Teamcenter Multi-Site Review

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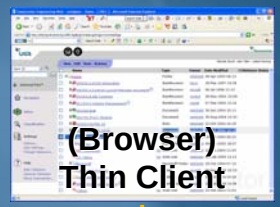
Topics

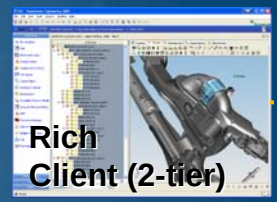
- V9.1
  - Single Installation
  - Crossing high latency boundaries
    - Thin Client
    - Multi-Site
- Tc 2005
  - Single Installation
  - Crossing high latency boundaries
- Path Forward
  - Higher latency clients (4-tier)
  - UGS Briefcase

TcEng V9.1 Deployment Architecture

Authoring Applications

Client Desktop





Rich Client (2-tier)

Teamcenter Clients

Data Center

Latency support between Client & Data Center

2-tier:

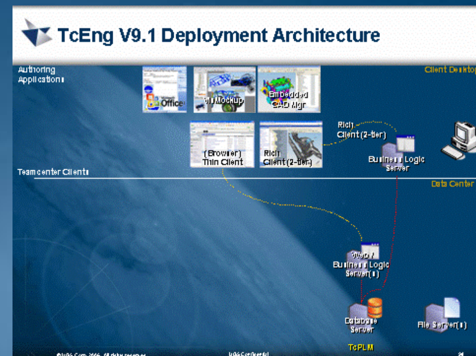
- 20-40 ms

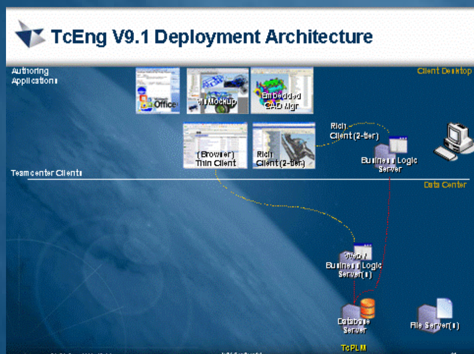
3-tier rich client:

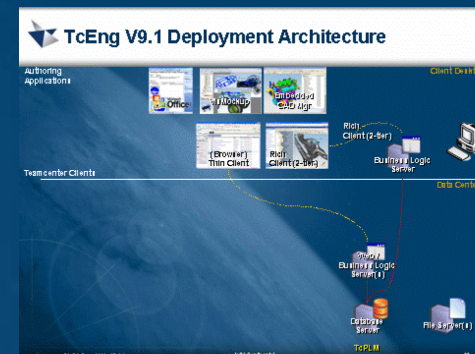
- 80ms
- Not supported by CAD Mgrs
- Not widely deployed

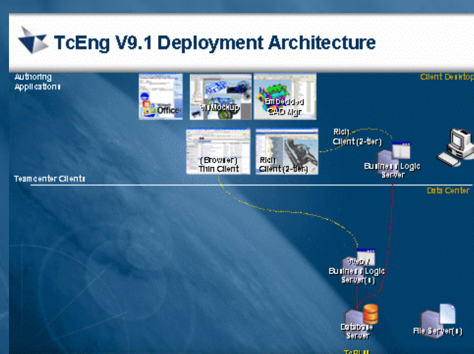
TcPLM

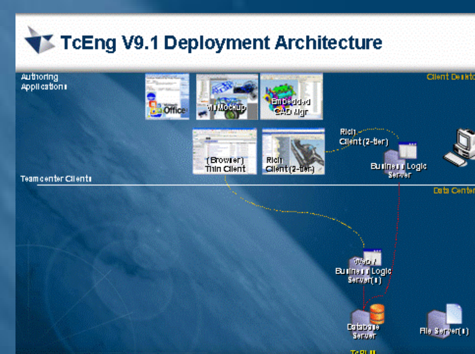
Federation to cross high latency boundaries











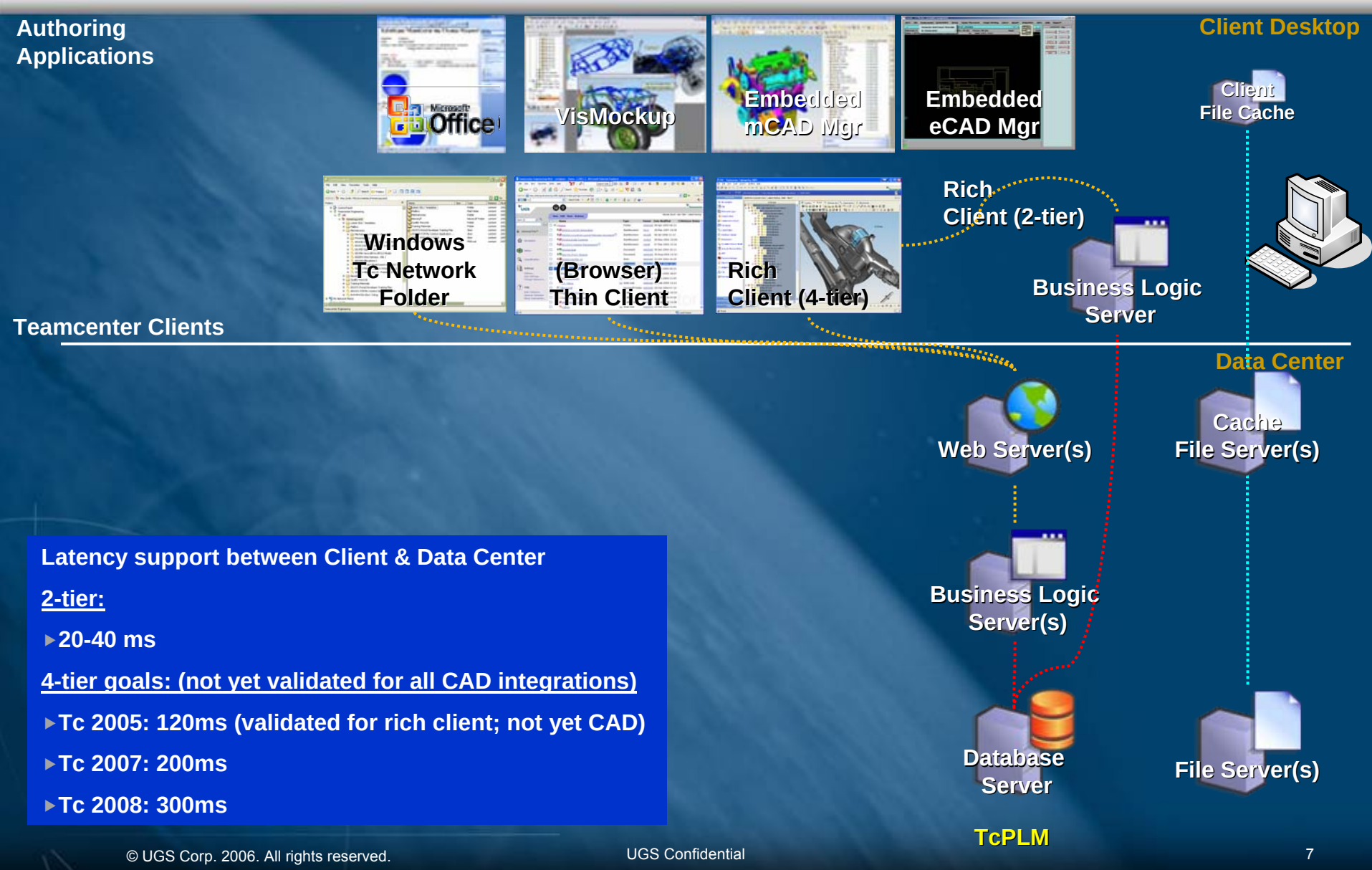
Latency – V9.1

- As latency increases, performance seriously degrades
- 2-tier Rich Client & CAD Mgrs
  - 20-40ms is the typical max
- 3-tier Rich Client
  - 80ms is the typical max, but not supported for CAD Mgrs
- 3-tier Thin Client
  - 200-300ms is supported today, but the thin client only supports a subset of PDM use cases
  - Business logic must be executed on the web server
  - Unattractive UI

