

Information Leveraging and Object Technology

**International Alliance for Interoperability
and**

David H. Horner

**THE CADD/GIS
TECHNOLOGY CENTER**



for Facilities, Infrastructure, and Environment



Agenda

- **Why Do We Need To Change**
- **Explanation of Object Technology**
- **Applications for Facility Management compliant with IAI-IFC and Objectivity**
- **Demonstratable Technology from Vendor Apps**
 - **Current Applications –Graphisoft, TriRiga/BricsNet, FIS-Facility Information Systems and Archibus**



Why Change?

- **Reduce total time entering facility & asset data**
- **Utilize better tool sets for managing our facilities**
- **Increase communication with customer & manage project expectations**
- **Reduce contract modifications by clarifying design intent**

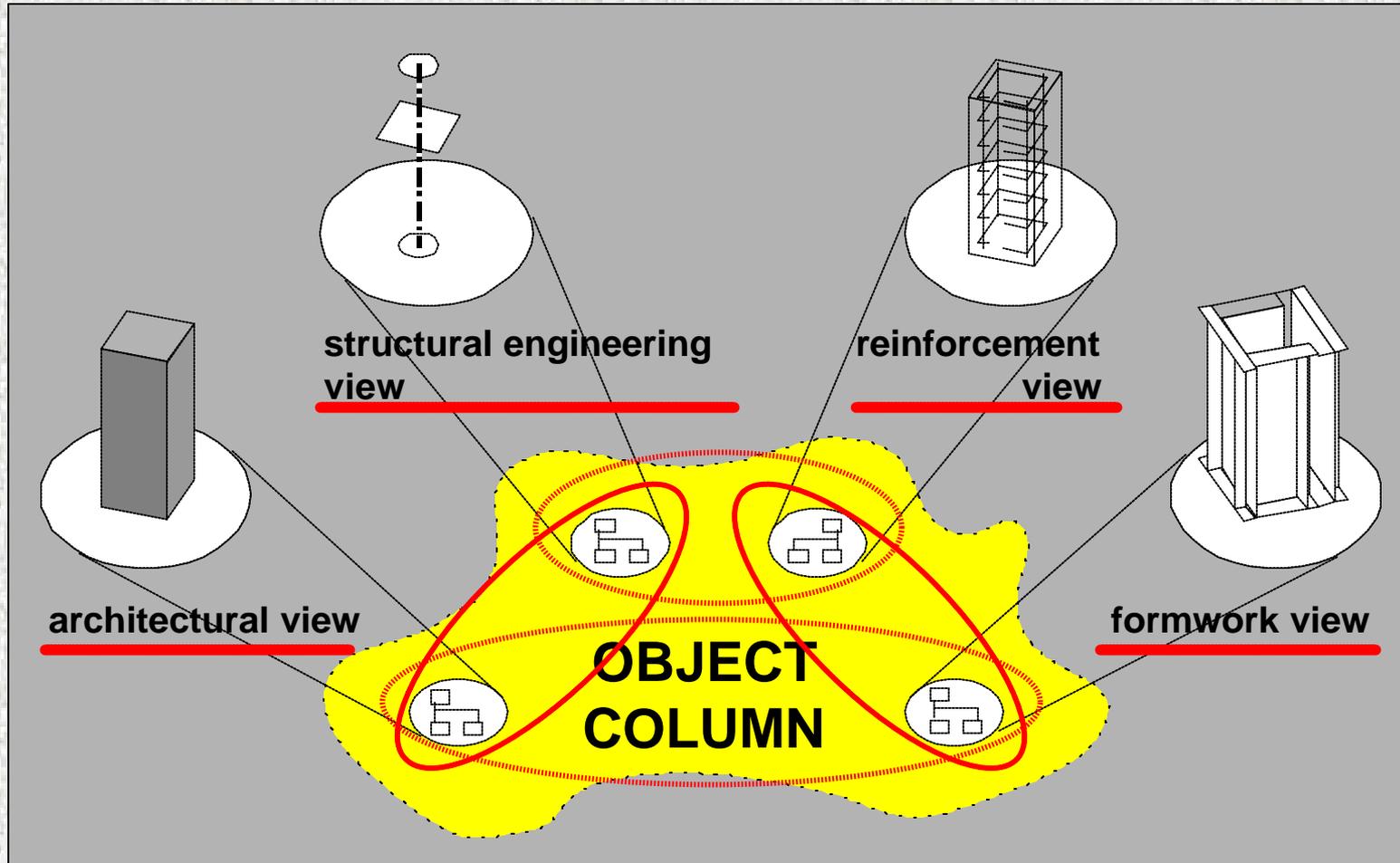


Example: Data integrity

- **All data for one object is integrated**
 - one application creates data, others can easily evaluate these data
 - **data can be linked** and accessed by other application over intranet or internet
 - access by document management (EDM)
 - access to manufacturer libraries (WWW)
- **Objective: Common management of all relevant building information**



Linking of different views



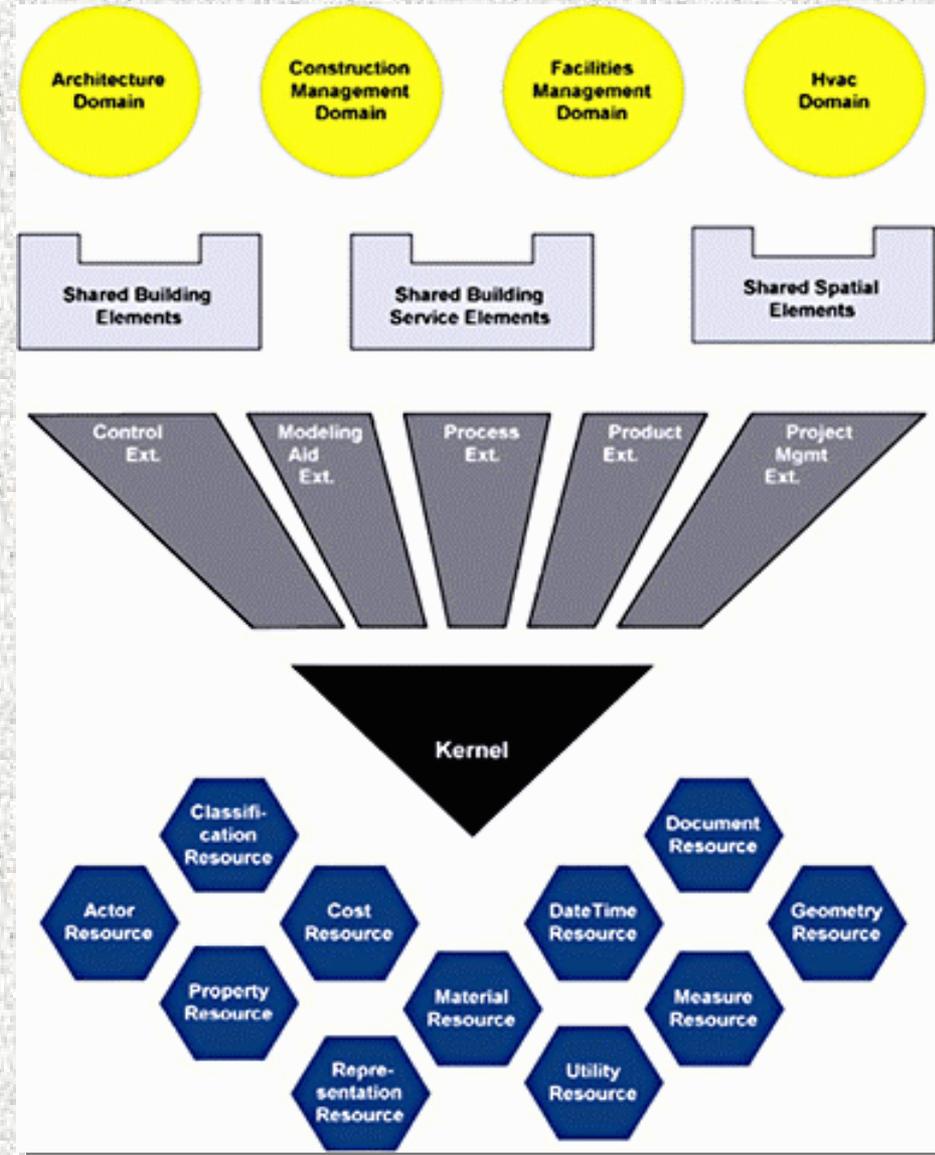
Needed! Object data exchange

- **New paradigm**
 - Semantic object information is exchanged, not “lines and arcs“ anymore
- **Formats for object data exchange**
 - data exchange on application level
 - proprietary, e.g, DWG with OMF objects
 - IAI level is standardised data exchange
 - **IFC (*Industry Foundation Classes*)**
 - IAI-International Alliance for Interoperability



