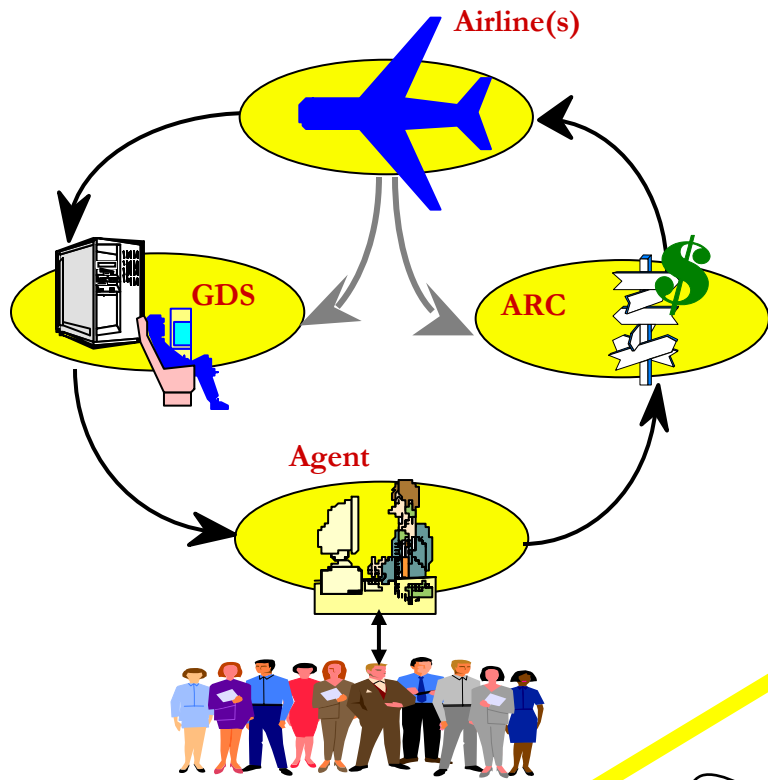
Existing Systems...



Won't Go Away Soon!

**Capital Invested Base
Industry Processes Linkages
Culture Blocks vs. "Change" Drivers**

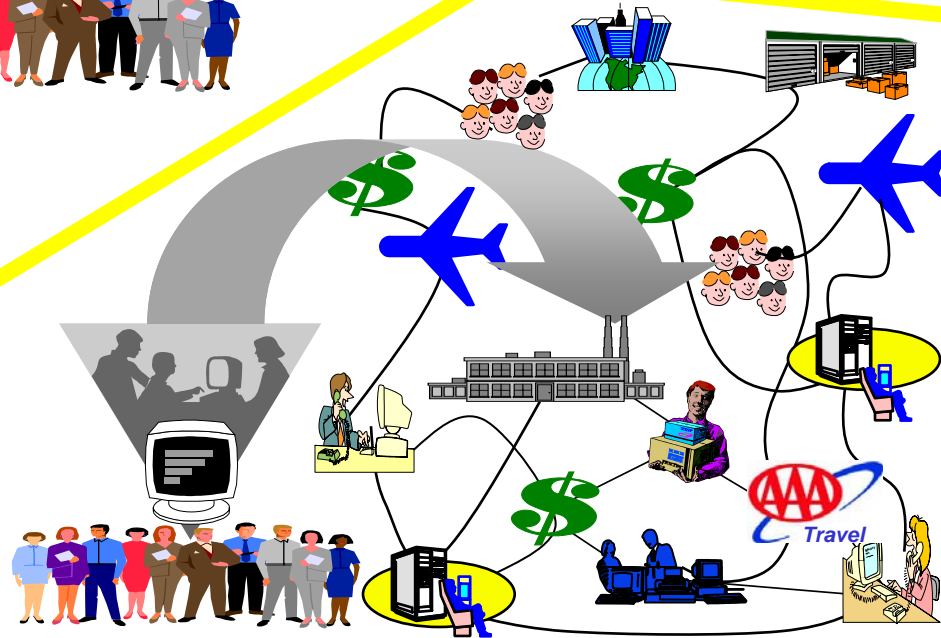
Business/Information Models...



