

Some Input to the 2nd Asia Construction IT Round Table Meeting

Nobuyoshi Yabuki, Ph.D., P.E.
Muroran Institute of Technology

August 24-24, 2006
@ Toranomom Pastral, Tokyo

OUTLINE

- IFC of IAI
- NEESgrid and EDgrid
- Over the “Interoperability”

IFC of IAI

- IFC: 3D construction project model.
- IFC2x3 is the current version.
- Mainly for buildings.
- IFC-BRIDGE, which is a result of Japan-France collaboration, will be implemented into IFC.
- IFG, which is GIS data model for IFC, developed by Norwegians, will also be included in IFC.
- Next version of IFC, which is expected to be released next year, is expected to make a big difference.

Some recent contributions to IFC by IAI Japan

- Architectural Domain Group: Development of Finishing Information Editor.
- Building Service & FM Domain Group: Development of JA BS standards to IFC Converter.
- Structural Domain Group: ST-2: Modeling of reinforcing bars of RC structures.
- Structural Domain Group and Civil Engineering Domain Group: ST-7: Modeling of data related with dynamic analysis of buildings, bridges, etc. for earthquake resisting design.
- Civil Engineering Domain Group: Development of IFC-BRIDGE, bridge product data model, with IAI French Speaking Chapter.

NEESgrid and EDgrid

NEES

- NEES (George E. Brown, Jr. Network for Earthquake Engineering Simulation) is a next generation grid network system to integrate 15 earthquake engineering related experimental and computational sites, supported by NSF (National Science Foundation) in the US.
- The final goal of NEES is that all the earthquake engineering researchers in the US can access to the experiment facilities and experiment data so that they can control the system and browse data remotely.
- NEESit is a virtual “collaboratory,” Cyberinfrastructure.

EDgrid (E-Defense Grid)

- EDgrid is inspired by NEESgrid.
- E-Defense is the world largest shake table experiment facility founded in 2005 in Hyogo Prefecture by National Research Institute for Earth Science and Disaster Prevention (NIED).
- All the experiment data will be open to all the Japanese earthquake engineering researchers after 1 year of each experiment via the Internet.
- As EDgrid is collaborating with NEESgrid, all the data are shared by Japanese and American researchers.

International Cooperation

- Japanese E-Defense and US NEES have agreed to share the experimental data together.
- EDgrid and NEESit are collaborating to develop data models to store all the experimental data.
- Korea and Taiwan, respectively, will agree (or have agreed?) to share their experimental data with US NEES.

NEES and EDgrid: What's the difference?

- NEES is expected to be a “collaboratory,” cyberinfrastructure, integrating 15 experimental and simulation sites.
- The concept of Cyberinfrastructure is a booster in NSF in various research fields.
- EDgrid is a realistic attempt.
- But EDgrid is just for E-Defense.
No collaboratgory. Quiet.

Over the “Interoperability”

