

Synchronize Smart Client Data and Offline Data

Brian Noyes

IDesign, Inc. (www.idesign.net)

brian.noyes@idesign.net

About Brian

- Principal Software Architect, IDesign, Inc. (www.idesign.net)
- Microsoft MVP in ASP.NET
- Writing
 - MSDN Magazine, asp.netPRO, Visual Studio Magazine, .NET Developer's Journal
 - Building Windows Forms Data Applications with .NET 2.0, Addison-Wesley, expected release spring 2005
- Speaking
 - Microsoft TechEd, Visual Studio Connections, DevEssentials, VSLive!, INETA Speakers Bureau
- Participates in Microsoft design reviews
- E-mail: brian.noyes@idesign.net
- Blog: <http://www.softinsight.com/bnoyes>

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 (WinForms)
- 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 Communication Approaches

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

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
 - NetworkChanged class (.NET 2.0)

Client Side Data 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

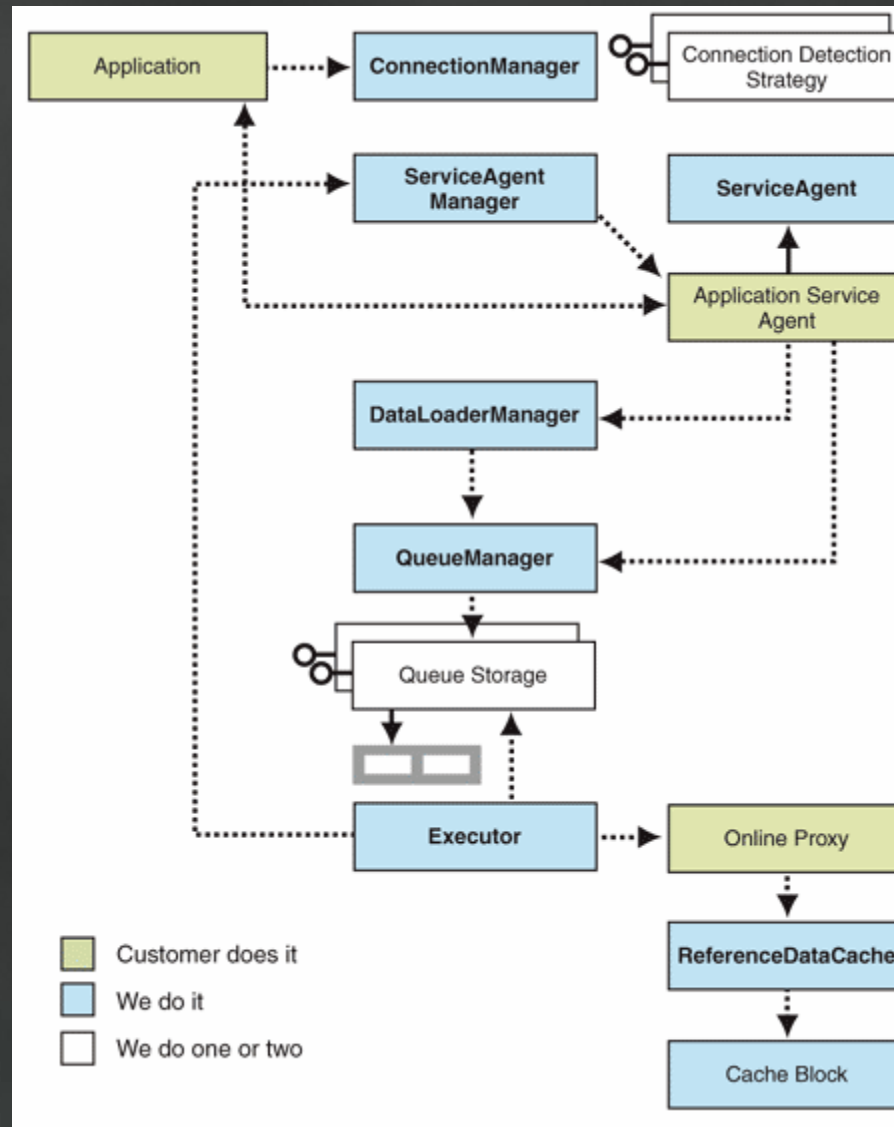
Demos

Simple Offline Data Caching
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
- Explore the Offline Application Block for maximum flexibility

Resources

- Smart Client Architecture and Design Guide
<http://www.msdn.microsoft.com/smartclient/default.aspx?pull=/library/en-us/dnpag/html/scag.asp>
- SQL Express
<http://lab.msdn.microsoft.com/express/sql/default.aspx>
- Offline Application Block
MSDN: <http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnpag/html/offline.asp>
Managing Offline Clients with the Offline Application Block, Klaus Aschenbrenner, DevX, <http://www.devx.com/dotnet/Article/21420/0/page/1>
- Enterprise Services / Queued Components
COM and .NET Component Services, Juval Löwy, O'Reilly and Associates, Inc., 2001.
- Web Services
.NET Web Services, Keith Ballinger, Addison-Wesley, 2003
- E-mail: brian.noyes@idesign.net
- Blog: <http://www.softinsight.com/bnoyes>