Hierarchical



Holistic



Hyperarchy

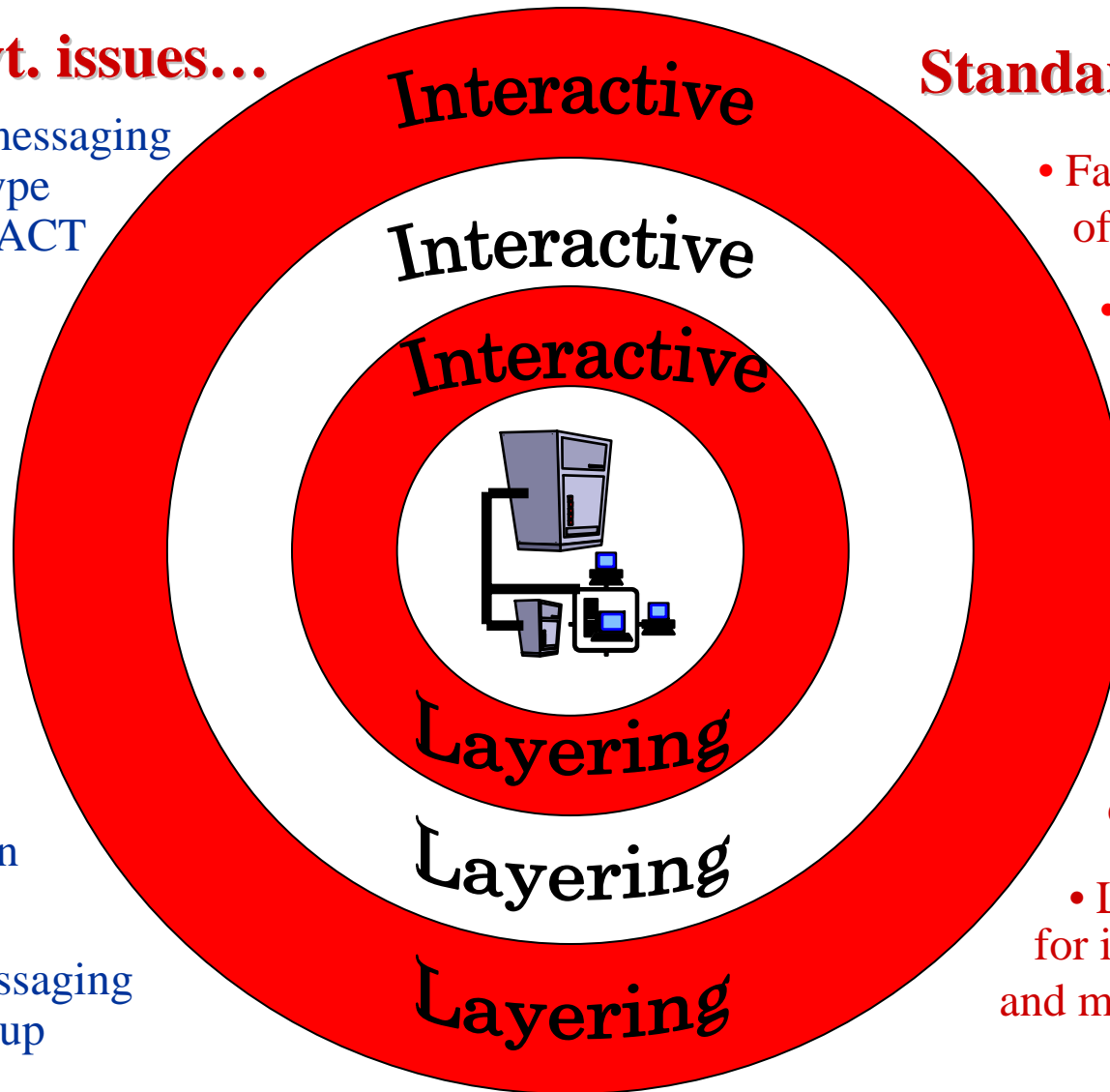
Blending Information Models...

Airline/Govt. issues...