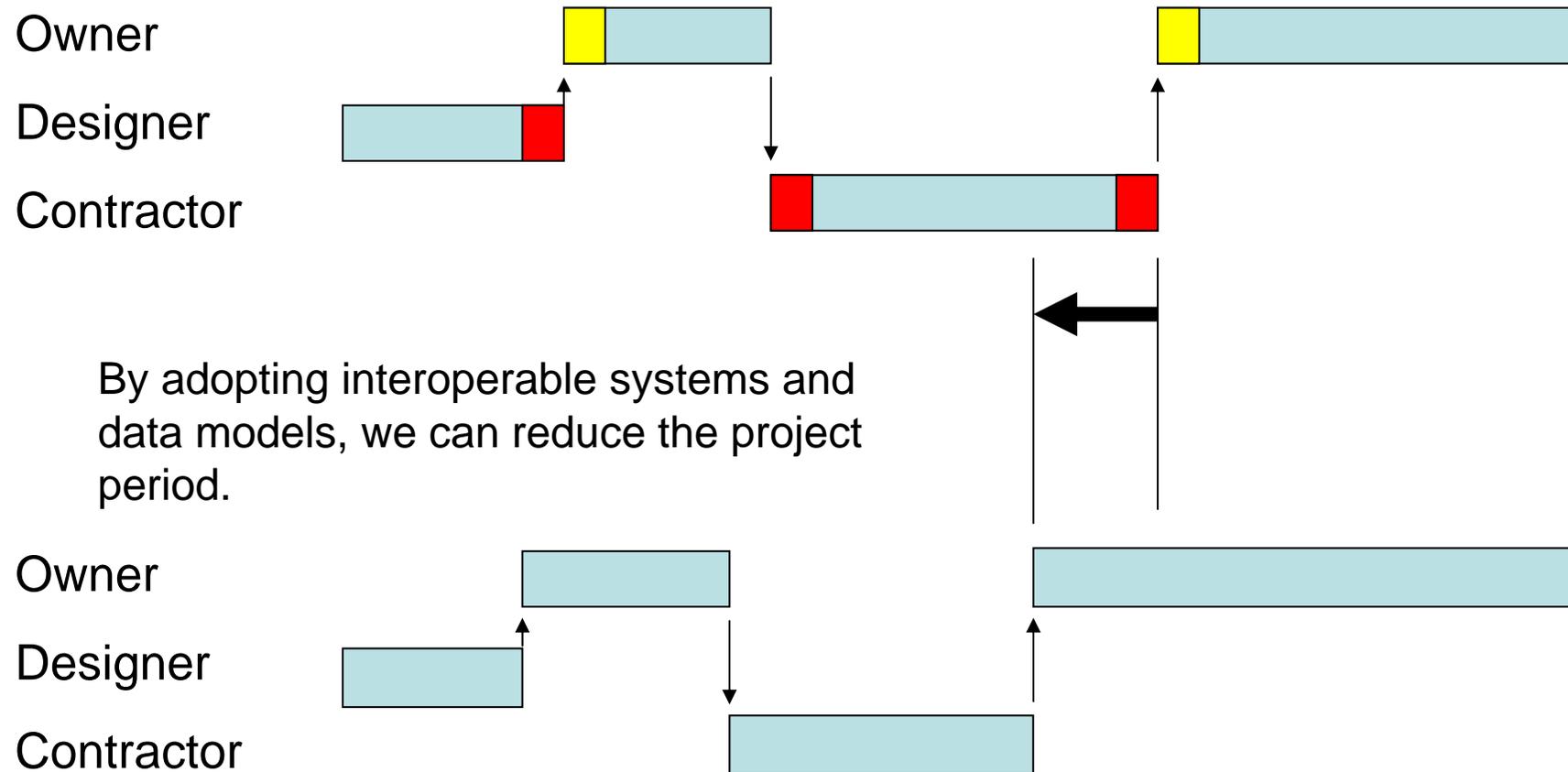
Interoperability

- Why is “interoperability” necessary?
- To improve the efficiency, quality and safety. Interoperable systems and data enable us to increase the speed, i.e., efficiency, and to reduce mistakes during data transfer and possibly the cost.
- Background: “Islands of automation” problem: Automating each task has almost been accomplished by using IT. However, the data transfer is currently the bottleneck of projects.

Efforts for CAD and Product Model Standards

- 1970s
 - IGES (Initial Graphics Exchange Specification)
- 1980s
 - US: PDES (Product Data Exchange Standard)
 - Europe: ISO, TC184, SC4, ISO-10303 , STEP (Standard for the Exchange of Product Model Data)
- 1991
 - PDES was merged with ISO-STEP.
- 1994
 - Autodesk started IAI (Industry Alliance for Interoperability).
- 1997
 - IAI became an International Alliance for Interoperability.

Is this enough?



