experience Banking

Technical
Overview

Building a foundation for innovation

Microsoft

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I. Introduction

Despite the digital revolution, the retail banking branch continues to be the primary delivery channel in retail banking. According to recent research by the Tower Group, 92% of U.S. households visit their branch at least once a month, and 50% consider the branch their primary contact point. Although customers may prefer one channel over others, there is a growing use of multiple channels; this places a growing challenge to banks in delivering a seamless and branded customer experience across all of their multiple channels.

At Microsoft, we believe technology has an important role in transforming the banking experience for customers, employees, and operations. As a result, we've made these three themes the focus of our experience△Banking framework.

At the heart of experience△Banking is a framework that delivers lower cost, rapid deployment, and ease of use in a straightforward, familiar interface that allows customer-facing employees to focus on the customer, not the software. That means every employee, from the branch manager to the customer service representative to the teller, has the ability to provide services tailored to the specific needs of each individual customer. Moreover, short implementation cycles put solutions in the hands of customer contact employees quickly and accelerate returns on investment.

This technical overview provides a high-level view of the Microsoft approach for the retail banking industry. It describes the value that can be provided to banks and independent software vendor (ISV), by:

> Creating holistic customer views that enable personalized services

> Offering consistent cross-channel communications

> Providing branch staff with sales and service applications that are easy to use

> Presenting customers with attractive and efficient self-service options

Last, this technical overview reviews the key implementation considerations for bringing to life deployments within a bank environment.

In line with the ongoing commitment of Microsoft to open standards, the Microsoft approach for retail banking provides a foundation for easy integration of applications. The result is a flexible platform that delivers consistent, high-quality service while allowing for future growth and innovation.

II. The Value of experience Δ Banking

Technical managers and analysts face significant challenges when implementing technology in banks. The Microsoft approach for retail banking was designed to address three critical factors that banking information technology (IT) management faces when considering deployment of multichannel solutions:

> Speed to value

> Integration and implementation complexity

> Technology life cycle

Speed to Value

In today's economic climate, banks are extremely diligent about controlling operating costs and focus much of their attention on relentless service execution, efficient product origination, and profitability. The speed with which value is achieved has become almost as important as the size of the return.

Speed to value is the period between deployment of technology solutions and the realization of business benefits. Speed to value factors in not just the technical complexity of implementing new capabilities, but also the change management issues that affect deployment, including the human factors.

In a fast-paced retail banking environment, it is crucial for new systems to offer familiar, intuitive interfaces that reduce training time and facilitate rapid adoption.

The Microsoft approach for retail banking draws on Microsoft research and development (R&D) investments to create solutions that are simpler to implement, easier for the end users to learn, and quicker to scale to full production. This framework reduces the clutter and complexity of designing technical infrastructure by taking advantage of standards-based solutions that are already familiar to enterprise banking IT organizations. The end user should find familiar user interfaces regardless of the type of device he or she uses to access the various applications. The scalability is grounded in years of Microsoft and industry research into developing robust, production-ready business solutions. This mature technical infrastructure should have minimal ramp-up time for IT personnel as well as end users, resulting in a more rapid time frame for achieving the desired return on investment (ROI).

Integration and Implementation Complexity

Applications in banks are often fragmented one-off implementations that lack consistency in capability, have overlapping scopes, and suffer from poor functional or data integration. The result is silos of applications that provide suboptimal operational outcomes, minimal if any enhancement in selling and cross-selling capabilities, and an undifferentiated customer experience.

Addressing this challenge requires systems integration—a complex and expensive proposition that banks rarely have the time or skill to effectively implement. External integrators can certainly fill that gap, but the framework must be able to address the complexity issue as a design point to deliver the promised value from application integration. By simplifying this integration complexity, the architecture can reduce the time frame required to implement and reduce the cost and effort of delivering desired results.

The Microsoft approach for retail banking provides a framework that articulates standards, methods, and processes for integrating banking applications. In addition to tried and true methods for application integration, the framework features new capabilities enabled by Web services and customer device integration. Implementers of the framework can benefit from shared integration methods and focus more on the issue that drives value: application function.

Automated systems management solutions are critical to the cost-effective management of branch environments. The systems management tools should leverage the framework to ensure consistency of implementation and to reduce the high cost of managing one-off solutions.

Technology Life Cycle

Large capital projects have been delayed for many years due to fiscal constraints. Only now have banks, impelled by the aging and obsolescence of their technology, begun to take on this daunting challenge. They are seeking ways to ensure that the refreshing of their technical infrastructure can have greater longevity, provide a platform for growth, and support new and emerging technologies, such as next-generation mobile devices and radio frequency identification (RFID).