- Two types of messaging
Type B Teletype
Type A EDIFACT
- Limitations in flexibility
- Markets evolving rapidly
- Suppliers are partnering and alliances forming
- Communication is increasing
- Traditional messaging is not keeping up

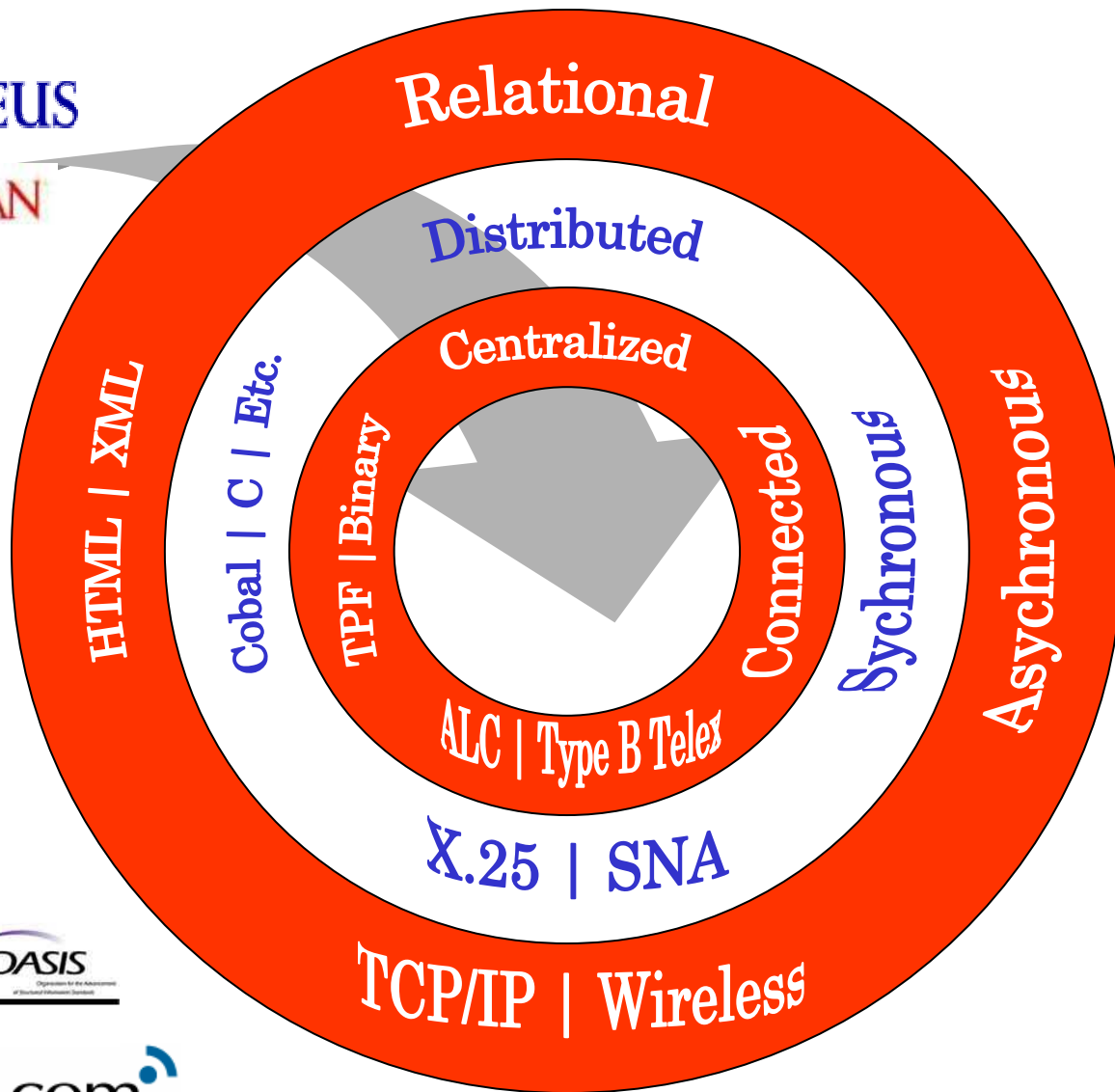
Standards/Gateway...