What are the IFC's Industry Foundation Classes

- IFC defines a single object-oriented data model shared by all IFC-compliant applications.
- IFC is public and open for implementation and use by any member. It is evolving.
- IFC is proving a strong transferring building geometry, generating object identity, and specifying general material selection



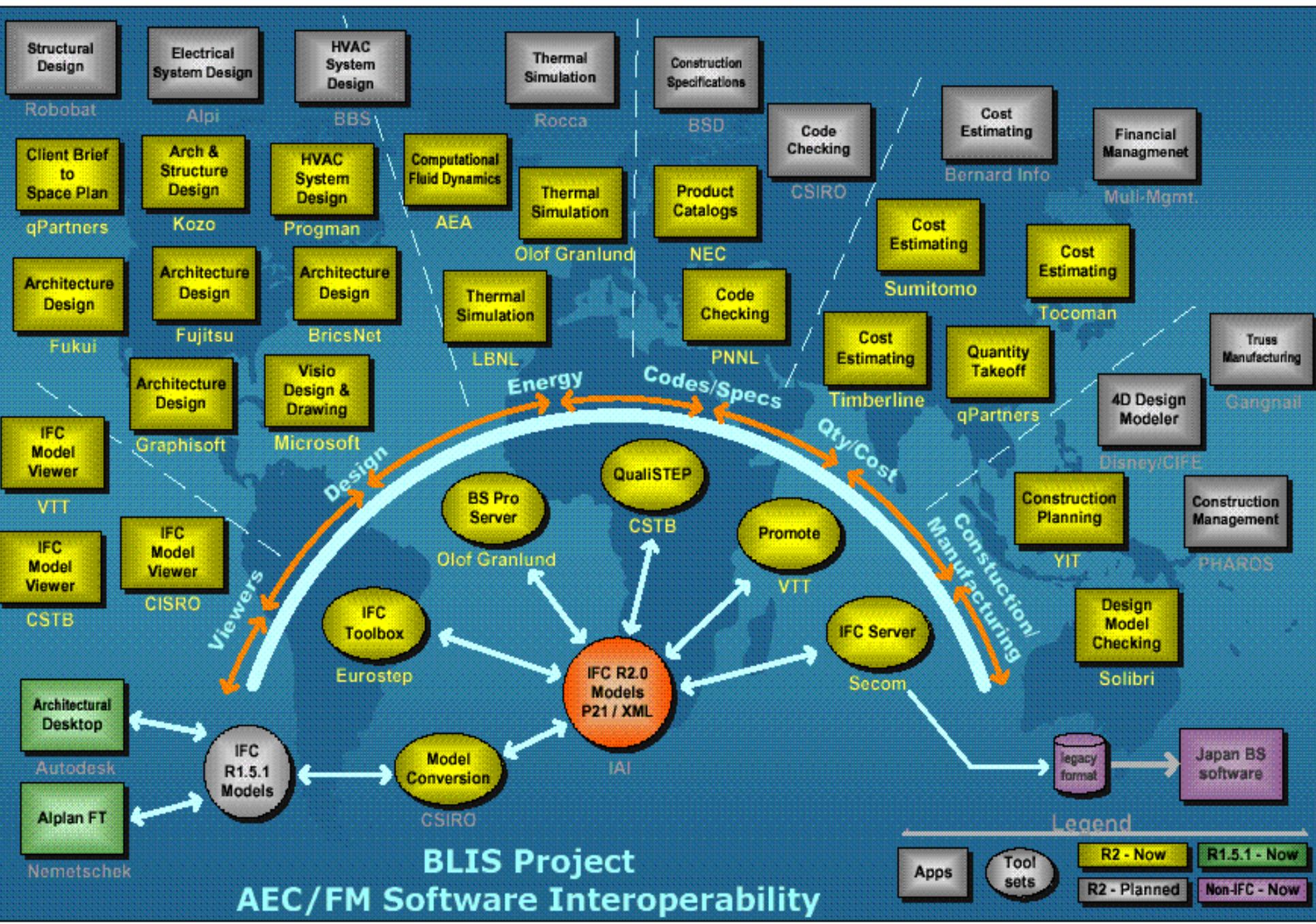
Turning IFCs into reality

- **Products implementing 2.0 are as follows:**

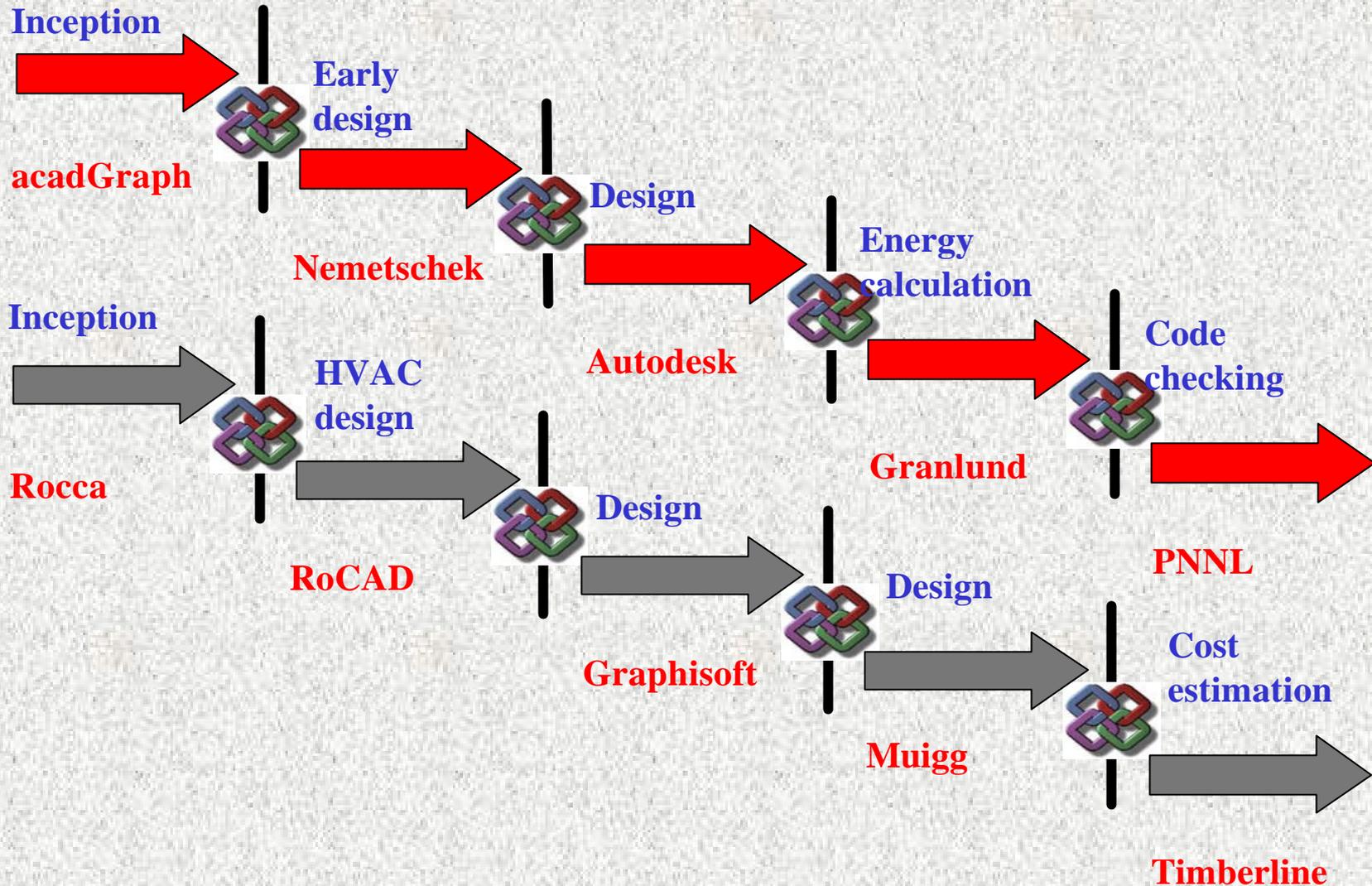
- **Graphisoft**
- **Nemetschek**
- **AcadGraph**
- **NEC**
- **Olof Granlund**
- **ArchiCAD**
- **allplan**
- **Alberti**
- **NcadArc**
- **SMOG**

and many others as shown on the “BLIS” or “Building Lifecycle Interoperable Software”