As described earlier, the Microsoft approach for retail banking is grounded on mature and stable technology that has been used in the production of banking solutions for some time. As Microsoft works within its R&D organization as well as with industry groups, ISVs, and standards bodies to define new solutions for the banking industry, the Microsoft approach for retail banking will be the infrastructure that underpins those innovations. As emerging technologies such as RFID or new wireless terminals become available, Microsoft enables these innovations within the architecture.

The Microsoft approach for retail banking is a solid platform for growth that allows banks to leverage their existing investment in skills and technology while establishing a foundation for adopting new innovations as they emerge in the marketplace. Banks will have not only a robust infrastructure to build on, but also Microsoft technology leadership to mitigate the risks of technology obsolescence in the long run.

III. Functional Architecture

The Microsoft approach for retail banking defines the business functions that Microsoft enables for a retail bank. These business functions provide a high-level map of the application required to run a customer-centric distribution environment that ensures a consistent cross-channel experience. The Functional Architecture is banking-specific and depicts a series of layers that provide discrete functionality. Each of these layers is described below.

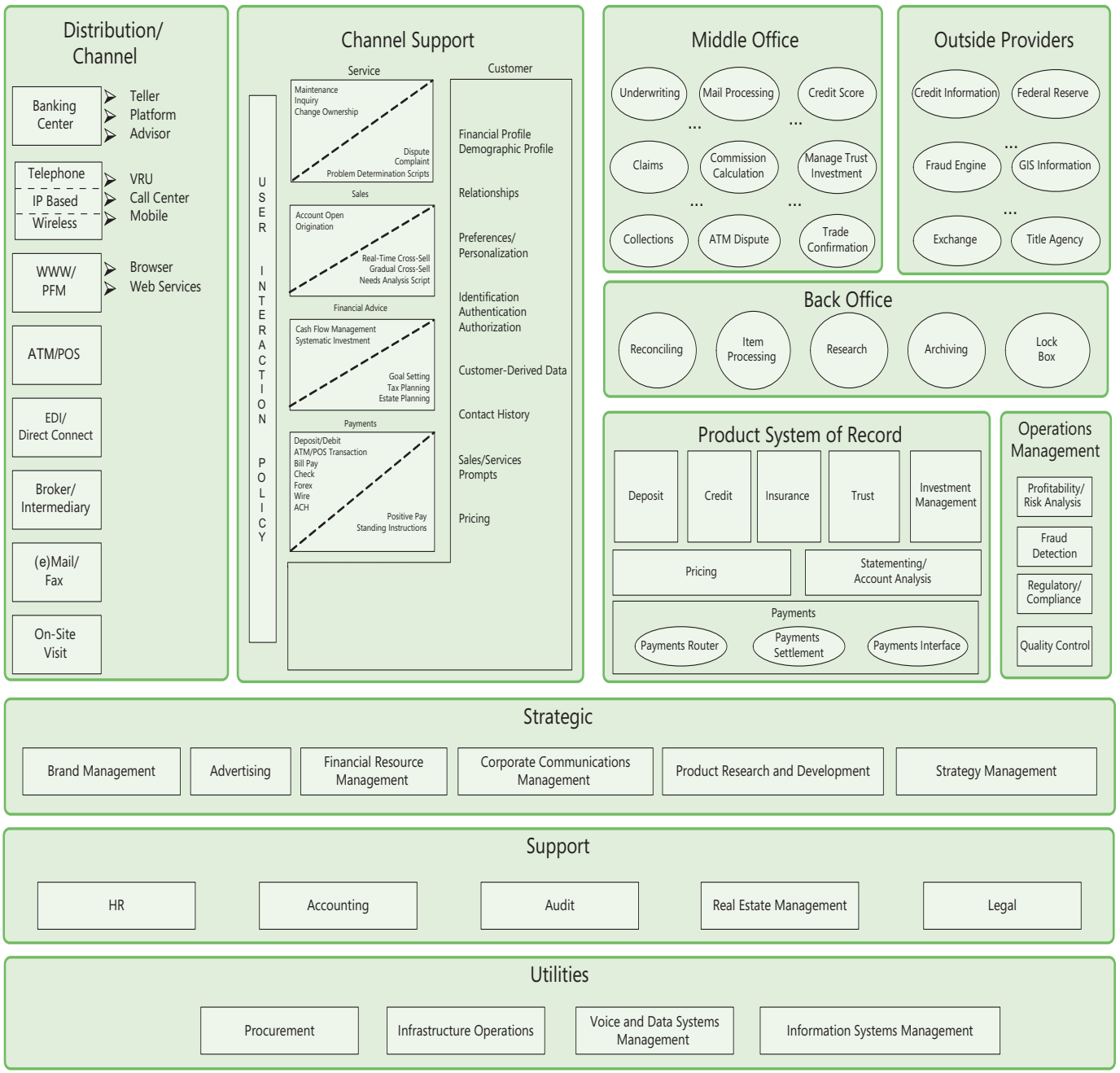

Figure 1

Distribution/Channel

> Presentation/interaction services—between the financial institution and its customers