- Faster exploitation of the Internet
- Easier use of cross-industry technology
- Tighter integration with suppliers and customers
- Lower costs for internal support and maintenance



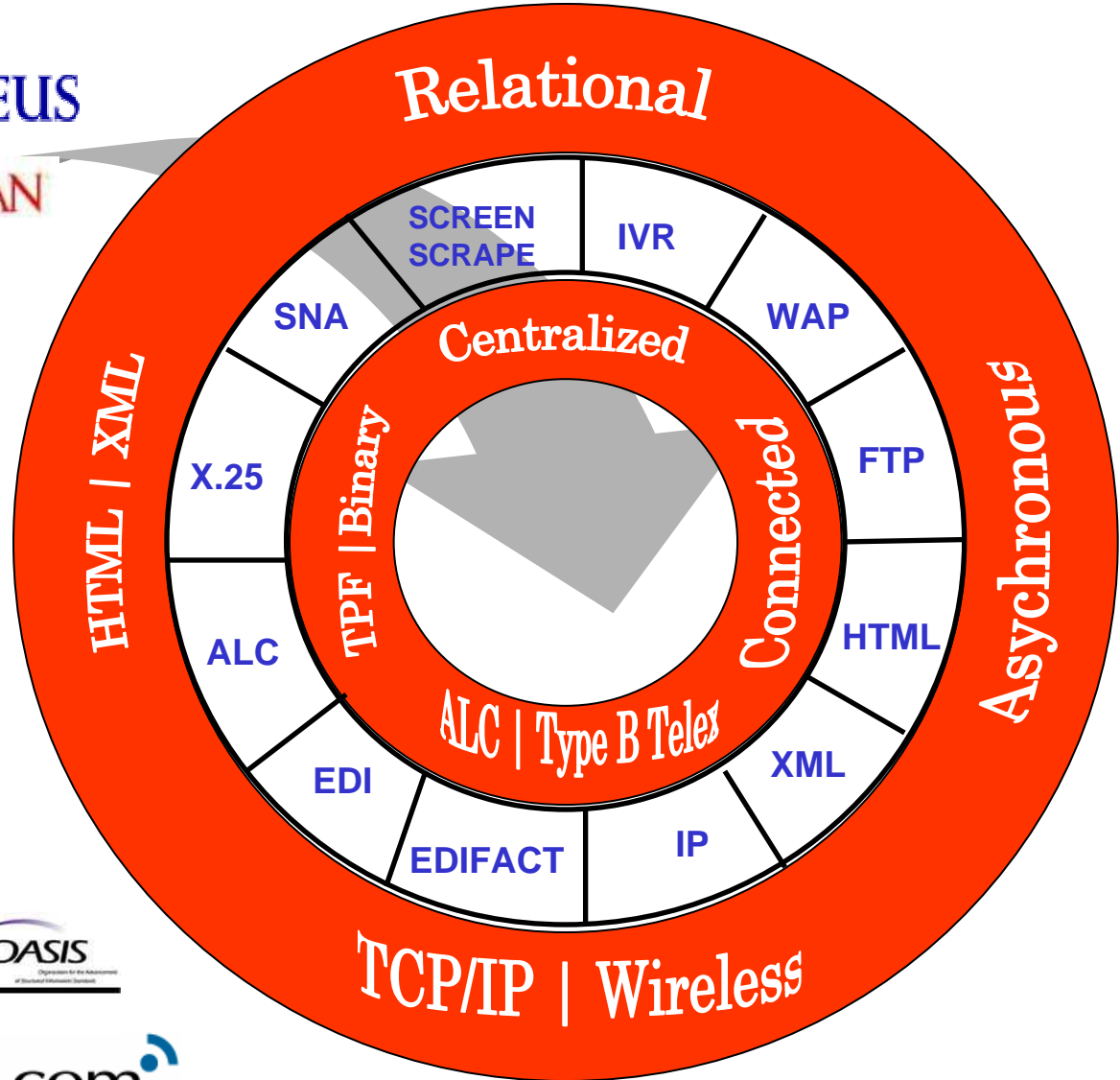
Confronted With...