Supporting High Latency Clients

- Meta-data
  - Goal is 1 round trip from client to server per gesture
- File Delivery
  - Keep the file “close” the user

Tc 2005 Deployment Architecture



Latency support between Client & Data Center

2-tier:

- 20-40 ms

4-tier goals: (not yet validated for all CAD integrations)

- Tc 2005: 120ms (validated for rich client; not yet CAD)
- Tc 2007: 200ms
- Tc 2008: 300ms

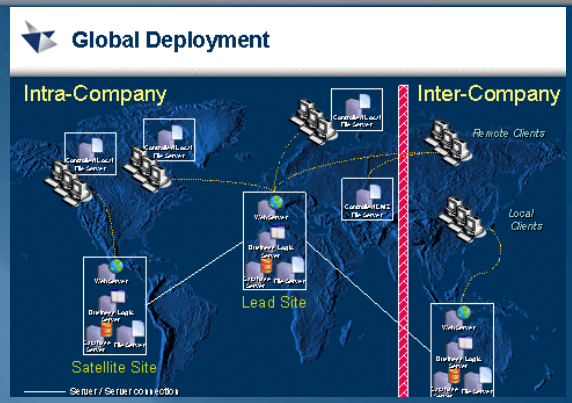
Latency – Tc 2005

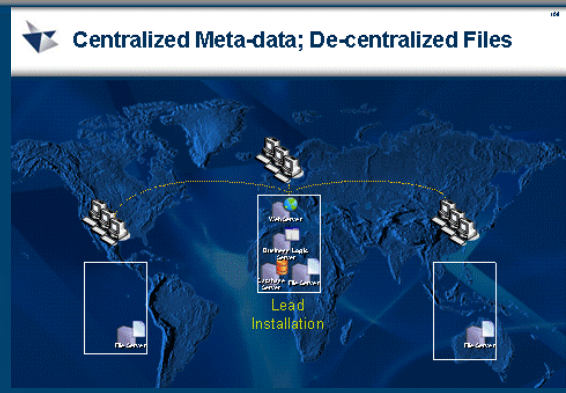
- 2-tier Tc 2005
  - Basically the same as V9.1
    - 20-40ms for acceptable performance
- 4-tier Tc 2005
  - As latency increases, performance is affected linearly
  - Not yet supported for CAD Mgrs
- 4-tier Tc 2005 SR1
  - Most CAD Mgrs now supported w/ 4-tier:
    - NX, I-deas, CATIA, ProE, Inventor
    - Mentor, Cadence

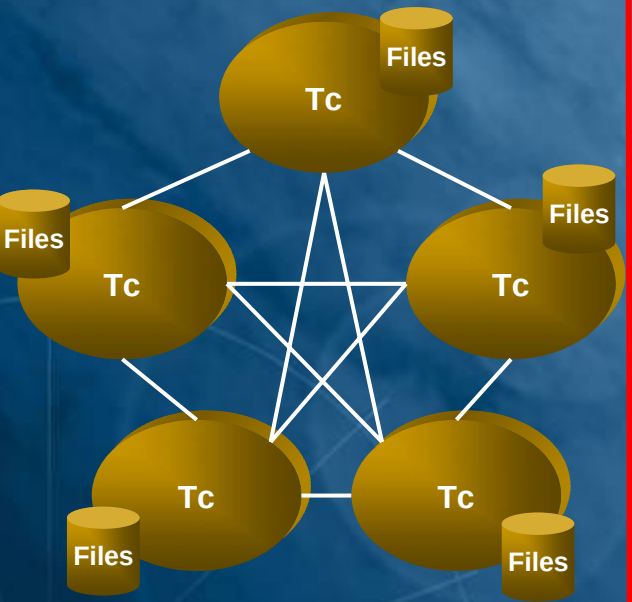
Architecture Evolution

- Supporting 2-tier isn’t wrong
  - Forcing 2-tier is wrong
  - Cannot require an HTTP listener on every desktop
- Supporting multi-site isn’t wrong
  - Forcing multi-site is wrong
  - Multi-site is still great technology for:
    - High latency or unreliable networks
    - Semi-Autonomous Installations

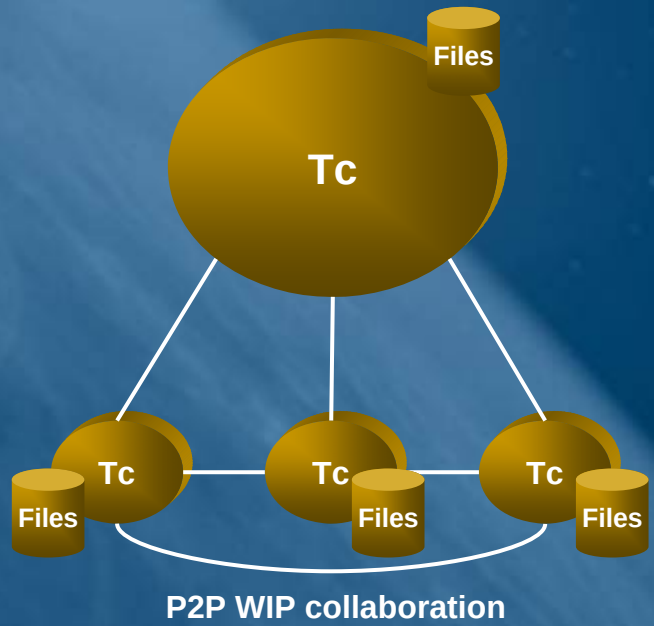
PLM Deployment Flexibility
(LAN / WAN Clients in all configurations)