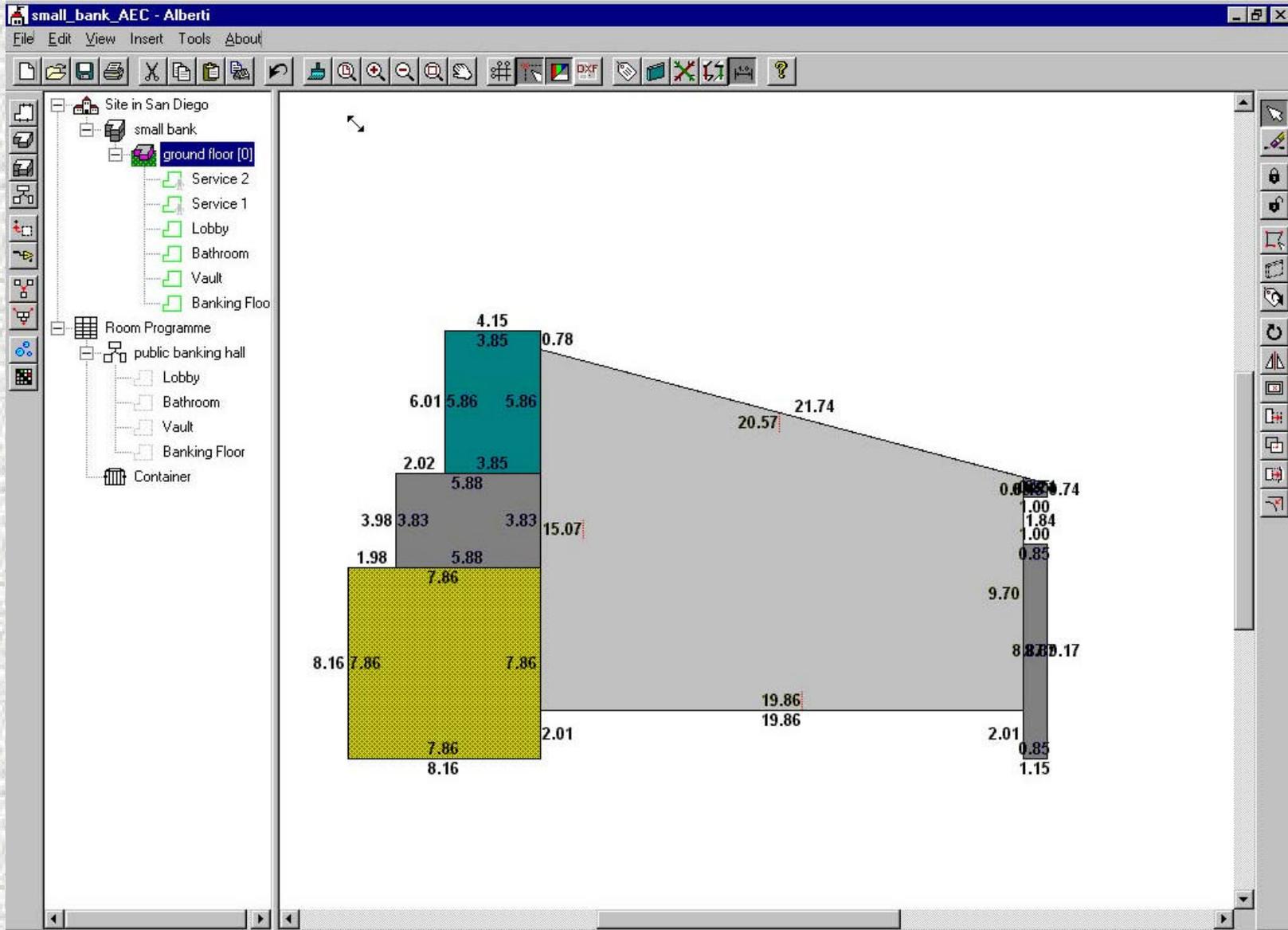
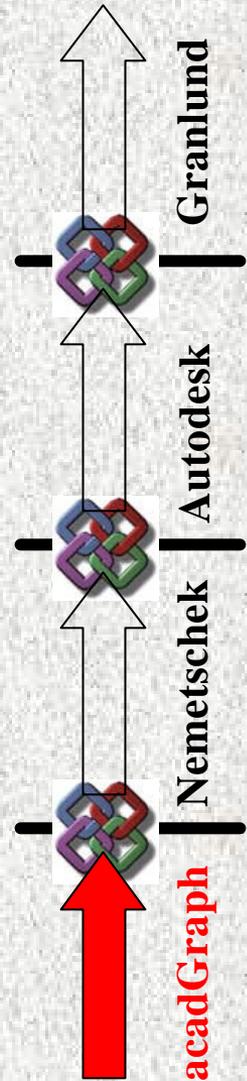




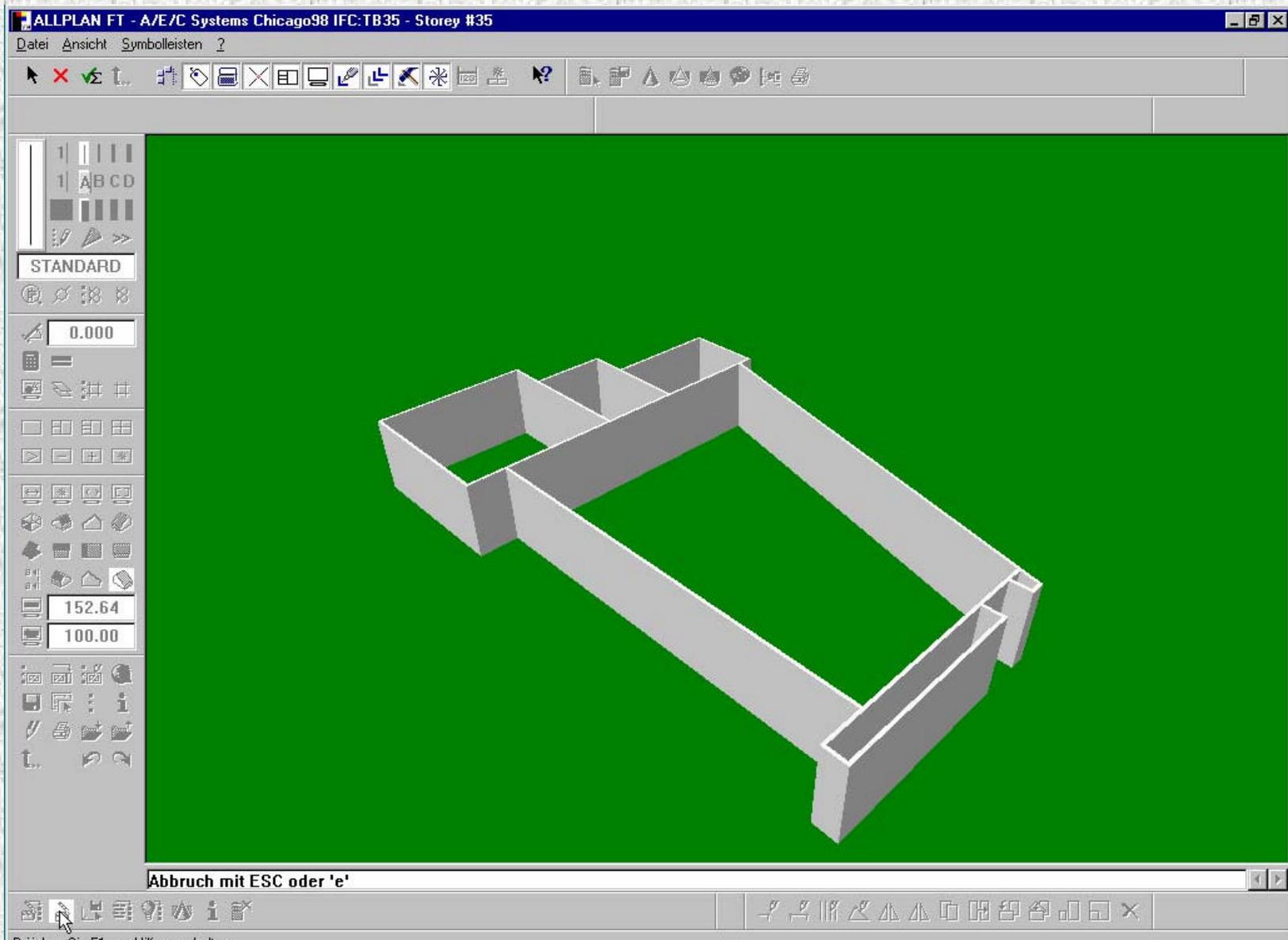
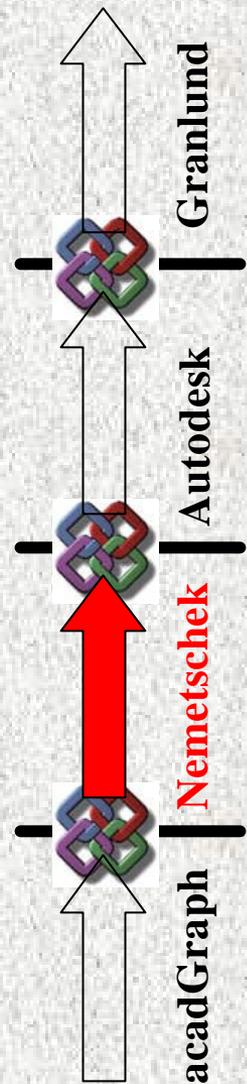
Example: A/E/C system 1.5 demo