TRAVEL Alliance
 OpenTravel Alliance
amADEUS
WORLDSPAN
Sabre
GALILEO INTERNATIONAL
XML/edi Group
 XML/edi Group
IFX
 IFX Forum
ASC X12
UN/EDIFACT
AutoLink™
DATALEX TRAVEL SOLUTIONS
ebXML
 Creating A Single Global Electronic Market
OASIS
 Organization for the Advancement of Structured Information Standards
Lanyon.com
 making information travel



Layered Messaging...

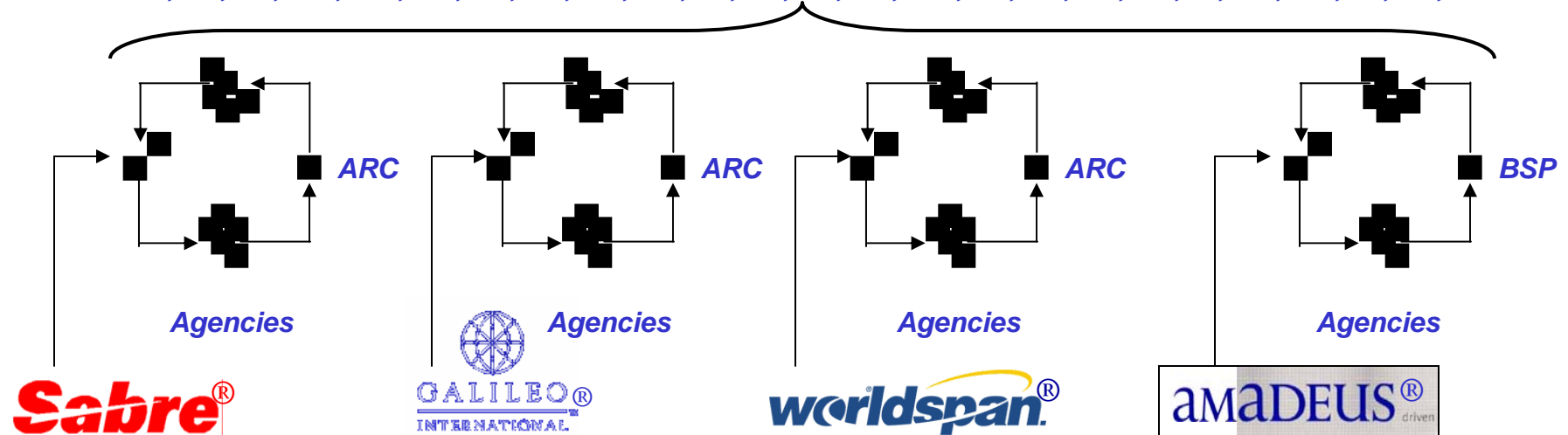
Confronted With...



Layered Messaging...

Proprietary “Silo” Structures...

AA, UL, DL, WN, NW, CO, HP, AS, AQ, HQ, TZ, LH, KL, AC, BA, AF, SR, QF, SQ, IB, MX, AM, JL, VP, ...

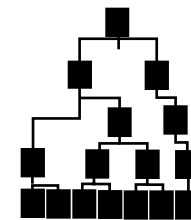
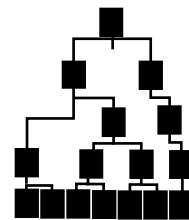
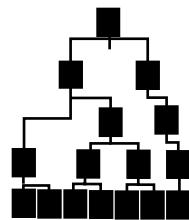
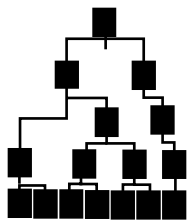