> Self service—the customer interacts with a bank employee to access the bank's services (e.g., VRU)

> Assisted—the customer interacts with a bank employee to access the bank's services (e.g., call center)

> Automated—a program owned by the customer interacts (automatically or through a customer action) with bank systems to access the bank's services (e.g., personal financial manager [PFM])

It is important to note that a device does not equal a channel, since a device may provide access to more than one. For example, a phone can provide access to a VRU, a call center, and, potentially, the Internet.

Channel Support

In the last decade, channels have become more alike in the functionality they offer, increasing the importance of ensuring channel consistency. To address the costs and improve channel consistency, the architecture contains a Channel Support set of services that are based on a robust customer information repository (CIR). A multichannel support infrastructure will be logically dependent on the CIR.

The six components of the Channel Support layer:

1. User Interaction Policy provides a consistent interaction approach across all the channels that is an important aspect of a solid customer experience. This component provides support for the implementation of the customer interaction business logic:

> Consolidates shareable navigation/interaction logic

> Simplifies the navigation of the multichannel component model by aggregating service calls

> Provides for reusable graphical user interface (GUI) components

> Supports cross-channel collaboration and security for unstructured information

2. Customer Information Repository (CIR) provides for eight clusters of customer information. It acts as the system of record for customer information and is the authoritative source for name, address, product ownership, etc. The CIR is used to drive the other services provided in the Channel Support component. The CIR component allows for:

> Holistic treatment of the customer

  – Bank employees have access to:

    • accurate view of the full relationship

    • electronic memory to understand previous interactions

  – Single-access identifier for all self-service channels

> Differentiated treatment of the customer

  – Deliver precise product advice

  – Adopt differentiated service levels

  – Allow for one-to-one pricing

3. Service provides services to satisfy basic maintenance-, dispute-, and refund-type requests. The goal of this component is to strive for "once and done" processing of service requests. When this is not possible, the component will support a "capture/track/route" process of the request and ensure channel actionability and feedback so that a request initiated through one channel can be updated/monitored through another channel.

This component will mainly interface with middle- and back-office systems.

4. Sales provides services in immediate support of the sales/product setup process. Again the focus is on achieving as much automation and cross-channel support as possible.

5. Financial Advice provides services required to support basic to advanced financial advice. It is important to note that most advice functions today are very labor intensive. The goal of this component is to create financial planning functions that are highly automatable, and to provide an infrastructure to support the more manual aspects of advice.

6. Payments become more and more real-time and take on multiple forms, creating a need to execute consistent business logic across channels at the time of "presentment" of the payment. This logic can relate to fraud, money laundering, and Payment authorization.

Middle Office

The Middle Office provides services for those functions that might require an interaction between the customer and the bank. A portion of these requests can be automated, but some cases may require the exchange of additional information. In addition, the Middle Office helps answer certain requests by providing missing information that enables straight-through processing to back-office systems.

Outside Providers

Outside Providers offer specialized services that are part of the bank's value chain. Some of these services are accessed through the bank, others through direct interfaces. The providers play a broad spectrum of roles, from national bank infrastructure through exchanges to title companies.

Back Office

Back-Office services are very standardized and repetitive. They should never require any interaction with a customer. The goal is to automate as many of these functions as possible. Most of these functions benefit from economies of scale.

Product System of Record

The Product System of Record services can be split into three distinct categories:

- **Accounting Systems/ The Core Product Accounting Systems**
  These systems are currently a mixture of accounting, pricing, customer, and statementing functionality. In the Microsoft approach, these systems focus on product accounting only.
- **Payment Systems**
  The payment infrastructure of a bank is normally a complex set of point-to-point interfaces. The multitude of interfaces makes optimizing payments processing a complex undertaking. In the Microsoft approach for retail banking, payments functionality is centralized and accessible in a "hub and spoke" manner. This provides a means of radically transforming the processing flow of internal payments.
- **Pricing/Account Analysis Systems**
  It is hard to truly implement relationship-based pricing in retail banking (in contrast to commercial banking). By creating an "account analysis"–like infrastructure for consumers, the Microsoft approach will make it possible to create one-on-one pricing and statementing.

Operations Management

Operations Management focuses on ensuring that the bank is run as efficiently as possible on a day-to-day basis. Operations Management impacts all the previously described components, which send/receive information to/from this function. Regulatory/compliance requirements are an area of ever-growing complexity. The Microsoft approach provides a comprehensive way of approaching these requirements.