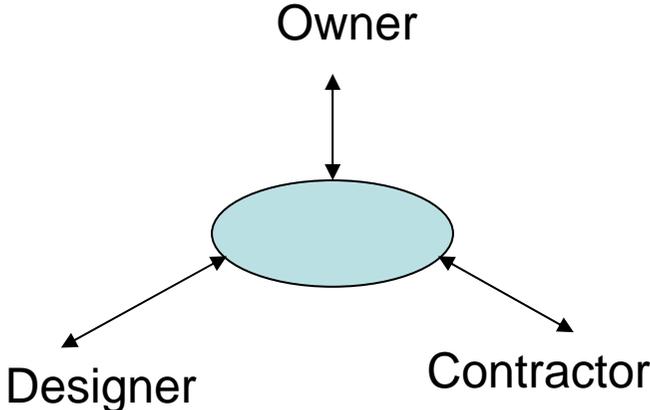
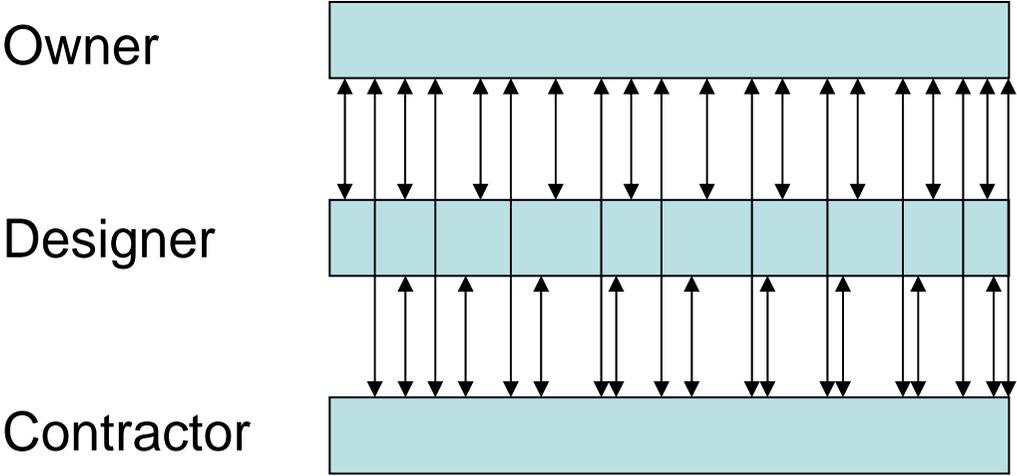
Concurrent, Collaborative, and Cooperative Approach would be needed.

- Why?
- In the global economy, competition is increasingly hard among companies in European and North American countries in order for them to win projects, especially in fast growing areas, e.g., Asia and Middle East.
- Since the end of “Cold War” and due to the spread of the Internet, many companies located in various countries can work together and buy goods from foreign countries.
- Speed and Cost are the key elements to win.
- To win, “interoperability” would be a must. But it is not enough. Something more and new would be necessary.

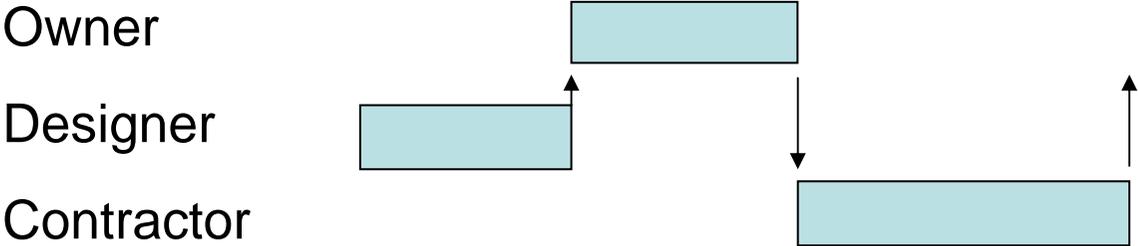
What would you do?

- Concurrent Engineering: Simultaneous and parallel work by heterogeneous engineers, systems in remote places. Proposed in the late 1980's in the US.
- Collaborative Engineering and Cooperative Work: Not only concurrent but also collaborative and cooperative aspects are emphasized. Proposed in 1990's and 2000's. Research has been being done in mechanical engineering, etc.

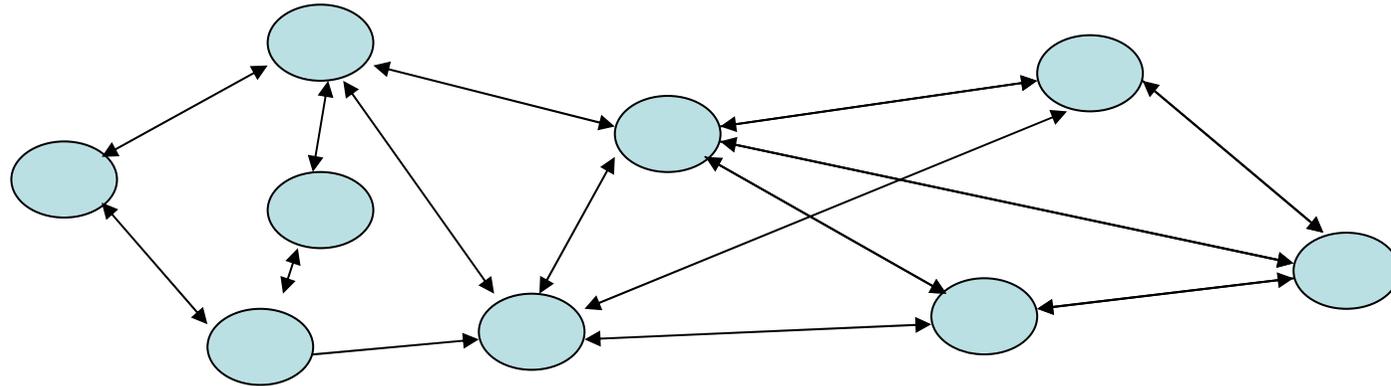
Challenge: Can we do this?



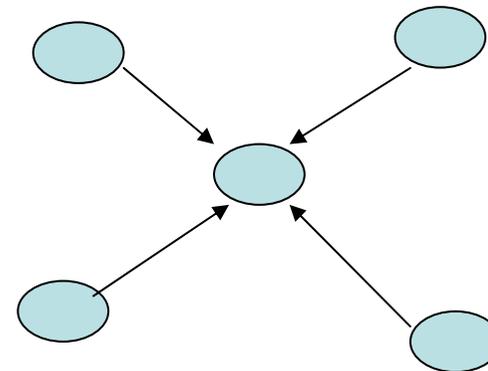
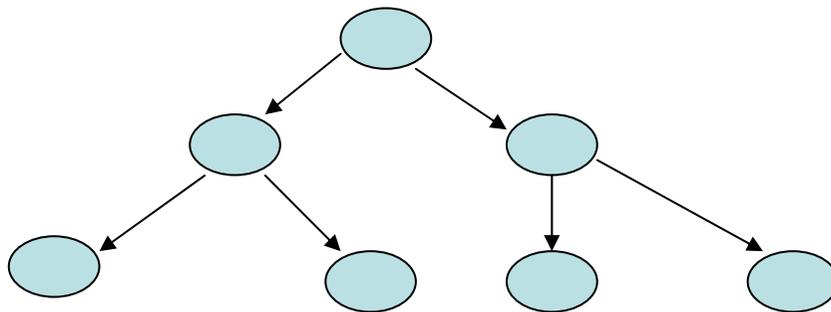
Instead of



Challenge: Can we do this?



Instead of



More challenges:

- Can we think of new concepts or frameworks?
- If we did, would we be able to start and accomplish them?
- What could hinder our efforts?