Federal
Bureau
Investigation

Central
Intelligence
Agency

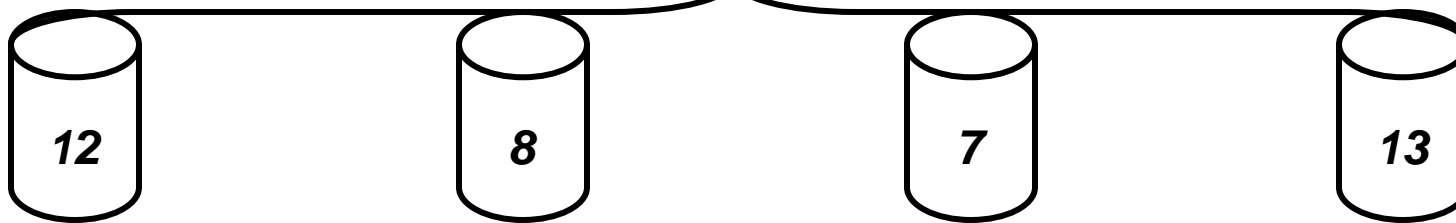
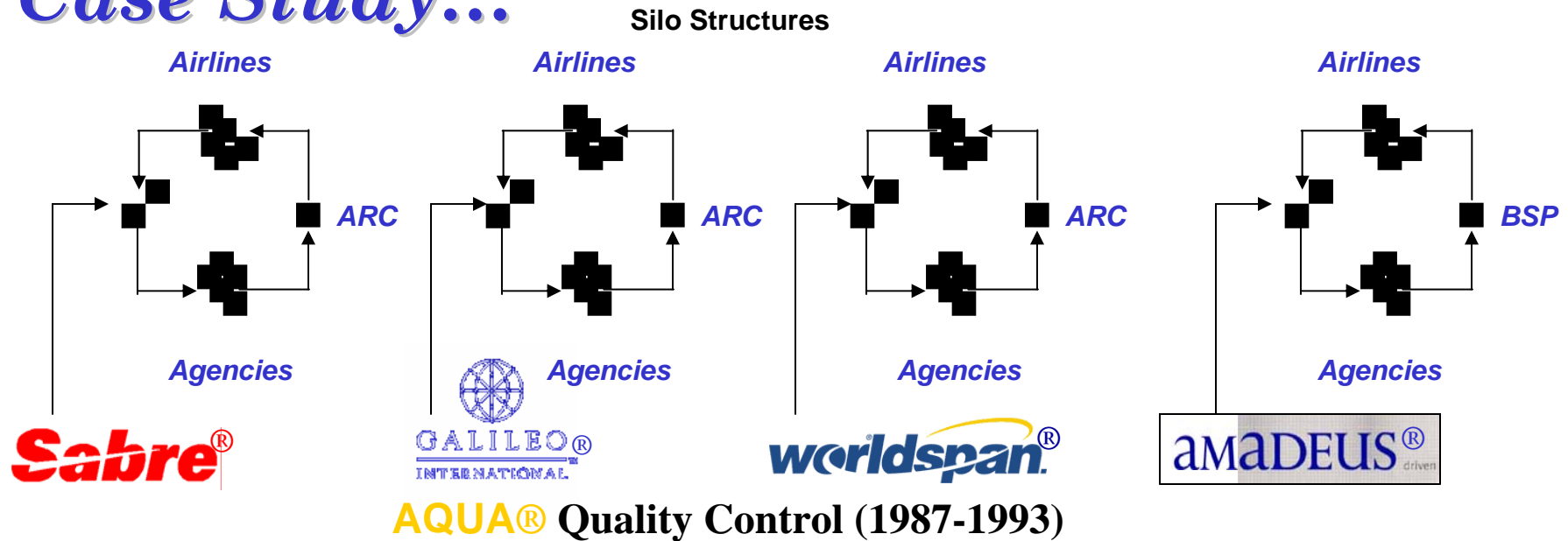
Customs

Immigration &
Naturalization



**“Proprietary” necessary to serve the competitive business
or unique agency function of each entity!!!**

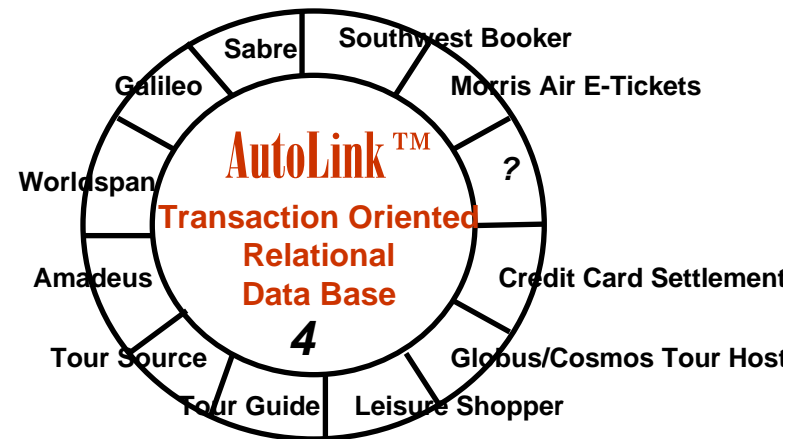
Case Study...