Strategic

Strategic services focus on managing the bank's financial assets through treasury management, investing for the "own account," securitization, and developing and creating the brand and new products.

Most functions in strategic services require very specialized information systems with their own lightweight work flow, used by a small number of employees.

Support/Utilities

Although there are banking aspects to these functions, they are very much horizontal in nature. They are included here in the interests of providing a complete picture.

IV. Technical Architecture

Figure 2 below illustrates the technical services that support the retail banking functional architecture.

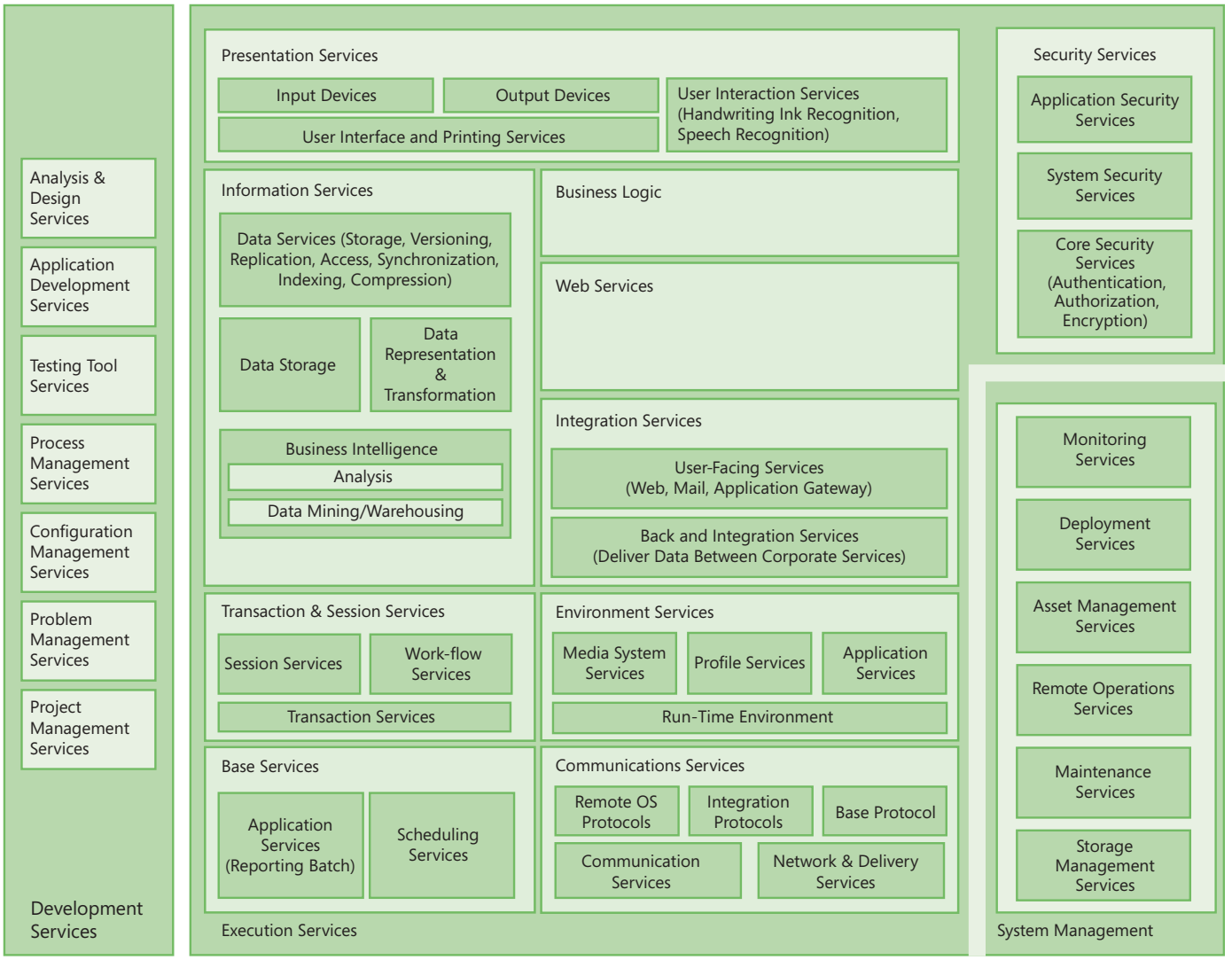

Figure 2

Execution Services

The Execution Services provide the major IT services needed to run business applications for the bank. These major services include the following:

- **Presentation Services** provide the ability to interface with the customer through a self-service, assisted, or automated distribution channel. Presentation Services are divided into four major groups:
  - Input Devices
  - Output Devices
  - User Interface (UI) and Printing Services
  - User Interaction Services

  The first two groups comprise the actual hardware that supports the UIs.