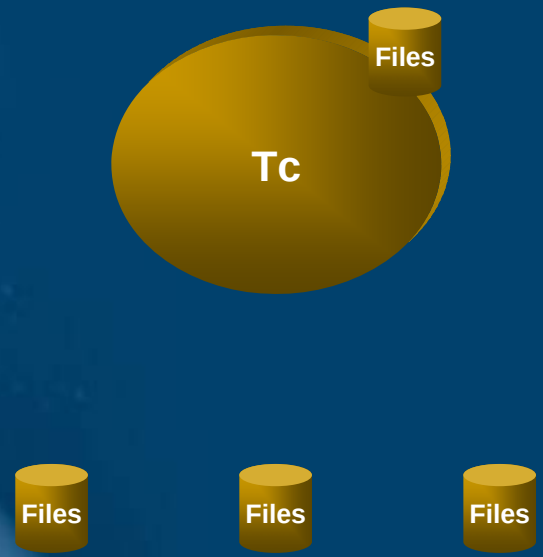


Peer-to-Peer



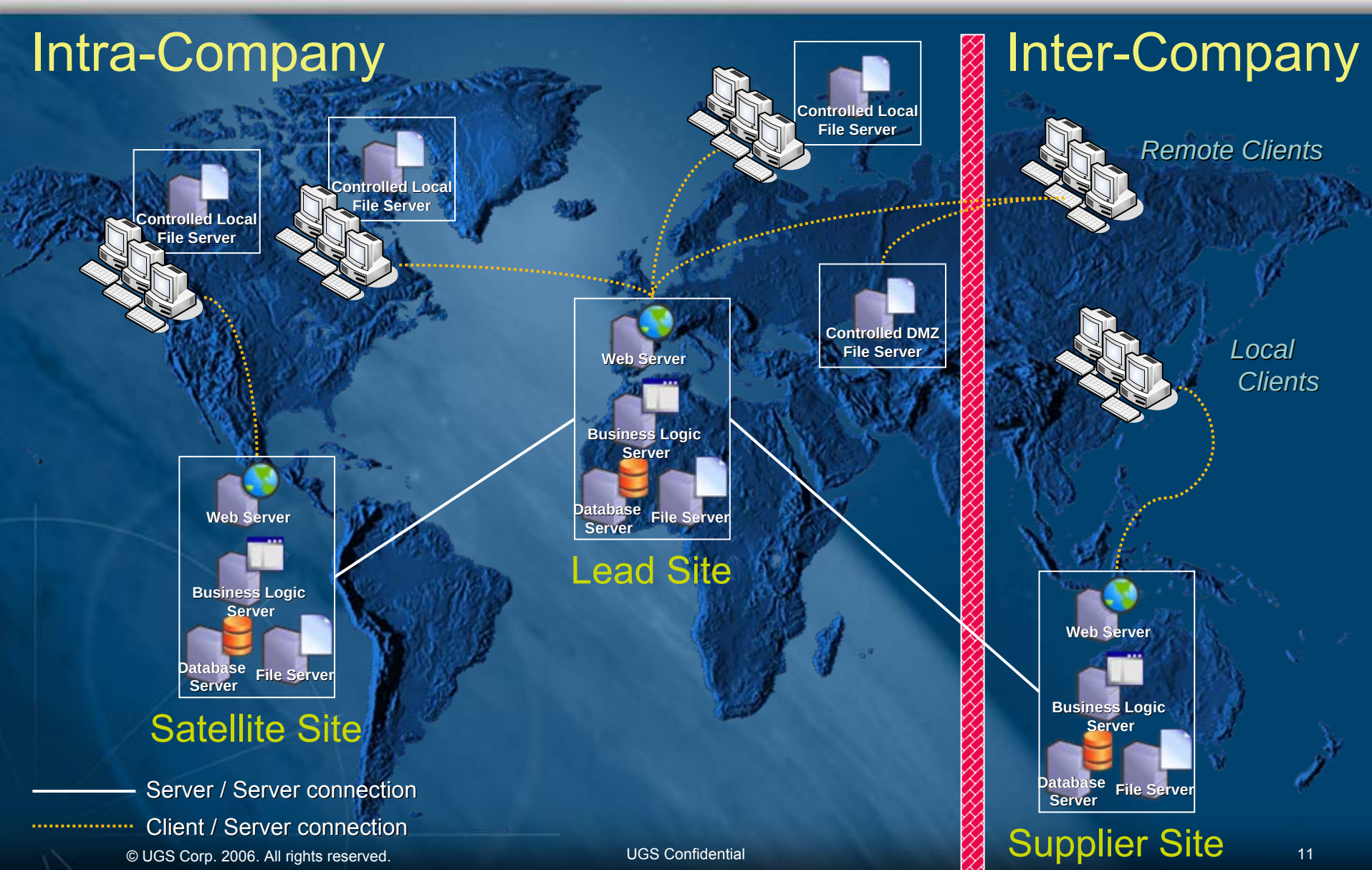
P2P WIP collaboration

Lead Site



Central Deployment

Global Deployment



When would you use Multi-Site?

- Coordination of
  - Semi-Autonomous Installations
  - Supplier / OEM integration
  - High latency WAN networks
  - Unreliable WAN networks
  - Proprietary projects (usually one direction only →)
- Support connection across installations that are running different versions
  (e.g., Tc V9.1 ←→ Tc 2005)

When would you want to “Centralize”?

- Consistent global processes
- Highly reliable WAN networks
- 4-tier Rich Client latency from desktop to “meta-data” data center is within supported guidelines
  - Tc2005 goal: 120ms
  - Tc2007 goal: 200ms
  - Tc2008 goal: 300ms

Tc V9.1 Deployment Support
Choosing The Right Technology For Your Global Deployment

You typically want the ‘fewest’ number of installations that makes sense

	Low Latency	High Latency
High Interaction	Single installation	Multi-Site
Low Interaction	Single installation or Multi-Site	Multi-Site
Semi-Autonomous Behavior	Multi-Site	Multi-Site
Large data / Many Revs	Single installation	Multi-Site
Follow-the-Sun	Single installation	Multi-Site

Tc 2005 Deployment Support
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Follow-the-Sun	Single installation	Single installation or Multi-Site

Tc 2007 Deployment Support
Choosing The Right Technology For Your Global Deployment

You typically want the 'fewest' number of installations that makes sense

	Low Latency	High Latency
High Interaction	Single Installation	Single Installation or Global Services
Low Interaction	Single Installation or Global Services	Single Installation or Global Services
Semi-Autonomous Behavior	Global Services	Global Services
Large data / Many Revs	Single Installation	Single Installation or Global Services
Follow-the-Sun	Single installation	Single Installation or Global Services

Well, what is “Multi-Site”?

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What is Multi-Site Collaboration?

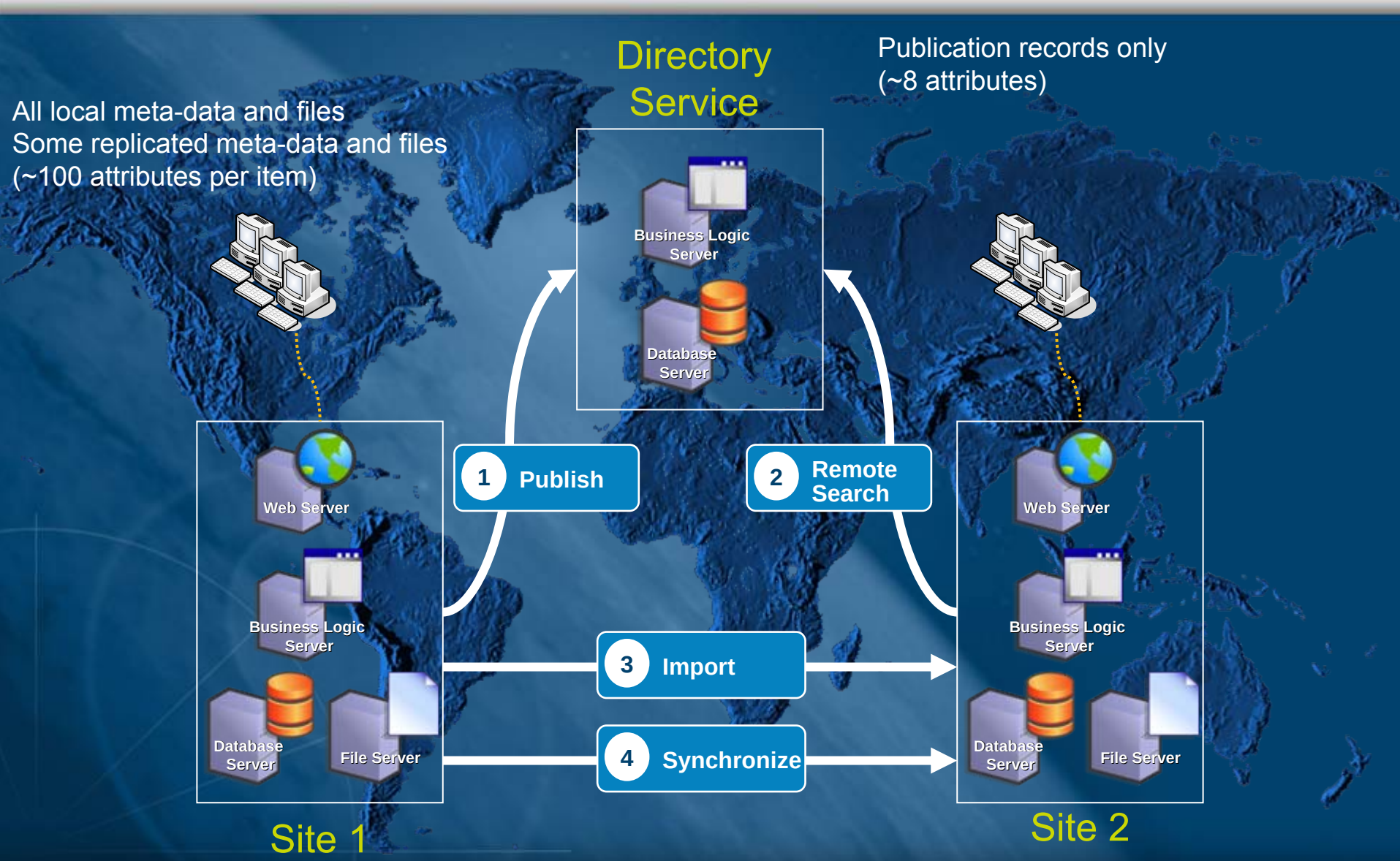
Federated Object Management System

- Federation (fed´ e ´rā´ shen) n. – a set of independent sites which are self sufficient, yet cooperate with each other
- Each site has its own resources, its own model, its own sets of users and groups, and its own business rules
  - Business rules consist of access controls, release procedures, change management practices, and other extensions

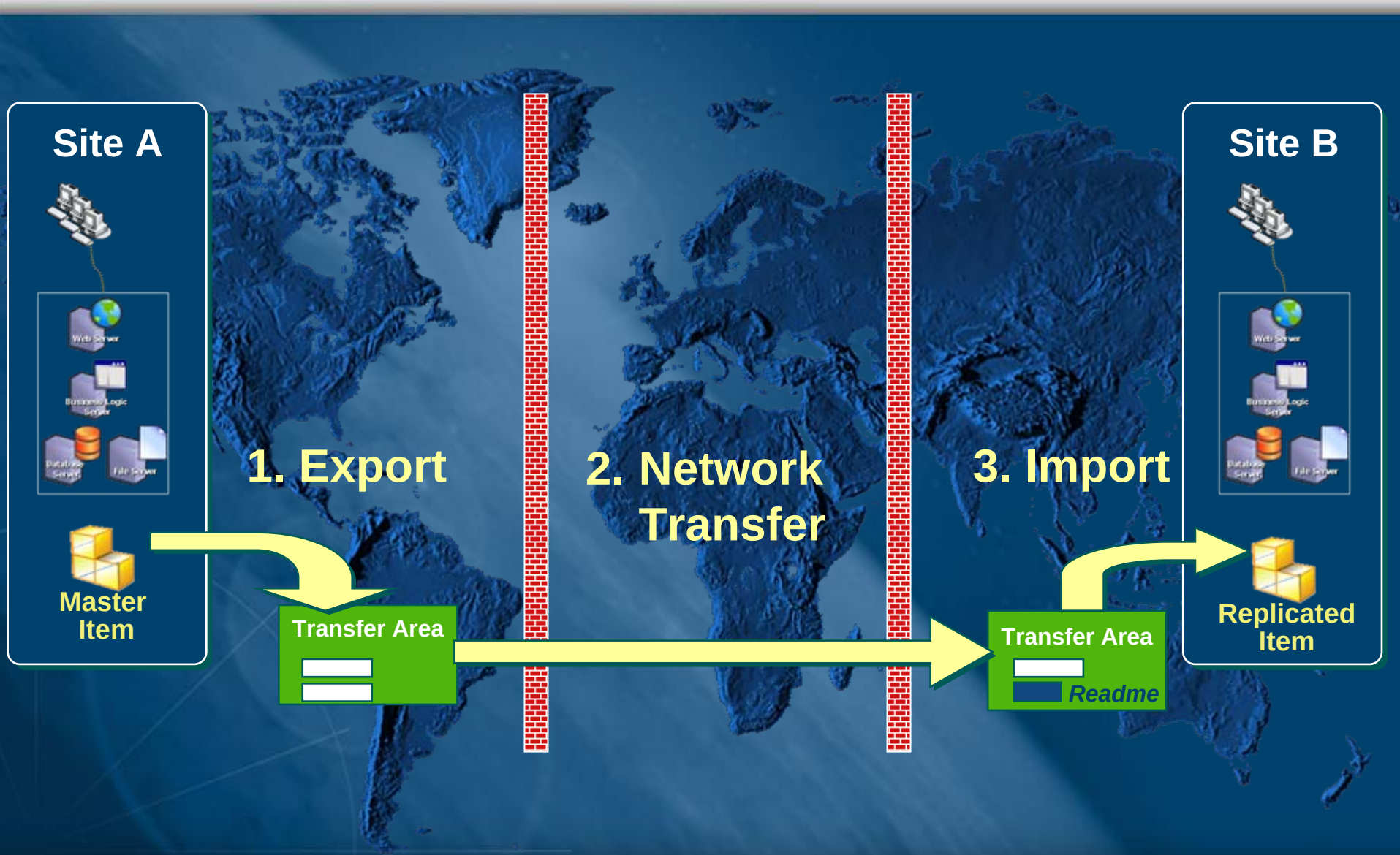
How Multi-Site Works

- Multi-Site is based on Item Import/Export and adds...
  - Remote Search against a directory service
    - *Essentially a “card catalog” that knows where data is hosted, but does not have a copy of the data itself*
    - *Note that normal search is against the installation the user is “logged in” to*
  - Automated Import/Export mechanisms supporting a simple “pull action”
  - Synchronization to propagate updates to replicas
    - *Only one installation has the modifiable copy (typically called the owning site) and all replicas are read only*

Multi-Site Fundamentals

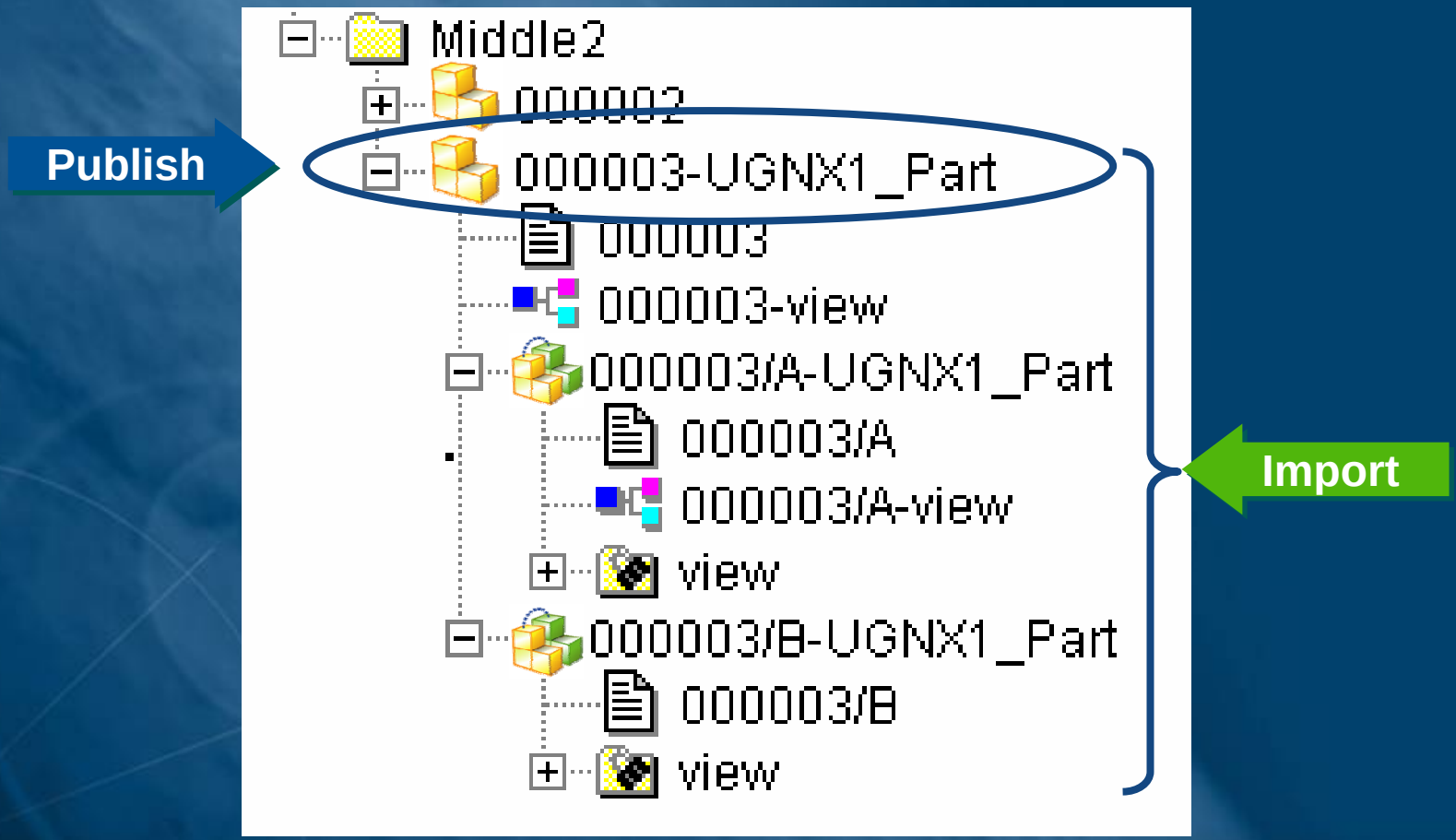


Multi-Site Collaboration Transfer Mechanism

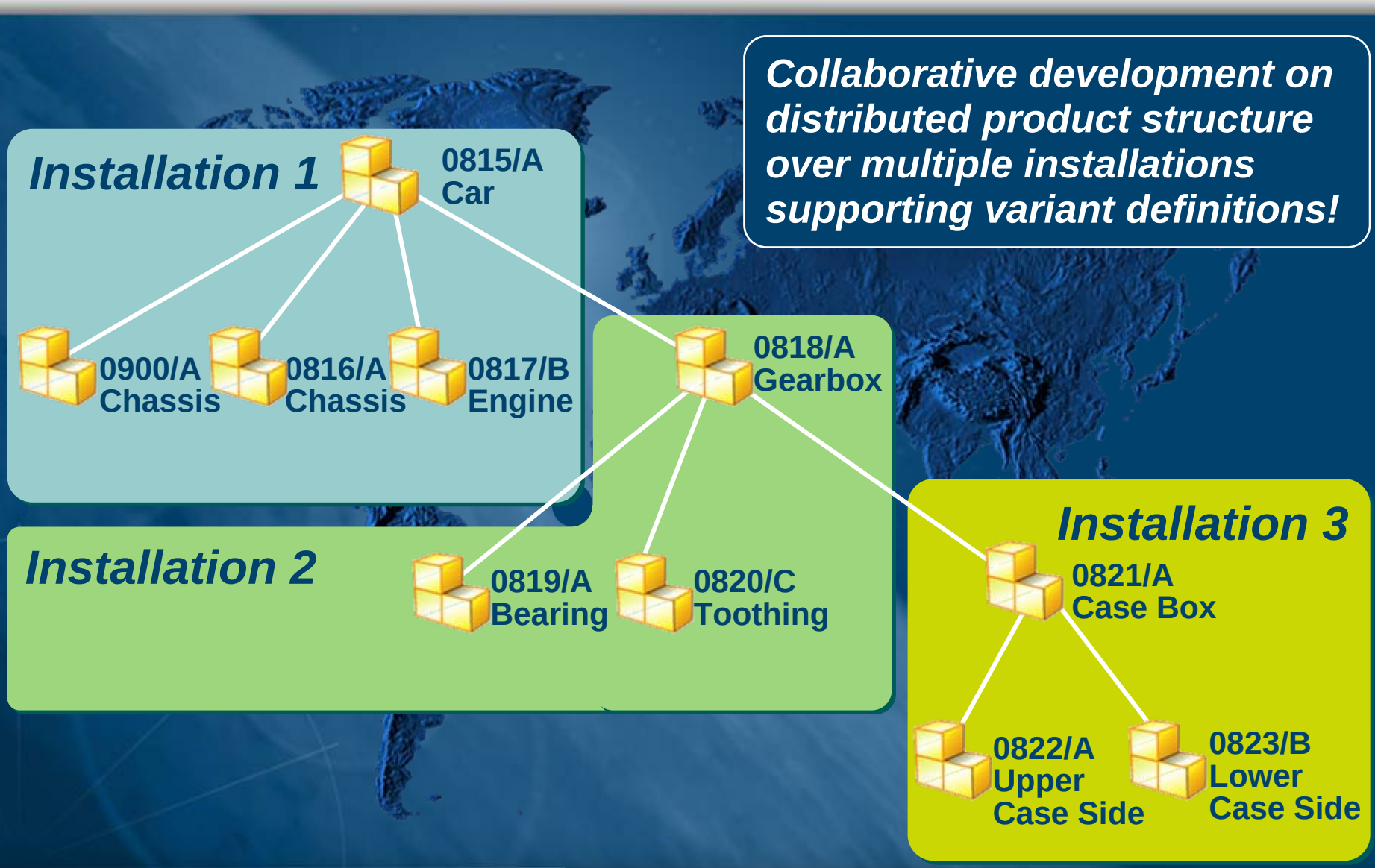


What is Replicated?

Items are the unit of granularity in Multi-Site

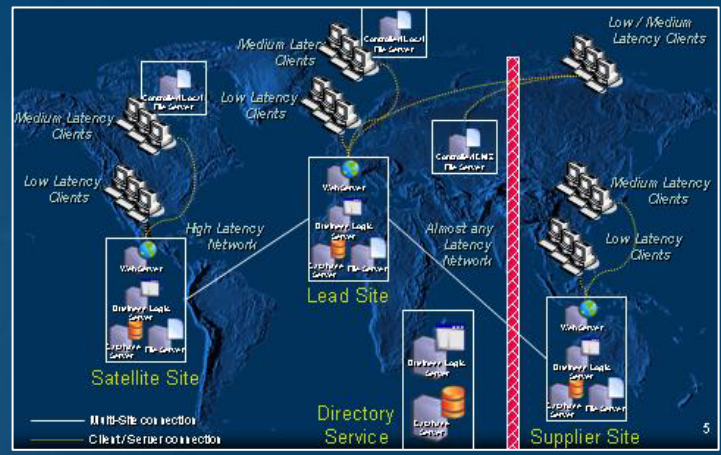


Global Product Development

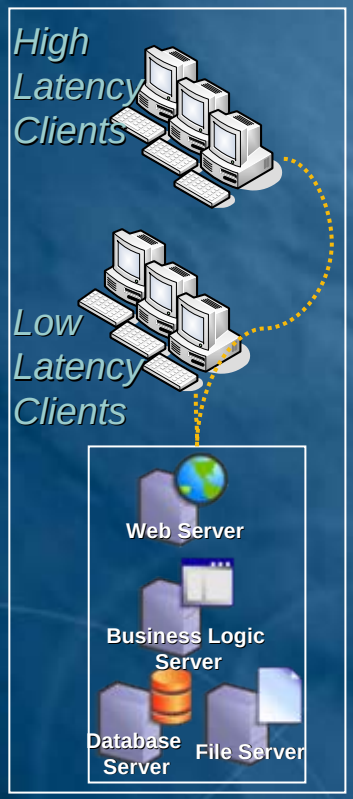


Multi-Site Strengths

- Coordination of
  1. Semi-autonomous Installations
  2. Sites with high latency networks
  3. Sites with unreliable networks
  4. Supplier / OEM integration
  5. Black projects (usually input only)
- Synchronization
  - On demand (pull)
  - At Lifecycle steps (push)
  - Interval based (push)
  - Subscription (deferred push on change)
  - Hub configuration (Store & forward; reduces point-to-point connections)
- Supports connection across installations that are running different versions (e.g., 9.1 ←→ Tc 2005)



Multi-Site Challenges



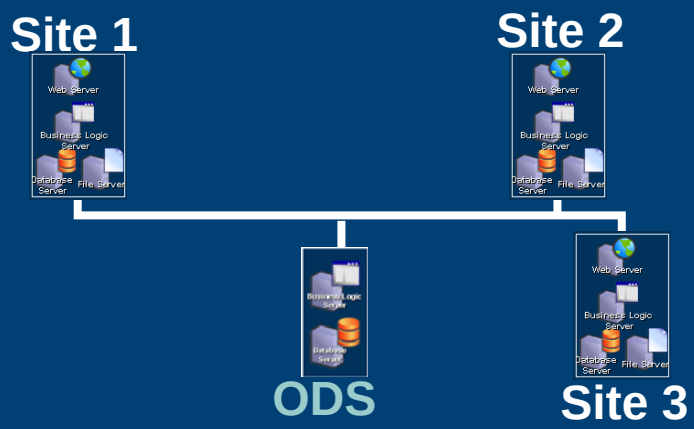
- It isn't a replacement for
  - Where high network latency clients are required
  - Where transactions are too slow to support "follow-the-sun"
- Not a way to improve the scalability characteristics
- Potential conflicts when replicating data
  - e.g. existing ItemID exists in importing site with a different UID
- Does not support distributed workflow
  - Teamcenter Engineering 2005 adds a "remote inbox", but not a way to connect workflow from one site to another

Multi-Site Best Practices

- Item Id Uniqueness across installations
  - Central Item ID Generation can be set up to ensure ID uniqueness across multiple sites
  - Other solutions are based on best practices
    - Reserve blocks of id's per site and use auto-generation of the Item ID's
      - e.g. 100,000 – 200,000 at Installation 1
      - e.g. 200,001 – 300,000 at Installation 2
    - Early publication in order to have the ODS ensure Item ID uniqueness

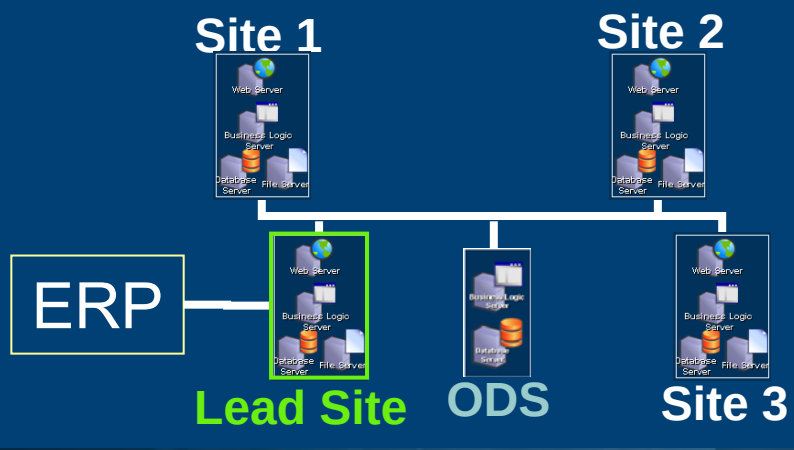
Standard Configurations

Peer-to-Peer



- Each installation runs in a fairly autonomous fashion
- Sharing between installations is on-demand
- Each installation must synchronize its replicas

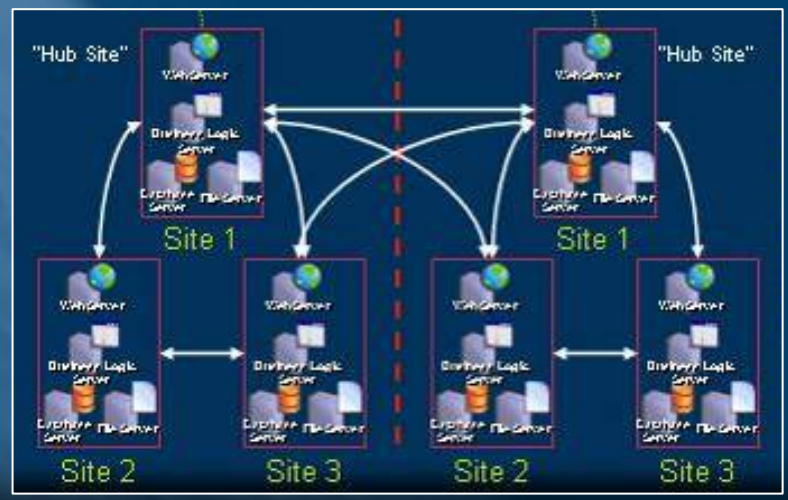
Lead Site



- Similar to above except that:
  - One installation is “more equal” than the others
  - This is the primary installation that typically updates ERP or interfaces to other legacy downstream applications

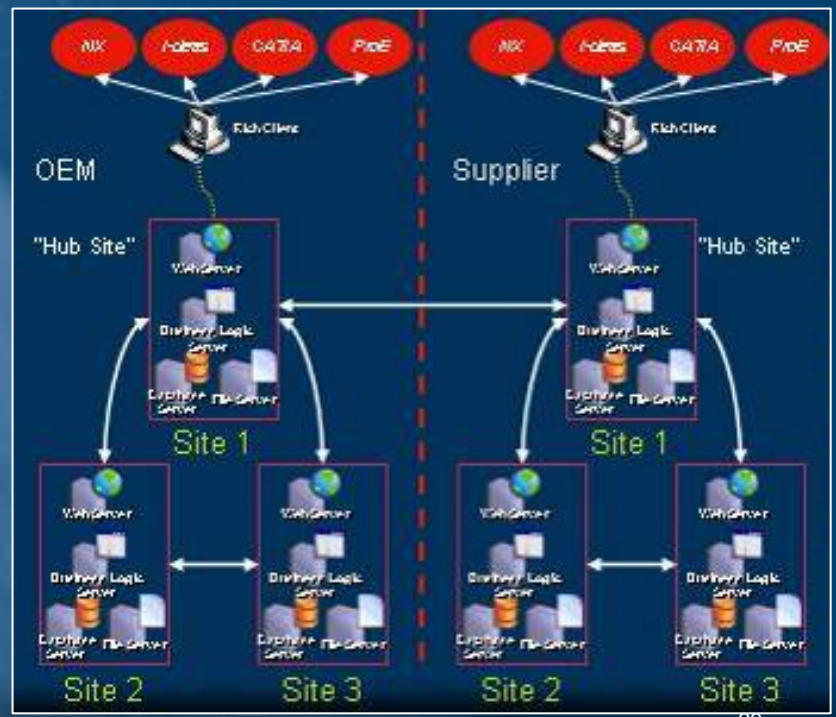
Firewall Considerations
Proxy IDSM

- By default, each installation that communicates with another installation uses 3 TCP ports to do so
  - This is not usually a problem within a company, but can be depending upon network topology
  - To alleviate this, you can configure a “proxy” IDSM server to so that instead of 3 ports per set of connections, you can have all connections between servers multiplexed on the same 3 ports
  - Especially useful for Supplier / OEM connections



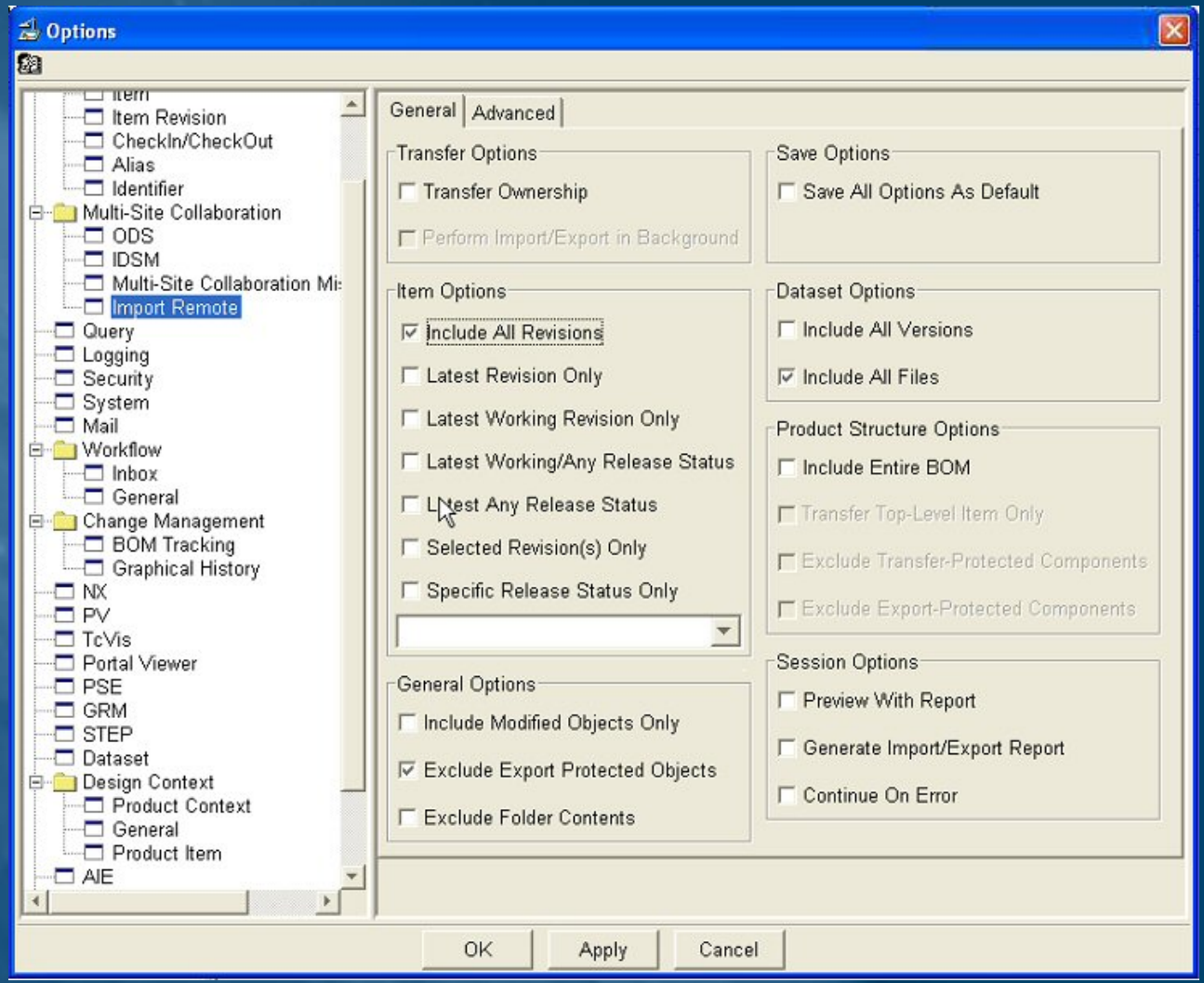
Synchronization Considerations
Hub Configuration