1. 1993 – TEG / AQUA Split

**2. How to do with 4 ...
what we had done with 40?**

**3. Created Transaction Parser
using Relational Data Base**



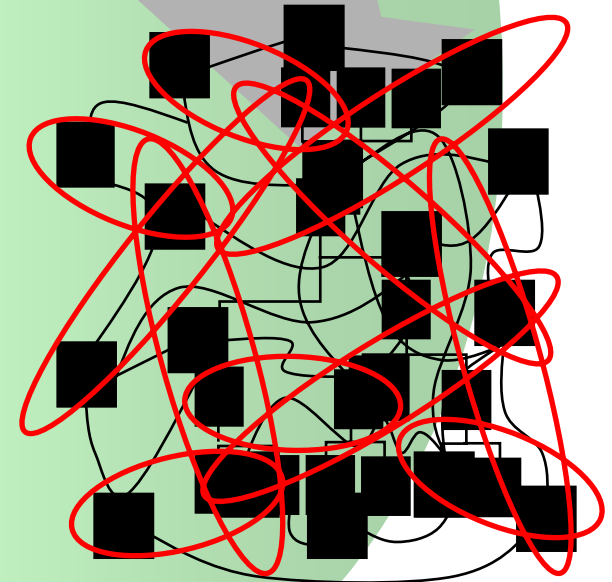
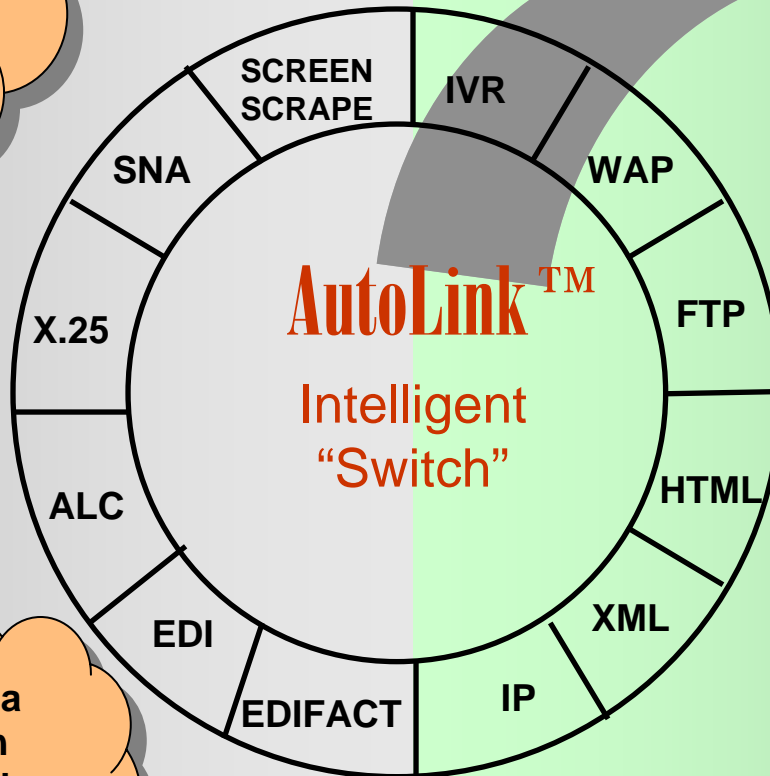
A Solution...

PA Consulting Group

TRAP "rules engine"
Terrorist Research Apprehension Program

AcuFlight, Inc.

ARINC YOU WON'T BELIEVE WHAT WE CAN DO.™
Booking Control Suite



Hyperarchy of Information

Banks
Government
Back Office
Accounting
Corporations

DavEl Limo
DoD Travel Systems
Skyjet
Globus
Brendan
Etc.

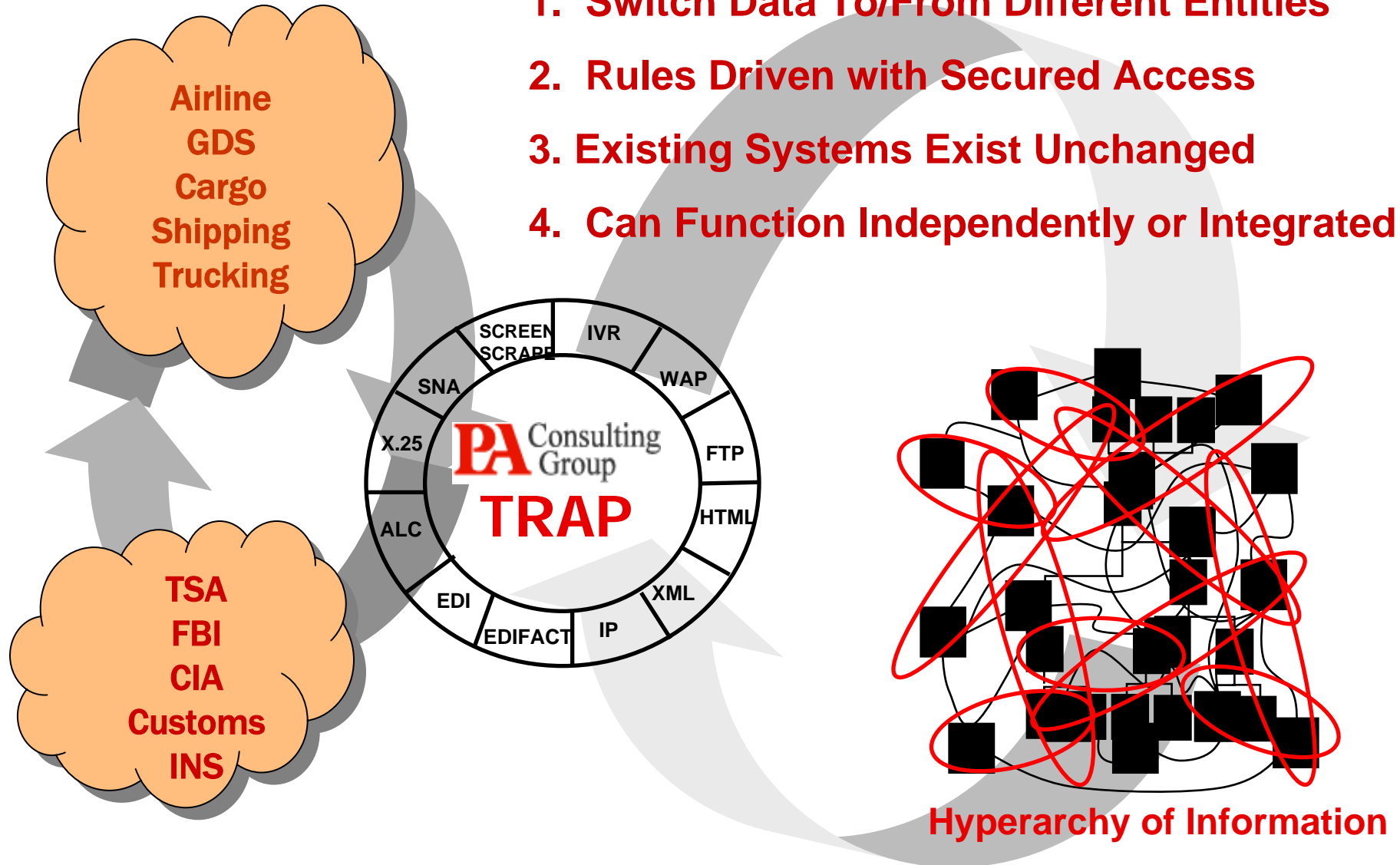
Sabre
Galileo
Worldspan
Amadeus
Abacus

Lufthansa
Austrian
United Airline
Southwest
Sun Country
Etc.

A context "engine"...

A Solution...

1. Switch Data To/From Different Entities
2. Rules Driven with Secured Access
3. Existing Systems Exist Unchanged
4. Can Function Independently or Integrated



**THE
EASTMAN
GROUP, INC.**

Thank You!

PA Consulting
Group

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