- **Information Services** are divided into four groups within the Banking Technical Services Architecture:
  - **Data Services** provide the utilities needed to work with data by providing data storage, versioning, replication, synchronization, indexing, and compression services.
  - **Data Storage** contains the actual data the bank applications use. This data may be an actual database, a document repository, a directory, a file system, or another specialized data store such as a geographic information system.
  - **Data Representation and Transformation Services** maintain data schemas and validation tables, provide transcoding services, and serialize data.
  - **Business Intelligence Services** provide the tools to filter data so a user can draw conclusions about business performance. It is divided into Analytic Services and Data Mining and Warehousing Services.

- **Transaction and Session Services** act at the unit-of-work (transaction) level, at the application-session (session) level, and at the work-flow level, which can be composed of several sessions:
  - **Transaction Services** are a single action executed as a result of input by a user or another application.
  - **Session Services** connect a set of consecutive operations a user executes within an application.
  - **Work-Flow Services** connect a set of logically connected business operations made on an application by one or more users in one or more sessions.

- **Base Services** provide the framework and tools to enable the processing of batch jobs and delivery of generated reports and correspondence. These services also provide a system scheduling capability.

- **Business Logic Services** contain the business application that is being executed to provide a business function.

- **Web Services** are a core communications capability between almost any system component in the architecture. Web Services are a way to integrate systems on the same or different platforms in any location.

- **Integration Services** deliver data from the branch server to the branch clients as well as to the back-end servers.

- **Environment Services** are made up of three components: Applications services perform error handling, notification services, as well as any code table translation (such as for language support); profile services describe the users, hardware, application, and locale parameters required to run an application; and media system services support any data type other than text: audio, handwriting, voice, and video.

- **Communication Services** support any services that have to do with communication outside the server. These include remote operating system (OS) protocols, base communication protocols, communication control services, and network directory services. It is essential that critical branch functions continue to operate when any part of the branch communication network fails. This provision for key function failover is a branch requirement and continues to be part of this new architecture.

Development Services

Development Services provide the tools needed across the various stages of the software development life cycle. It should be noted that many of these services are required even if the bank does not develop its own software. Defining requirements, testing, and managing problems are examples of services required by all institutions:

- **Analysis and Design Services** provide the tools to specify system requirements and how the system requirements will be implemented.
- **Application Development Services** provide the tools used to program or build the system.
- **Testing Tool Services** capture, store, and maintain relationships between the test conditions, test cycles, test data, and issue logs.
- **Process Management Services** provide the tools to properly sequence simple business process tasks as well as manage work flow for complex situations that include multiple groups or systems.
- **Configuration Management Services** provide the tools for managing version control, change control, and migration control to ensure that changes to components are properly captured and shared across the development team.
- **Problem Management Services** provide the tools to manage and track the system issues identified and ensure that each is documented and resolved.
- **Project Management Services** provide the tools to enable the management teams to properly track the status of a system's development project as well as perform planning, scheduling, and reporting activities.

Operations Services

Security and systems management are critically important to the successful operation of bank systems.

Operations Services provide the ability to manage devices and software easily as well as protect them from unauthorized access. Security Services operate at the core layer of the infrastructure, at the system layer, and at the application layer.

- **Core Security Services** provide the foundation for the other security services. Core Security Services include authentication services to verify that an entity is what it claims to be. In addition, these Core Security Services include authorization services, which implement access policies that restrict which entities can access a specific resource. Core Security Services also include encryption services that use cryptography to protect the data within a specific transaction.
- **System Security Services** interact with the environment, information, and business logic services to provide certificate management, content and virus inspection, and intrusion detection.
- **Application Security Services** interact with the presentation, business logic, and integration services to provide single sign-on capabilities, registration and identification capabilities, nonrepudiation services, and notarization and logging services.

Systems Management Services within Operations Services work in conjunction with the Base Services, which provide the reporting and scheduling capabilities.

- **Monitoring Services** monitor the run-time state of an application, including server load, successful job execution, and system error conditions; and trigger notification events to either software routines or to human beings. Typically, exceptional conditions are routed to an enterprise-located systems management central location or console. This systems management capability may automatically issue system commands to remedy problems that were logged. Client machines and logs are also monitored.