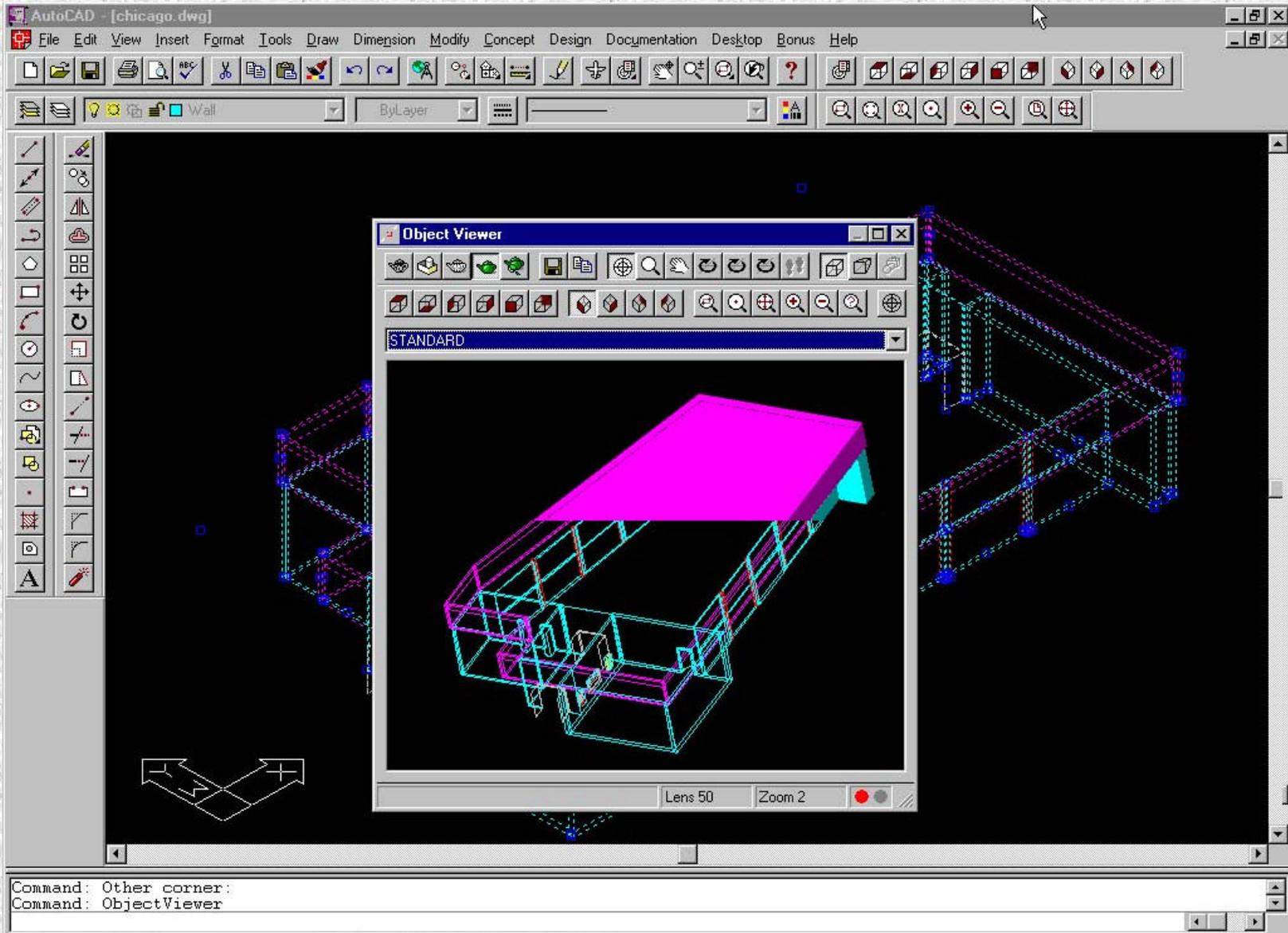
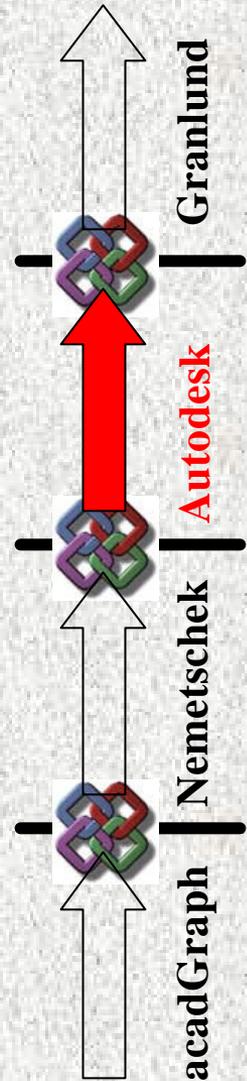
A/E/C example: 1/4



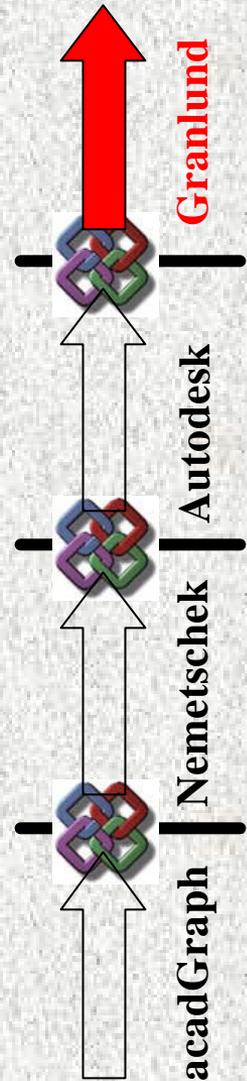
A/E/C example: 2/4



A/E/C example: 3/4



A/E/C example: 4/4



AutoCAD - [BnkFloor.dwg]

File Edit View Insert Format Tools Draw Dimension Modify Help

Room heatloss

Design outside temperature:
Down floor type: ground floor
Cond. through bottom floor: 5 W/m²
Bottom floor U-value: 0.25 W/m²K

ROOM R4
net-area: 245.8 m²
volume: 984 m³
air infiltration: 0.20 1/h
Temperature: 21.0 °C