- By default, an object can only be replicated from its “owning” location; and only the owning location can synchronize its replicas
- To alleviate this, customers can configure an installation as a “Hub”
- This supports the “store and forward” of replica objects
  - This is particularly useful for sharing of items with suppliers and partners
  - Also useful if you don’t want an installation to have to update its replicas



Import Options

- Ownership transfer
- Rules for what item revisions and dataset versions to replicate
- Product structure options
- Miscellaneous options
  - Include / exclude
  - Reporting
  - Action on error

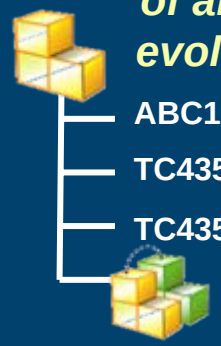


Global Services Roadmap

Multi-Site

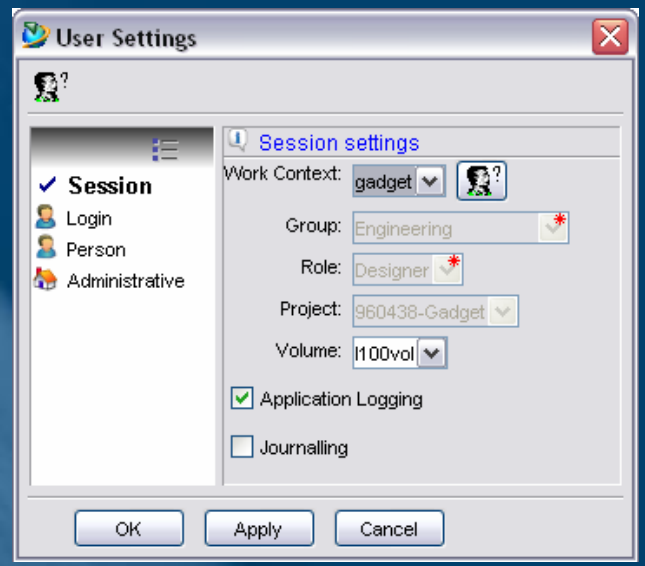
- 9.0 Centralized Item ID's / Auto Publish
- 9.0 Global subscription notification
- 2005 Background Remote Check-in / Check-out
- 2005 Improved site sync performance

Example use of alternate / evolving ID's



Multi-Site Enablers

- 9.0 Distributed System Administration
- 9.0 Identifier Objects (Alternate / Evolving ID's)
- 2005 Project level security
- 2005 Auto assign objects to Projects
- Remote Inbox



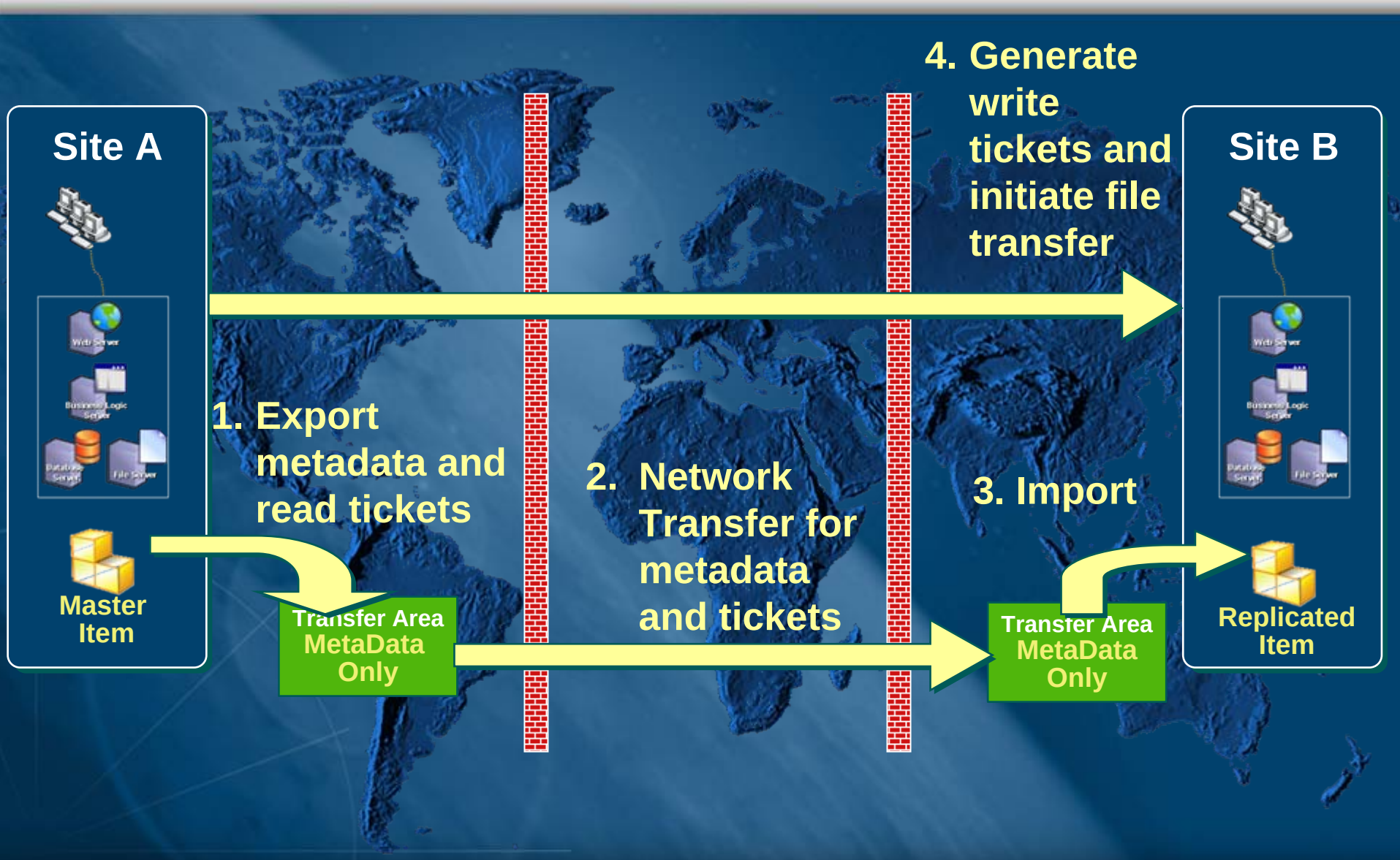
Distributed System Administration

- Enables the distribution of system administration data between commonly-managed sites via PLM XML
  - Users
  - Groups
  - Types
  - …
- Avoids problems in replicating product data due to missing system objects

Teamcenter Engineering 2005
FMS for Multi-Site

- Leverage the Onion-Networks-based accelerator used by FMS for up to 5X performance compared to FTP for file transfer in Multi-Site
- Leverage the caching capability of FMS for direct volume-to-volume file transfer between Teamcenter Engineering 2005 systems via FMS cache
  - Less file movement
  - Less temporary disk space required
- Not a full replacement…
  - Data sharing with pre-V10 systems will continue to retrieve bulk data out of the volume and use current Multi-Site protocol for data transmission
  - Metadata and POM transmit files will still be transmitted using current Multi-Site protocol

2005 Multi-Site Collaboration Transfer Mechanism with FMS



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