- **Deployment Services** control the release of software and operating system changes to a specific location or facility through a managed and controlled mechanism. In the case of a branch-located system, both server and client application and systems software must be deployed. A teller or platform image may be deployed in two steps with the new image being deployed to the local server and then loaded to the client at a specified time or, in the case of a thin client, at boot time. The ability to revert to a previous image is also contained in this service area. Before a new deployment occurs, this service checks for software prerequisites and ensures that the physical hardware is adequate for the new software release (e.g., that there is enough disk space or memory on the machine).
- **Asset Management Services** provide visibility into the location and ownership of any type of device located within a specific location, including handhelds, ATM systems, and display screens. This service also tracks the software versions installed on each hardware device.
- **Remote Operations Services** provide the tools for centrally located staff to control and change system configuration and settings on hardware that resides within a specific location. This capability includes the ability to take over the operations of a remote machine to resolve problems. This function must provide the ability for a remote support desk to maintain both servers and clients in the branch. It also should allow remote staff to either shadow a user in the branch or take control away from that user.
- **Maintenance Services** provide the tools for centrally located staff to diagnose issues that are occurring on a device at a remote facility or location. This capability works along with Remote Operations to provide the ability to easily resolve issues from a central location.
- **Storage Management Services** provide tools to efficiently manage and optimize the use of data storage technology that resides in a branch.

The Microsoft approach for retail banking comes to life through the physical and logical implementation of technology solutions that enable retail banking innovations. Many ISVs and system integrators have developed and deployed enterprise banking solutions that conform to the experience Δ Banking framework.

V. Microsoft Product Alignment

The Microsoft Technology Platform fully enables the functional architecture for retail banking. The platform has been designed to work with your current IT investments and is fully XML Web services enabled. The platform enables speed to value, allows you to develop and deploy secure applications quickly, reduces integration and implementation complexity, and provides a long-term technology foundation for the future.

The following framework provides an example implementation of how the Microsoft products can enable your retail banking architecture.