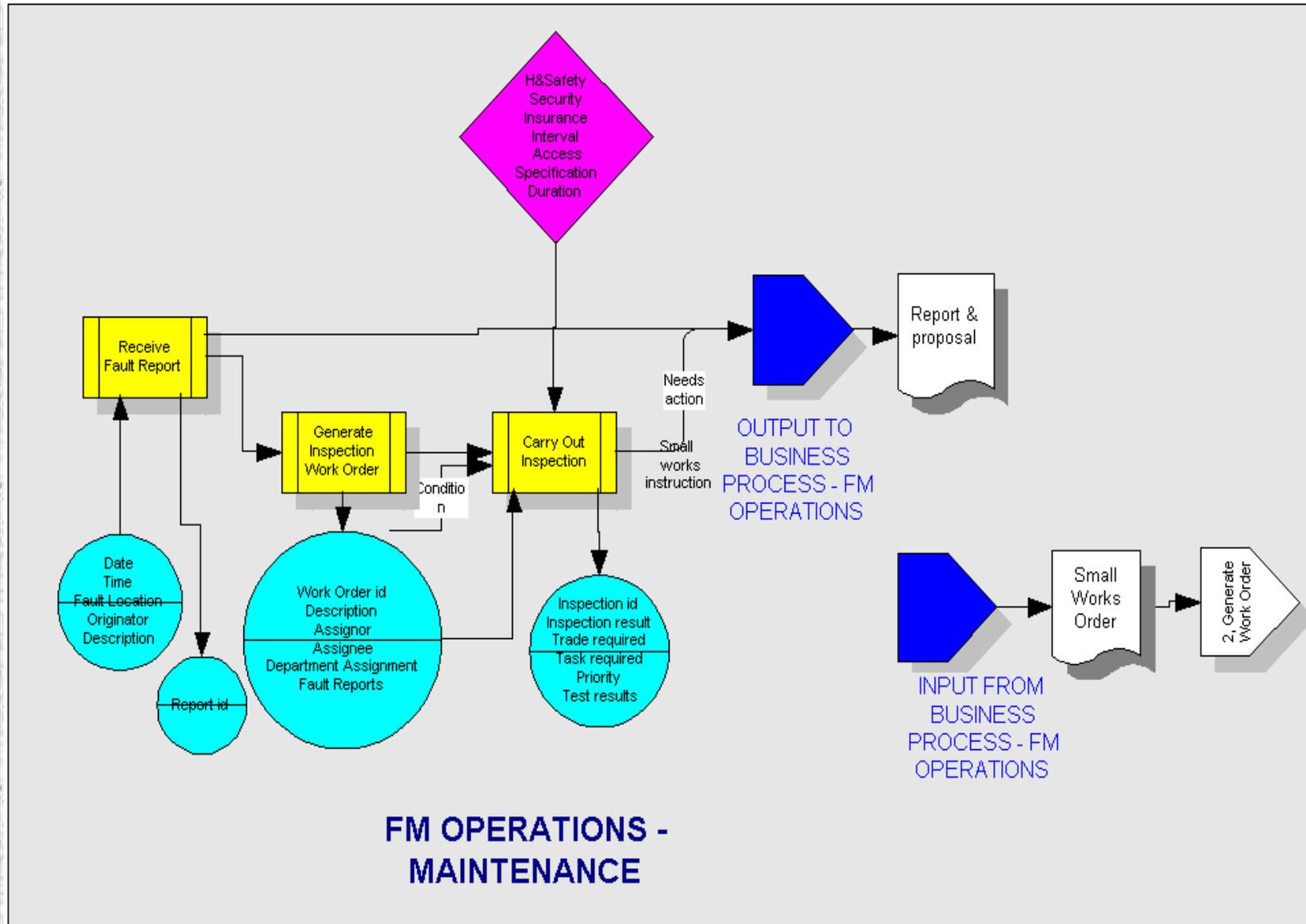
Code	Area	U-value	Temp.	Conduction
EXT1	82.8	0.40	21.0	0
EXT1	99.3	0.40	12.0	358
Floor	245.8	0.25	12.0	643
MSAF	67.6	1.17	12.0	712
Roof	246.0	0.25	12.0	554

Conduction: 2299 W
air infiltration: 590 W
Total heatloss: 2889 W

Return

Command:
Command:
Select room:

Identify Key Interfaces: Reference Process Model

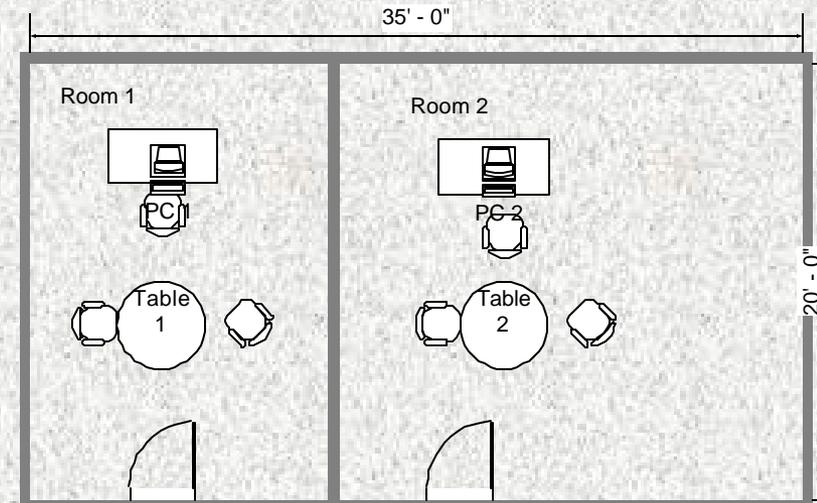


What has Developed for Version 2.0X

- Move Management Industry Foundation Classification
 - *The process updates space inventories*
 - *Space requirements and validation of existing space utilization*
 - *Continued process model development towards an integrated model for the combined FM Process to include*
 - *Application and Work Order controls*
 - *Work Order Management*
 - *Asset Management*
- (This validation includes the FM Groups from the European committees).*

POC Test Case- Desired Output Plan

- **Move PC1 from Room1**
- **Move contents of Desk1 from Room1**
- **Move contents of Table1 from Room1 to Room2**



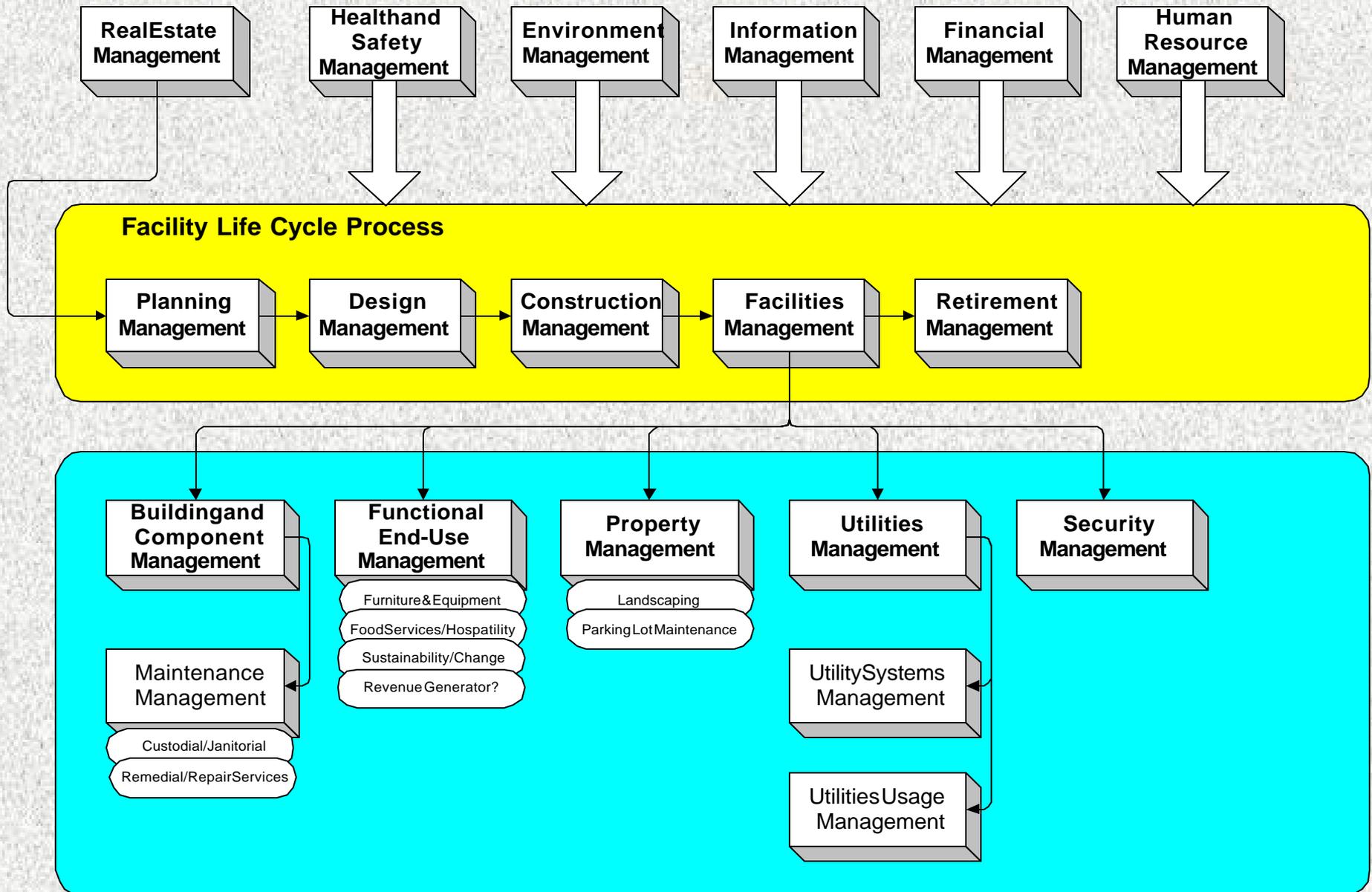
Current Status

- **Business Case Model for Move Management has been developed from the IFC R2.X Implementers Release**
- **This process took us 14 month's from start to finish**
 - **Within 24 month's vendors are implementing**
- **Firm implementers interest**
 - **Archibus**
 - **Peregrine Systems (Span FM)**
 - **Workplace Systems**
 - **Facility Information Systems**
 - **VISIO-Implemented**
 - **ArchiFM-Graphisoft-Implemented**
- **Process Model forms the basis for standard Move Management procedure in the new FM Handbook produced by PGWSC (Canadian Government)**

Expecting
PDSI Maximo



Where do we go from here?



