Smart Client Offline Data Caching and Synchronization

aka The talk formerly known as:

Synchronize Smart Client Data and Offline Data

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About Brian

- Principal Software Architect, IDesign Inc. (www.idesign.net)
- Microsoft MVP in ASP.NET
- Writing
  - MSDN Magazine, CoDe Magazine, The Server Side .NET, asp.netPRO, Visual Studio Magazine, .NET Developers Journal
  - Data Binding in Windows Forms 2.0, Addison-Wesley, expected release Fall 2005
- Speaking
  - Microsoft TechEd US and Malaysia, Visual Studio Connections, VSLive!, DevEssentials, INETA Speakers Bureau, MSDN Webcasts
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Agenda

- What is a Smart Client?
- Disconnected Operations Challenges
- Data Communications Approaches
- Client Side Data Caching
- Connection Management
- Data Synchronization
- Offline Application Block

What is a Smart Client

- Rich user interface (Windows Forms)
- Connects to back-end services
- Runs securely on the client
- Supports auto-deployment and update over the network
- Supports disconnected operations

Disconnected Operations Challenges

- Offline use case identification
- Online communications transport
- Connection management
- Client-side caching approach
- Offline data synchronization
- Security

Data Communications Approaches

- Database
- .NET Remoting
- Enterprise Services (COM+)
- MSMQ
- Web Services
- Indigo

Data Transfer Approaches

- Passing a Data Transfer Object via Method Call
  - .NET Remoting, Enterprise Services, Web Services
  - DataSet, custom business object (collection)
- Service-Oriented
  - Enterprise Services, Web Services, MSMQ
- Data replication
  - MSDE/SQL Express -> SQL Server

Connection Management

- Need to detect and control online vs. offline operations
- Detection techniques
  - Try connected operation – handle failure
  - Ping/connect attempt first
  - WinInet API
  - Offline Block Connection Management
  - NetworkChange/NetworkInterface classes (.NET 2.0)

Client Side Caching

- Memory
- Saved Data Transfer Object
- Database
- Message Queues
  - MSMQ
  - Database
  - Enterprise Services

Data Synchronization

- Data oriented
  - Merge replication
- Service oriented
  - Remote method invocation
  - Message delivery
    - Confirmation return message
    - Poll for completion

Demos

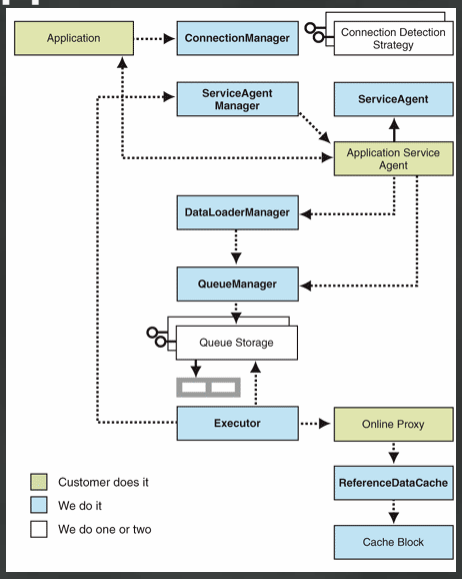
Simple Offline Data Caching and Sync

Enterprise Services Queued Components

Offline Application Block

- Connection State Detection / Control
- Download / Upload Data
- Queued data requests
- Reference Data Caching
- Asynchronous request processing
- Encryption / signing of stored data
- Provider model for connection detection, data request queuing, data caching, service agents

Offline Application Block



Demo

Offline Application Block Client

Summary

- Design for disconnected operations early
  - Identify offline use cases
  - Pick data communications technology
  - Select caching and synchronization mechanism
- Prefer decoupled, service oriented approaches for enterprise applications
- Simplest option: Isolated Storage caching of DataSets passed through Web Services
- Explore the Offline Application Block for maximum flexibility

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