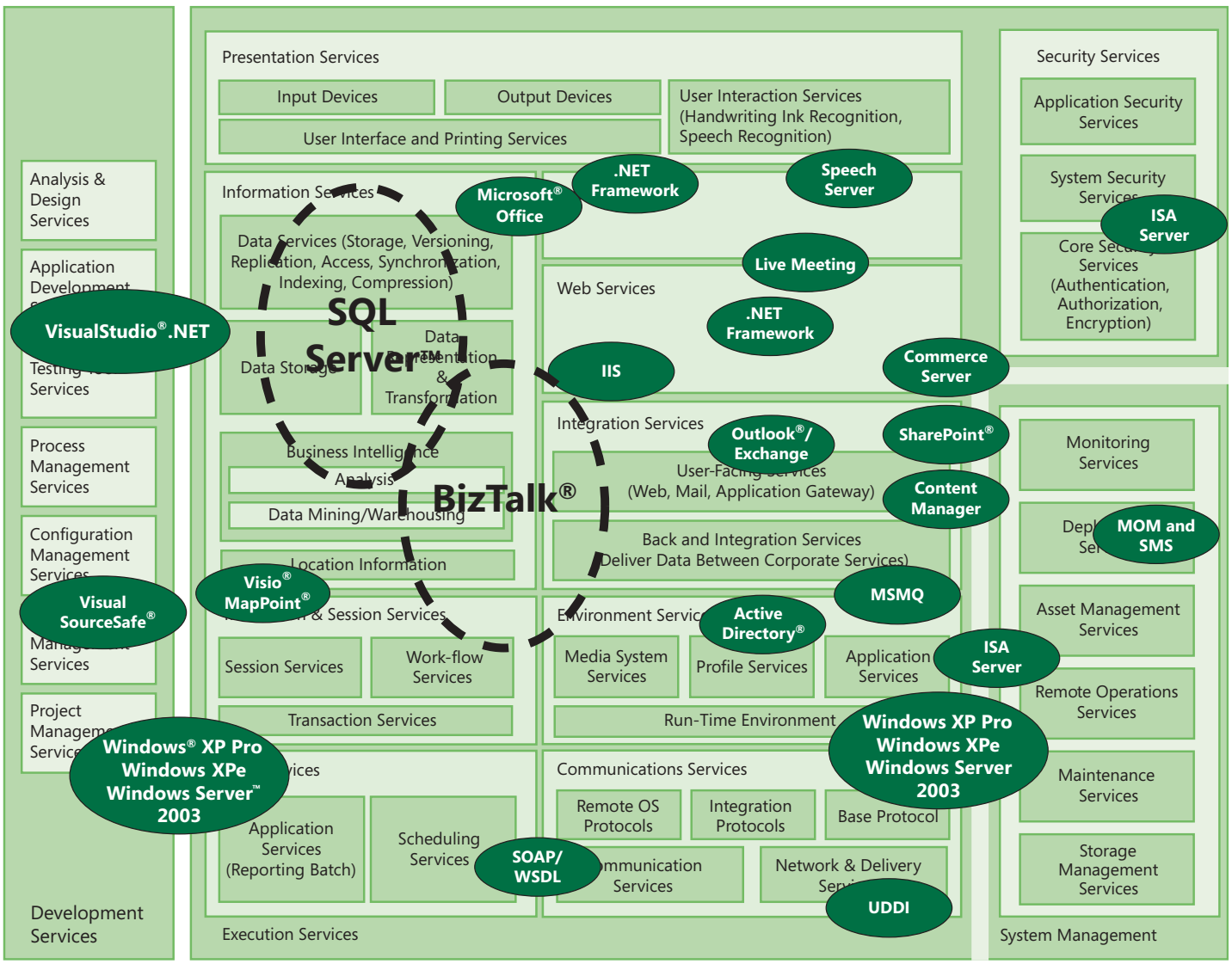

Figure 3

VI. Major Microsoft Technologies Contained in experience Banking

Product Descriptions

Windows Server provides an integrated server platform that includes many services, including all UI and communications protocol functions. Other included functions are highlighted in the table with an asterisk (*).

Active Directory* (AD) delivers authentication and role security services.

SQL Server offers database support. It includes analytics, data transformation, and reporting functionality.

Windows XP Professional operating system provides basic client platform support.

Message Queuing* (MSMQ) provides reliable network communications services based on a messaging queuing model.

BizTalk Server provides the orchestration and messaging functions to deliver Real-time Retailing. It can also use MSMQ for messaging and provides enterprise applications integration services.

Internet Security and Acceleration Server (ISA) provides a firewall and supports a caching function for Internet applications.

Systems Management Server (SMS) provides application deployment, security patch management, mobility terminal management, asset management, and integration with AD through Windows Management Services.

Microsoft Operations Manager (MOM) delivers enterprise-class operations management, by providing comprehensive event management, proactive monitoring and alerting, reporting, and trend analysis.

Windows SharePoint Services is a development platform for creating collaboration and information-sharing applications.

Commerce Server provides a powerful set of capabilities for non-transaction-based sites, including user profiling, content targeting, multilanguage capability, and advanced business analytics.

Content Management Server enables companies to quickly and efficiently build, deploy, and maintain content-rich Web sites.

Visual Studio .NET provides a single comprehensive development tool known as an integrated developer environment (IDE) for creating the next generation of applications.

Microsoft Office System includes new programs, servers, and services that build on the productivity software skills.

The **.NET Framework** simplifies Windows software development. It provides developers with a single approach to build both desktop applications—sometimes called smart client applications—and Web-based applications.

Microsoft Speech Server contains all the server components for deploying telephony (voice-only) and multimodal—(voice/visual) applications.

Live Meeting conferencing service helps you and your employees run and participate in interactive meetings around the world—in real time and at a moment's notice.

Exchange Server enables knowledge workers to gain access to critical business communications almost whenever and wherever they need to and is designed to deliver greater security, availability, and reliability.

Microsoft Visio is a diagramming program that can help you create business and technical diagrams that document and organize complex ideas, processes, and systems.

Microsoft Visual SourceSafe is the ideal version control system for any development team using Microsoft Visual Studio .NET.

VII. Adoption: How Do You Get There?

Base Infrastructure

Enablement of retail banking scenarios relies on the establishment of a base infrastructure. Standards-based technologies that leverage Web services for integration and interoperability are strong starting points. Even more fundamental, the deployment of the latest operating systems from Microsoft positions the banks for new solutions. A well planned iterative implementation strategy will help banks justify and realize value.

Deployment Release Strategy

Once a bank has decided what innovations to implement, it faces the daunting task of deciding its overall release strategy. Bigger, fewer releases enable more long-term capabilities, which require significant amounts of development, testing, and overall change management coordination. The focus is on building sustainable business benefits, enhancing people capabilities, and facilitating fundamental business-process change. This release strategy is typically used when the change is big, complex, and profound in its implications to the retail enterprise and the bank.

Microsoft suggests that future release strategies be more iterative and value-based. This approach allows banks to implement a flexible infrastructure for gradual introductions of new productivity and integrated service delivery capabilities in a more componentized fashion.

Smaller, more frequent releases drive rapid business benefits. This release strategy prioritizes specific benefit goals and first addresses the opportunities that have the greatest immediate impact. The implication is to develop and deliver multiple pilots and prototypes, and accrue benefits in the short term to fund the next set of programs. When innovative opportunities are more compartmentalized, this approach works well and builds momentum along a track record of success.

Many organizations will find success in leveraging the "quick-win" strategy of shorter releases to generate the business benefits and, ultimately, the funding for larger, more complex programs. This combination of implementation approaches effectively creates a self-funding innovation engine, which will provide the financial justification of the Microsoft approach for retail banking.