Vendor Applications





Graphisoft

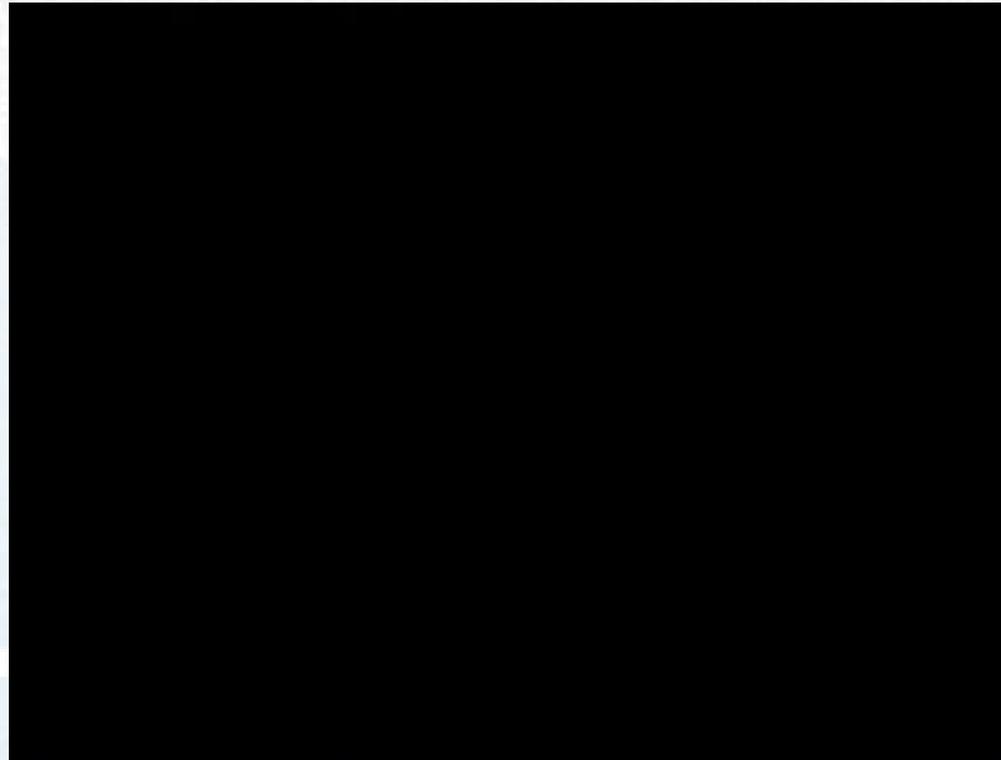
ArchiCAD & ArchiFM-Best of Class



For 15 years Graphisoft has focused on better tools for design communication while working to eliminate through automation, the drudgery of drafting and documentation.

“ArchiCAD's complete 3D modeling environment...does a better job of automating the generation of construction documents such as floor plans, elevations and schedules than any other package on the market today”. CADALYST Magazine 2001-5 Stars

Information sharing & being IFC compliant helps eliminate data re-entry, and data loss. From design through facilities management we integrate information.



ArchiCAD/ArchiFM

Designing & Building Information

- ArchiCAD/ArchiFM considered “easiest” to learn and use-Cadence & Cadalyst Magazine
 - Compared to AutoCAD ADT, and Bentley TriForma
- Marine Library
 - Site Specific Objects
- Training Options
 - Information Building
 - Communication
 - Visualization
 - Object Creation
 - IAI-IFC Exchange
 - ArchiFM
 - Report Writing
 - Tech Support



Baltimore Coast Guard Facility

Property Peachtree Square

Project Building 1

- PROJECT MGMT
- DEFINITION
- CHASE
- Locations(Create)
- Orders(Create)
- Page(Create)
- Order (e)
- PROJECT
- SETUP

Inside the Project- Building 1

Add Project Announcement

Project Update Edit Delete

Charles Dulaney [Add Link](#)



We look forward getting started and delivering a successful project.

Related Links

Delete

http://www.hardhattechnologies.com	Edit	<input type="checkbox"/>
---	----------------------	--------------------------

What's New

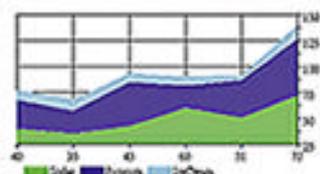
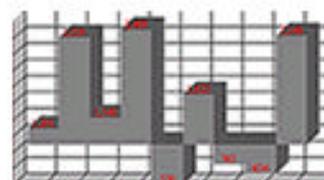
ID #	Module	Description
A-50005	Projects	New Project Requested
A-50123	Projects	Design Development Drawings Updated
L-80013	Leases	Lease Request

Action Items

ID #	Module	Description
A-50005	Projects	Project Approval Requested
B-10003	Procurement	2 Bid Responses
P-12345	Properties	Space Request

Alerts

ID #	Module	Description
A-50005	Properties	Property Status Changed to Active
P-23101	Properties	Occupancy Performance Warning
P-12345	Properties	Environmental Compliance Inspection Due

Overall Occupancy**Overall Expenses****In Development**

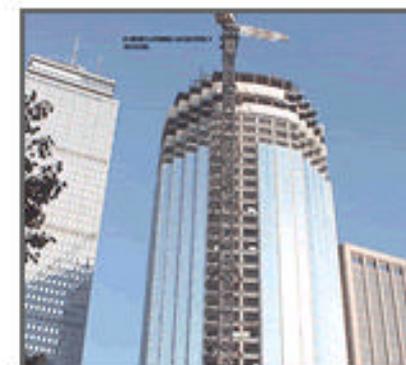
ID #	Property	Phase
P12345	This Building	Approval
P12345	This Building	Approval
P12345	This Building	Approval

In Transition

ID #	Property	Phase
P12345	This Building	Approval
P12345	This Building	Approval
P12345	This Building	Approval

Featured Property

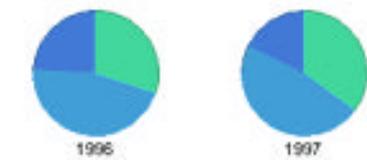
ClearView, Palo Alto

**Current Weather** 80

ID#	Property	Status
P12345	111 Tower	Construction

ClearView Projects

ID #	Property	Phase
P12345	This Building	Approval
P12345	This Building	Approval
P12345	This Building	Approval

ClearView Occupancy

Enterprise-scale Interoperability

CAD Platform



AutoCAD Map R3.lnk



MicroStation95.lnk



**Maintenance
Mgmt.**

**PSDI
MAXIMO**

FME
AWI/CSI Maximus

**Document
Mgmt.**

PCDOCS



Employee and Equipment Data

FIS Web Demo - Microsoft Internet Explorer

File Edit View Go Favorites Help

Back Forward Stop Refresh Home Search Favorites History Channels Fullscreen Mail Print

Address http://fis-show1.fisincnt/web_html/fwd.htm Links

FIS

[MAIN](#)

[FIS/FM](#)

[Reports](#)

[Drawing Viewer](#)

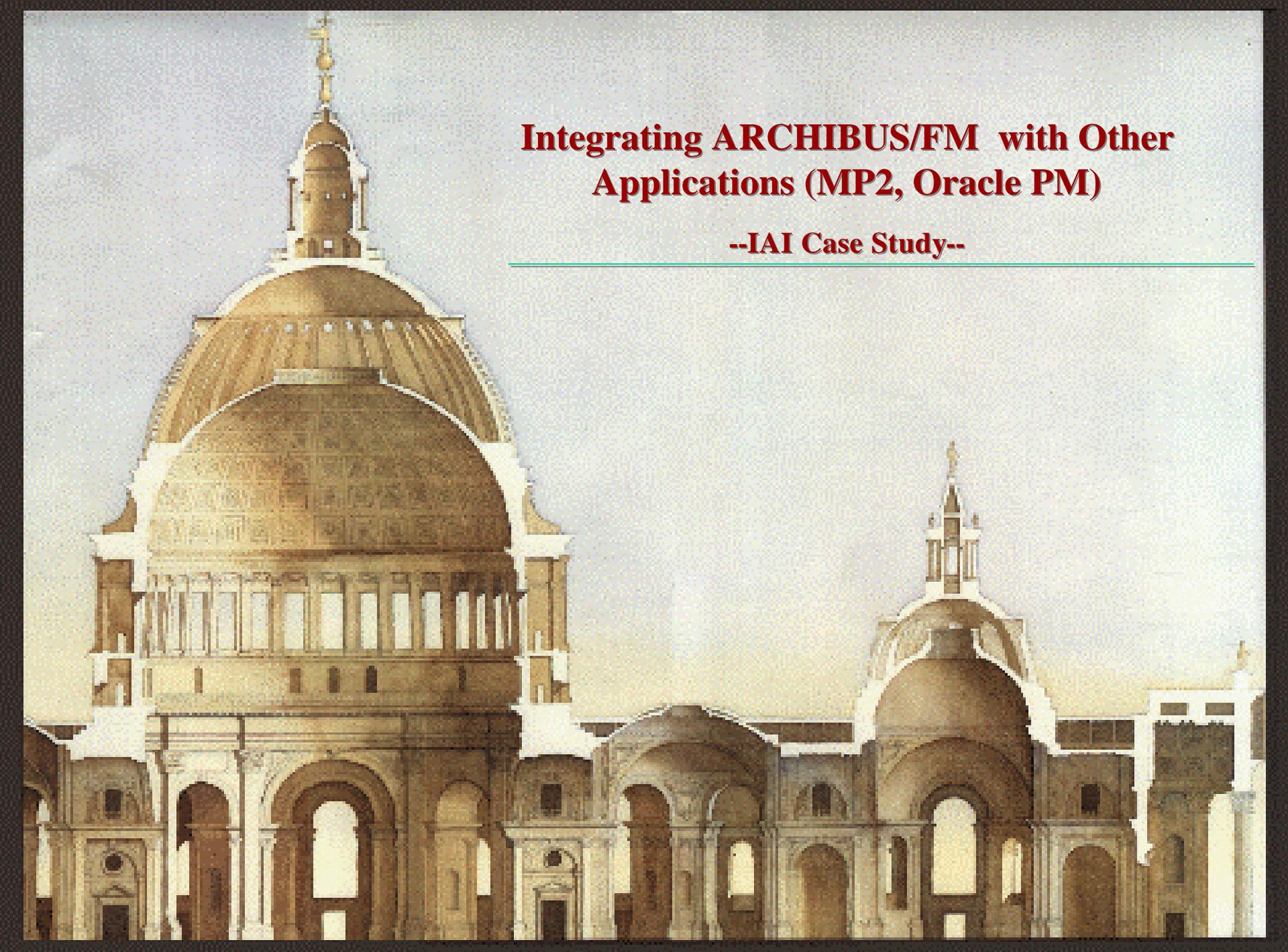
[MAP](#)

[KeyMap](#)

- Employee Label
- Employee
- Equipment
- Space
- Space Billing
- Space Organization
- Space Occupancy
 - OA
 - OP
 - OT
 - VA
 - VR
 - VU
- Space Standard
- Space Category
- Space Type

Equipment : Personal Computer | 1 'Equipment' selected | 1 : 14,897 | 6,388 x 3,763 (ft)

Serial No.	Name	Cat.	Type	Std.	Manufac.
PC-102	Personal Computer	COMP	PC		ALL COUNTY PC



**Integrating ARCHIBUS/FM with Other
Applications (MP2, Oracle PM)**

--IAI Case Study--

Integrating Archibus-FM with Other Applications

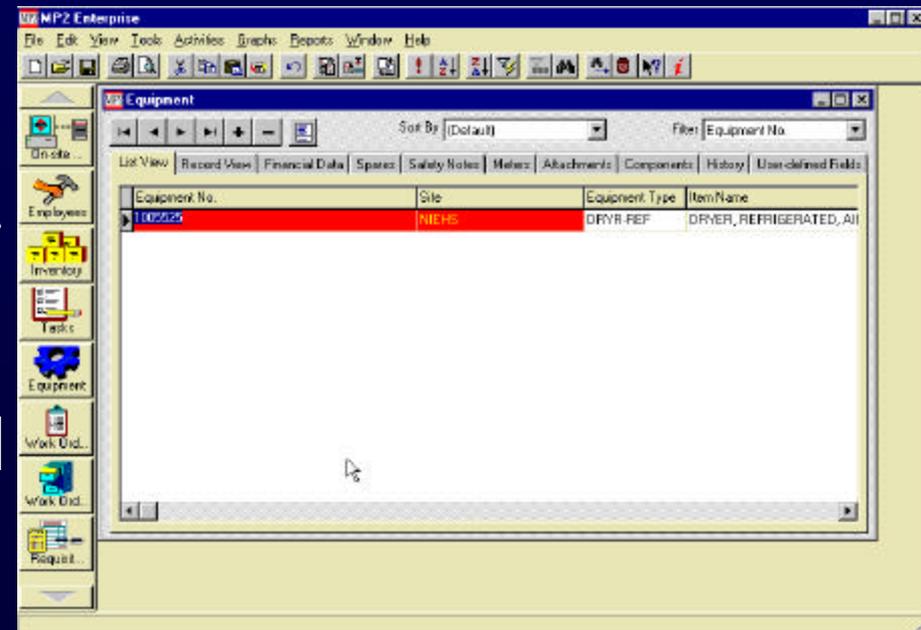
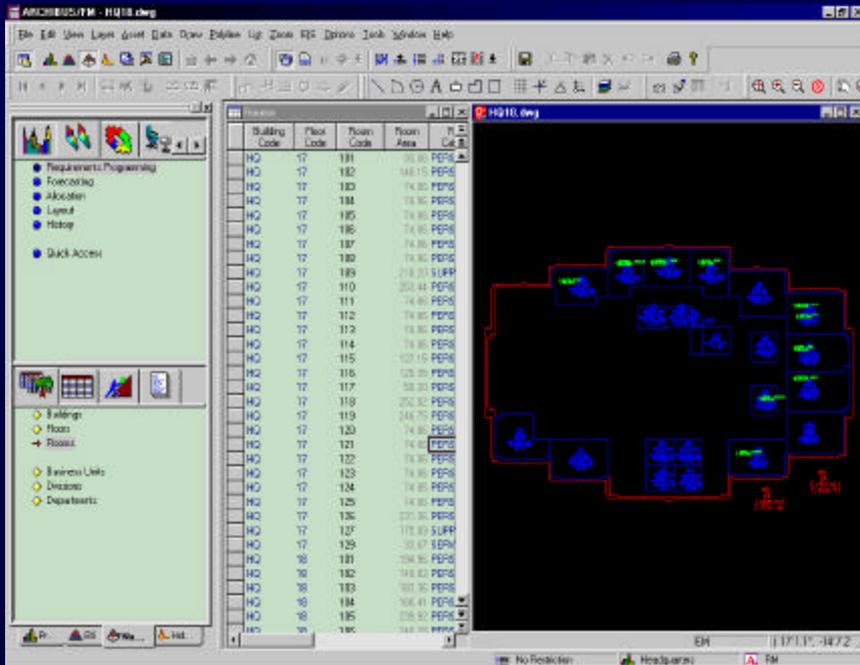
- **Goals: share data, use both programs**
 - **Integration with MP2: MP2 for Work Request, Work Order, Equipment, A/FM for locating problems on drawing**
 - **Integration with Oracle PM: PM for HR management, A/FM for locating employees on floor plans**
- **Difficulty in Integration**
 - **Incompatible database tables and fields**
- **Solution**
 - **Adapt A/FM tables and fields, extend to encompass data formats of other applications**