Microsoft believes that this "quick-win" strategy can be based on an approach called "value targeting." These short-duration analyses can help banks understand the matrix of the feasibility and time line of implementation execution along with the time to value and amount of value for various capabilities. This information allows banks to target or prioritize the features that drive value most quickly at the lowest amount of risk. This approach-to-value targeting will be critical to quickly unlocking the operating improvements that are available to banks now.

Branch banking has historically had long release cycles. Development cycles of two to three years, coupled with two- to three-year deployment cycles, are typical. With the current focus on ROI and the need for rapid innovation, it is not practical to develop and deploy in a big-bang approach. Any infrastructure should support the rapid testing of new concepts and then the rapid deployment of these concepts.

Microsoft believes that retail banks that follow the "test/select/develop/deploy" approach enabled by an agile technology platform will be the banks that deliver new capabilities fastest with the highest value to customers, employees, and operations.

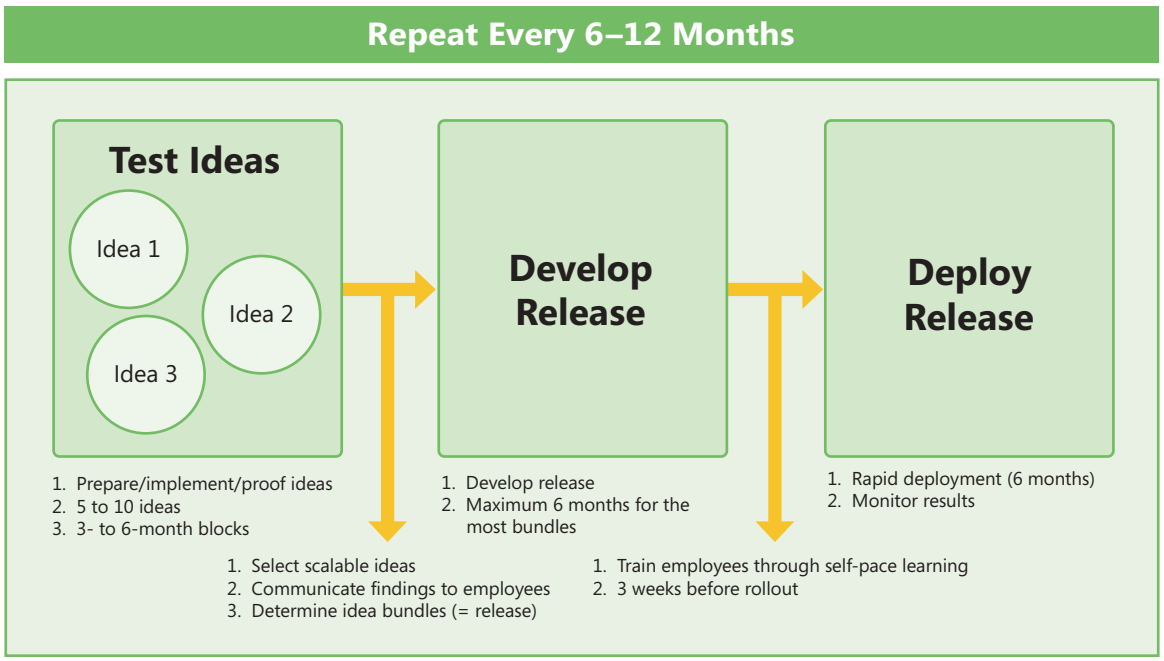

Figure 4

The more integrated the platform, the faster this pattern of "test/select/develop/deploy" moves, because developers can spend more time on innovation and less time on integration.

As retail banks begin to explore the Microsoft approach for retail banking and identify opportunities for implementing these business concepts into their operations, it will be the enabling platform that brings experience△Banking on Microsoft to life. The Microsoft approach for retail banking is designed for flexibility and allows retail bankers to adopt the components most relevant to them and to their business needs. At the same time, experience△Banking provides an infrastructure with the capacity for growth as innovative products and services evolve.

In many areas, such as integration with customer-owned devices (PDAs and Smartphones, for example) and the creation of an enterprise system for recording customer information, experience△Banking is on the cutting edge of technological development. Microsoft technology not only offers production-ready, enterprise-scalable solutions, but also delivers solution capabilities more efficiently than other competing platforms, with a lower total cost of ownership.

Learn more about the experience Δ Banking framework
and how it can help your bank.

To find out more information and to read customer examples of how Microsoft-based solutions are currently being implemented in retail banks, visit us at **www.microsoft.com/experiencebanking** or call your Microsoft Representative.

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