Integration of A/FM and MP2

- A/FM and MP2 have direct access to each other's data

ARCHIBUS/FM

Datastream MP2

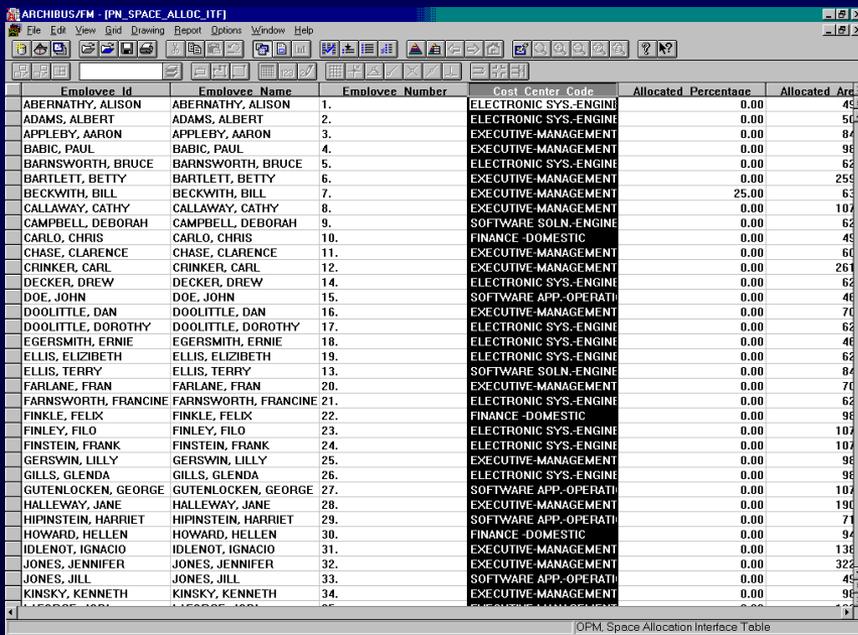


Integration of A/FM and Oracle PM

- A/FM and PM cannot access each other's data directly

ARCHIBUS/FM

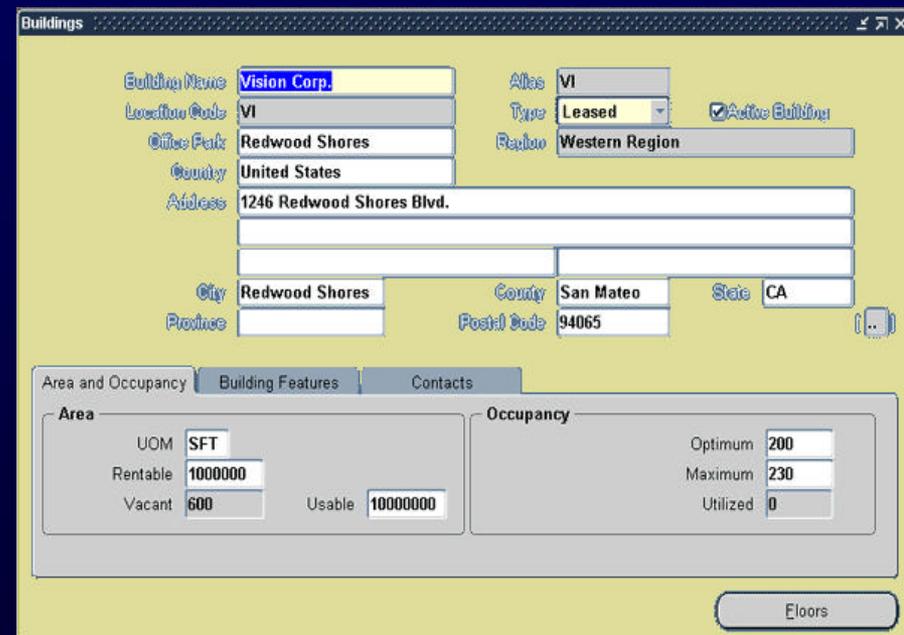
Oracle Property Manager



ARCHIBUS/FM - [PM_SPACE_ALLOC_ITF]

Employee Id	Employee Name	Employee Number	Cost Center Code	Allocated Percentage	Allocated Area
ABERNATHY, ALISON	ABERNATHY, ALISON	1.	ELECTRONIC SYS.-ENGINE	0.00	45
ADAMS, ALBERT	ADAMS, ALBERT	2.	ELECTRONIC SYS.-ENGINE	0.00	50
APPLEBY, AARON	APPLEBY, AARON	3.	EXECUTIVE-MANAGEMENT	0.00	84
BABIC, PAUL	BABIC, PAUL	4.	EXECUTIVE-MANAGEMENT	0.00	98
BARNSWORTH, BRUCE	BARNSWORTH, BRUCE	5.	ELECTRONIC SYS.-ENGINE	0.00	62
BARTLETT, BETTY	BARTLETT, BETTY	6.	EXECUTIVE-MANAGEMENT	0.00	255
BECKWITH, BILL	BECKWITH, BILL	7.	EXECUTIVE-MANAGEMENT	25.00	63
CALLAWAY, CATHY	CALLAWAY, CATHY	8.	EXECUTIVE-MANAGEMENT	0.00	102
CAMPBELL, DEBORAH	CAMPBELL, DEBORAH	9.	SOFTWARE SOLN.-ENGINE	0.00	62
CARLO, CHRIS	CARLO, CHRIS	10.	FINANCE -DOMESTIC	0.00	45
CHASE, CLARENCE	CHASE, CLARENCE	11.	EXECUTIVE-MANAGEMENT	0.00	60
CRINKER, CARL	CRINKER, CARL	12.	EXECUTIVE-MANAGEMENT	0.00	261
DECKER, DREW	DECKER, DREW	14.	ELECTRONIC SYS.-ENGINE	0.00	62
DOE, JOHN	DOE, JOHN	15.	SOFTWARE APP.-OPERATI	0.00	46
DOOLITTLE, DAN	DOOLITTLE, DAN	16.	EXECUTIVE-MANAGEMENT	0.00	70
DOOLITTLE, DOROTHY	DOOLITTLE, DOROTHY	17.	ELECTRONIC SYS.-ENGINE	0.00	62
EGERSMITH, ERNIE	EGERSMITH, ERNIE	18.	ELECTRONIC SYS.-ENGINE	0.00	46
ELLIS, ELIZBETH	ELLIS, ELIZBETH	19.	ELECTRONIC SYS.-ENGINE	0.00	62
ELLIS, TERRY	ELLIS, TERRY	13.	SOFTWARE SOLN.-ENGINE	0.00	84
FARLANE, FRAN	FARLANE, FRAN	20.	EXECUTIVE-MANAGEMENT	0.00	70
FARNSWORTH, FRANCINE	FARNSWORTH, FRANCINE	21.	ELECTRONIC SYS.-ENGINE	0.00	62
FINKLE, FELIX	FINKLE, FELIX	22.	FINANCE -DOMESTIC	0.00	98
FINLEY, FILO	FINLEY, FILO	23.	ELECTRONIC SYS.-ENGINE	0.00	102
FINSTEIN, FRANK	FINSTEIN, FRANK	24.	ELECTRONIC SYS.-ENGINE	0.00	102
GERSWIN, LILLY	GERSWIN, LILLY	25.	EXECUTIVE-MANAGEMENT	0.00	98
GILLS, GLENDA	GILLS, GLENDA	26.	ELECTRONIC SYS.-ENGINE	0.00	98
GUTENLOCKEN, GEORGE	GUTENLOCKEN, GEORGE	27.	SOFTWARE APP.-OPERATI	0.00	102
HALLEWAY, JANE	HALLEWAY, JANE	28.	EXECUTIVE-MANAGEMENT	0.00	191
HIPINSTEIN, HARRIET	HIPINSTEIN, HARRIET	29.	SOFTWARE APP.-OPERATI	0.00	70
HOWARD, HELLEN	HOWARD, HELLEN	30.	FINANCE -DOMESTIC	0.00	94
IDLENOT, IGNACIO	IDLENOT, IGNACIO	31.	EXECUTIVE-MANAGEMENT	0.00	138
JONES, JENNIFER	JONES, JENNIFER	32.	EXECUTIVE-MANAGEMENT	0.00	322
JONES, JILL	JONES, JILL	33.	SOFTWARE APP.-OPERATI	0.00	45
KINSKY, KENNETH	KINSKY, KENNETH	34.	EXECUTIVE-MANAGEMENT	0.00	98

OPM Space Allocation Interface Table



Buildings

Building Name: Vision Corp. Alias: VI

Location Code: VI Type: Leased Active Building

Office Park: Redwood Shores Region: Western Region

County: United States

Address: 1246 Redwood Shores Blvd.

City: Redwood Shores County: San Mateo State: CA

Postal Code: 94065

Area and Occupancy Building Features Contacts

Area: UOM: SFT, Rentable: 1000000, Vacant: 600, Usable: 10000000

Occupancy: Optimum: 200, Maximum: 230, Utilized: 0

Floors

↑ ↓ ↑ ↓

Common Interface

Where you can Find Information

- 1) http://wwwroot\cgtc\Projects\01.044\IAI_Work\IfcR2x - **DOWNLOAD IFC2X-Recommend UK Site as direct link.**
- 2) http://cig.bre.co.uk/iai_uk/IFC2x.htm - **DOWNLOAD IFC2X**
- 3) http://cig.bre.co.uk/iai_uk/iai_documents.htm - **DOWNLOAD Documents for IFC Functions**
- 4) http://cig.bre.co.uk/iai_uk/documentation/IFC30/index.htm - **DOWNLOAD IFC 3.0**

DISCUSSION: