

# Next-Generation, Back-Office Banking Solution

Industry Financial Services

**Business Challenge** Seamlessly processing high-transaction volumes from offline and online sources

Technology Solution FLEXCUBE from i-flex Solutions Ltd.

Enterprise Hardware Platform ProLiant<sup>™</sup> Servers from the new HP SOLUTION ARCHITECTS





intel

# MEETING NEW MARKET DEMANDS

FLEXCUBE, a next-generation, Universal Banking Solution from i-flex Solutions Ltd., enables banks to meet the challenges of intense competition, reduced margins, and increasing customer expectations. FLEXCUBE provides a back-office processing environment for corporate, retail, and investment banking operations with a highly flexible and scalable modular architecture.

# THE BUSINESS CHALLENGE

A critical initiative for banks in today's competitive environment is ensuring customer satisfaction while keeping costs low. To that end, banks need to have the ability to process very high transaction volumes from multiple channels, all in a seamless, online, real-time fashion—with minimum delay.

From a system perspective, banks are seeking a solution that can work within a standards-based server architecture—delivering the highest levels of performance, with the ability to scale up to meet growing transaction volumes. Some of the other challenges encountered by banks are:

- · Providing a wide variety of products to the customer
- · Reducing time-to-market for new product offerings
- · Achieving a single customer view
- · Co-existing with legacy systems
- Realizing high availability and reliability

# THE SOLUTION OVERVIEW

The FLEXCUBE solution is built on a scalable n-tier distributed architecture, combining rich, comprehensive functionality and a contemporary standards-based system. It provides 24x7, real-time transaction processing on an integrated Intel<sup>®</sup>-based server platform using multiple delivery channels. FLEXCUBE is a highly modular system, offering financial institutions the ability to choose the set of functional modules that they wish to deploy.

The FLEXCUBE solution was developed by i-flex Solutions Ltd. and has been extensively tested at Intel<sup>®</sup>'s Services and Solutions Labs. These tests have demonstrated that the solution can handle collective transaction loads of 3,000 branches and 20 million customer accounts without any performance bottlenecks or system lapse.

FLEXCUBE has been adopted by more than 100 customers worldwide, within just four years of its launch. FLEXCUBE has been ranked among the world's top two largest selling wholesale back-office banking systems in the International Banking Systems (IBS) UK Sales League Tables for 1999 and 2000. FLEXCUBE first achieved this ranking in 1999 within two years of its launch. FLEXCUBE has also been ranked among the top three retail back-office banking systems by the London-based Retail Banking Systems (RBS) for the year 2000.

# Solution Blueprint:

Next-Generation, Back-Office Banking Solution

Solution Provider: i-flex Solutions Ltd.

# TECHNOLOGY

FLEXCUBE is built on an n-tier architecture to deliver high-performance and seamless scalability. The architecture supports conventional customer interaction technologies such as teller and ATM with modern delivery channels such as Internet, Mobile, and IVR. The architecture uses modern open technology and industry standard components and eliminates dependence on any single vendor or product.

**Operating System:** Microsoft\* Windows\* 2000 Advanced Server and Datacenter Server **Host Database:** Oracle\*

Channel Database: Oracle\*, Microsoft SQL\* Middleware: COM+, WebSphere\*, WebLogic\*, MQ Series Component Model: COM+, EJB 1.x (under development) Protocols: ISO8583, XML, TCP/IP, X.500, SSL

# WHO THE SOLUTION WILL BENEFIT

FLEXCUBE's end-to-end offering and high degree of parameterization makes it an ideal solution for a range of institutions in the banking and finance domain, including retail banking, corporate banking, and investment banking.

- As the Online Transaction processing engine of a large retail bank or for a single bank, covering retail, commercial, and investment banking. End-to-end delivery channels range from branch system to Internet banking.
- A departmental solution for treasury, trade finance, or investment banking for a large bank. It also can function as a multi-country, multi-entity solution for a large multinational bank where FLEXCUBE is the core banking system for the branches of the bank in different countries.
- As the core processing solution for a country's central bank and development bank or "Bank in a Box" for a virtual bank.
- A Decision Support System for large banks or as a front-end Web delivery system using FLEXCUBE @ for mobile and Internet banking.

Within these kinds of institutions, the end users of FLEXCUBE would be:

- End customers of the bank
- CEO, CIO, Senior management
- · Departmental heads
- IT head and IT staff
- Fund managers and dealers
- Treasury, Trade finance managers
- Bank tellers

# FUNCTIONAL BUSINESS CONCEPT

## **MODULAR YET INTEGRATED**

FLEXCUBE's modular architecture allows the bank to choose an optimum set of modules that best suit its needs, without being saddled with unnecessary components. The functional modules belong to the broad categories of retail banking, treasury, trade finance, mutual funds, and delivery channels, among others.

## **UNIVERSAL BANKING**

FLEXCUBE is based on the concept of Universal Banking. It is an integrated solution and provides complete support for retail, commercial, and investment banking.

## SEAMLESS DELIVERY OVER MULTIPLE CHANNELS

FLEXCUBE supports non-stop convenience banking for all retail transactions through various delivery channels, such as branches, ATMs, POS terminals, debit cards, SWIFT, telephone/call center, and Internet.

# 24 X 7 PROCESSING

FLEXCUBE supports continuous availability of banking services in an online mode even during the time the end-of-day batch is running. Except for a brief period (3-4 minutes) when the business day is switched to the next day, the online system is continuously available.

## **MULTI-LINGUAL**

The FLEXCUBE National Language Infrastructure ensures that most languages can be easily supported at various levels, ranging from reports, to teller screens, to data stored in the database. Even double-byte languages, such as Japanese and Korean, can be supported. For example, FLEXCUBE on Intel<sup>®</sup> Architecture is used to support the operations of a large, leading bank in Japan—entirely in Japanese.

## LOW TOTAL COST OF OWNERSHIP

FLEXCUBE runs on an open platform and makes use of industry-standard and off-theshelf components. An alternative to RISC servers and mainframes, FLEXCUBE on an Intel<sup>®</sup>-based platform offers banks the ultimate combination of low-cost, high-performance, and an Integrated Banking System.

# USER EXPERIENCE

## THE INTERFACE DESIGN FOR VARIOUS FUNCTIONS IS ILLUSTRATED BELOW:

## **Retail Banking**

Provides browser-based access to all teller functions and all other retail banking operations, such as DDAs, Savings and Current Accounts, Term Deposits, Retail Loans, Mortgages, ACH and Clearing systems.

Account Ope	ning					
Branch Name	¥	Product Name		¥		Serial No
Account No		Account Title				
Customer Inform	nation					
Customer IC		Category	IC Type	Short Name Birth / I Date	Reg Relations	Customer ID
10002		ADDED FOR ACCT P1/	-		Sole Owne	r. 💌
10003		IFLEX EMPLOYEES	-		Joint and F	irst 💌
10004		Defence Persons	• B		Joint and C	)ther 🔽
Officer ID	G6TGT	•		Tax Code (%/exemption)	9.0000 / 1000.00	•
Cheque Book Request				No of leaves	100	
Interest Waiver				Restricted Account		
Interest Rate		1		Deposit Term		
Installment Frq			Ŧ			
CR Interest Variance				DR Interest Variance		
Installment Amount						

Account No	101293000018 DOWCORP
Account Ccy	MYR Z Txn Ccy MYR Z
Acct Ccy Rate	15.55000 Txn Ccy Rate 15.5500
Txn Amount	1,000.00
Account Amt	1,000.00
Varrative	CHEQUES DEPOSITED ON CASA ACCOUNT

## **Corporate Banking**

Includes a graphical user interface (GUI) for commercial banking functions such as, treasury, trade finance, investment banking and cash management. The GUI also allows access to maintenance functions, including currency maintenance, product definitions, and more.

LC Contract						
Template	Q User R	ef. EXPORT LC TEST	 Contract Ref.	000LCEX993650001	< 2 of 2 ▶	s
Product LCEX	Q F	Product Description	XPORT LC-NON RE	VOLVING		V
Type Export Irre	evocable Non Re	volving		Operation Cod	e Advice 🔹	м
Main	Parties	Advices	Ship/Docs	Tracers	Others	1
Terms					,	Т
Currency	USD Q	LC Language ENG	Q Issue Date	31-DEC-1999		С
LC Amount		20,000.000	Expiry Date	28-JUN-2000		
Guarantee Type			Closure Date	28-JUL-2000	Auto Closure	
Related LC		Transfera	able Expiry Place	JLA USA	9	
Tolerance	r	-	Credit			
About Clause	About	×	. Iype Mode	Straight	Drafts	
May LC Amount	0	20.000.000	Mode		e	
Liability %	<u> </u>	20,000.000	Details	EXPLC		
Liability Amount		20,000.000	Custana	1	14	
Revolving Details			CUSIOME	LEWIS01 Q	Party Type BEN Q	
Automatic Reir	nstatement	Revolves In Time	Name	JOHN LEWIS		
Cumulative		C Revolves In Value	Their Ref.	REF FOR BEN		
Eromuonau	Next Deinstaten	ant Data	Dated	31-DEC-1999		
Frequency	Next Reinstaten	ient Date J	Current	Availability	20,000.000	
Memo			🧐 Outstandii	ng Liability	20,000.000	
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#### Internet Banking

FLEXCUBE @ provides HTML screens for performing retail and commercial banking over the Internet. The solution enables personalized screen layouts based on user profile, preferences, and user privileges.



flex direct			pay bills <mark>on</mark>	line	
	TUU FROM DAEWOO MOTO	RWORKS KOREA VALUE 569	0,009USD BILL NO: 56966U	FROM SHROFF & CO, MUMBAI	
	• my bank • • my bills	s • • my funds • • •	ny cards 🔹 🔹 corp. banking 🔹 🔹	my stocks • • my home • •	logou
Corp. Accounts 🕥 📥					
External Transfers	Letter Of Credit Initia	ition			
nitiate	American Ma		Deat Defense		
Modify	Amenament No.	United Steel NV	Bank Name		_
Authorize	Beneficiary Name	Onited Steel, NT	Status		
View	Issue Date		Expiry Date		
_etters of Credit	Expiry Place		User Reference		
nitiate	Amount		Currency		
Modify	Initiation Limit	19999.00	Authorization Limit	20000.00	
Authorize					
View	geno	terms	parties shipment	conditions	
Bank Guarantee	User Reference				
Foreign Eychange	Product Type		I C Import Bevolving		
Cuetomor Sorvico	On Code				
Castomer Service	Op. Coue		ASIT.		
Corporate Admin	Amount				_
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•	*Issue Date			dd/mm/yyyy	

# LOGICAL SOLUTION

FLEXCUBE is a modular solution that allows the bank to choose only the functionality they wish to offer their customers. It is a fully integrated system with a common set of core services that are used across all the front-end functional modules to deliver a diverse range of banking functionality.



# **Customer Delivery Channels**

# FLEXCUBE CORE MODULES

Core modules form the foundation for operation of all the other functional modules. They provide a set of common services that are seamlessly accessed by all the other functional modules, such as accounting, customer information, risk management, and others.

## THEY INCLUDE THE FOLLOWING:

## **General Ledger**

The user-definable, multi-currency General Ledger (GL) supports unlimited levels of account consolidation and reporting.

## **Customer Information File**

The Customer Information System captures and maintains relevant customer information to provide a detailed profile of a customer's relationship with the bank and between the customers.

#### **Comprehensive MIS**

MIS support including profitability analysis, is provided at several levels such as customer, product, branch, business segment, bank, and any other user-defined MIS class.

## **Risk Management**

FLEXCUBE provides online, centralized tracking of multi-currency customer limits across all branches. The lines can be defined for a single module or product—or across a combination of modules and products.

#### **Standing Instructions**

The Standing Instructions module of FLEXCUBE executes payment instructions for customers at periodic intervals. The module additionally handles sweeps based on projected value-dated balances between the Nostro accounts.

# Clearing

The Clearing module handles the back-office retail banking business such as inward clearing, outward clearing, check operations, and generation of related reports. It supports centralized, as well as decentralized, clearing operations.

## **Nostro Reconciliation**

This module helps in reconciling balances and transactions reported by correspondent banks in their statement of accounts.

#### Work Flow Management

This module handles the complete end-to-end processing of commercial contracts, right from the initiation of the contract or transaction, up to the point of closure. It also offers the option of document management system that helps retrieve the particular supporting document or contract that can be stored in various formats.

#### **Fixed Asset Management**

The Fixed Assets module enables tracking of all the necessary information for events like depreciation, revaluation, sales/transfer of assets and disposal of assets.

## **Expense Processing**

The Expense Processing module offers a comprehensive solution wherein Banks can automate all the processes from preparing expense budgets to recording of all consequent expenses, Credit Limits to Vendors, Contract Settlements, Advance Payments and Final Payments to Vendors.

# FLEXCUBE FUNCTIONAL MODULES

Functional modules deliver a complete range of banking functionality to the end customer ranging from retail, corporate, and investment banking.

#### THESE INCLUDE:

#### **Current and Savings Accounts (DDAs)**

The Current and Savings Accounts module of FLEXCUBE supports a complete range of savings, current, and overdraft accounts with account analysis capability and parameterized controls.

## **Term Deposits**

FLEXCUBE supports complete processing—account opening, redemption, renewal, interest, and maturity processing—of a range of term deposits that include cumulative deposits, non-cumulative deposits, deposit certificates, cluster deposits, and unfixed deposits. The Term Deposit module interfaces with the Current and Savings Account (CASA), thereby serving as an intelligent cash management tool. The deposit can also act as collateral for an overdraft (OD) facility. This enables the placement of liens against loans and mortgages.

## Loans

FLEXCUBE supports a full range of loans and mortgages. It processes the complete life cycle of the loan contract including disbursement, repayment, as well as interest and arrears processing, rescheduling, interest rate changes, partial payoffs, and settlement.

# Loans Application Processing System

FLEXCUBE Loans Application Processing System (APS) processes loan applications from the complete approval cycle to acceptance of the loan. The system tracks the progress of the application through the stages of appraisal, recommendation, sanction, and final customer loan offer and its acceptance.

## Loan Syndication

The Loan Syndication module enables a Bank to handle the syndicated loan processing in various capacities—either as a lead bank or a syndicate member—and tracks the distribution of the asset amongst multiple parties as well as the sharing of interest and other related revenues.

## **Cash and Liquidity Management**

This module allows the corporate treasurer to minimize idle balances, regularize deficit and surplus cash positions between accounts, apply lowest cost of capital to fund daily cash requirements, and concentrate liquidity to invest in highest yield opportunity.

#### Letters of Credit

The Letters of Credit (LC) module supports the processing of all types of clean and documentary LCs. These include Import LCs, Export LCs, Guarantees, Shipping Guarantees, Clean LCs, and Standby Guarantees. Processing and monitoring these LCs—including the booking, subsequent amendment, calculation and collection of commission and charges, and finally the ailment—is automatic.

## **Bills and Collection**

The Bills and Collections module complements the Letter of Credit module. The Bills and Collections module handles the subsequent processes required for negotiation, acceptance, and/or discount of all types of documents under import and export credits.

## Foreign Exchange

The Foreign Exchange module supports back-office processing for spot, forward, and swap deals. The system also supports arbitrage deals.

## **Money Markets**

The Money Market module provides back-office support for all money market transactions involving lending or borrowing with corporate customers, commercial banks, or other financial institutions. This includes management of treasury operations through call borrowings and overnight placements.

## Derivatives

The Derivatives module is built to cater to complete back-office processing for derivative instruments. It has comprehensive support for over-the-counter (OTC) instruments such as Forward Rate Agreements, Interest Rate Swaps and Cross Currency Swaps and Exchange, traded instruments such as Equity and Index Options, and Futures.

## **Fund Transfer**

The Funds Transfer Module of FLEXCUBE is a front-office system that handles the processing of funds transfer (local and foreign) between financial institutions. It supports processing of foreign and local currency funds transfer, Incoming, Outgoing, and Book Transfers.

## **Investment and Asset Management**

The Investment module handles a variety of multi-currency instruments, Fixed and Flexible Interest Bonds, Discounted Instruments, Equities, and Government Securities. The module possesses end-to-end processing capability and supports operations such as Deal Capture, Automated Deal and Money Settlements, Automated Accrual and Revaluation, and Portfolio Valuation.

#### **FLEXCUBE**—Investor Services

FLEXCUBE—Investor Services (IS) module helps a Mutual Fund Company create an automated network of branches and enables effective fund marketing, management of intermediaries, and time-bound handling of investor transactions.

#### **Electronic Messaging System**

This module automates the sending and receiving of documents and advices. It supplements the message generation function provided by the Core module. It also enables a direct link to SWIFT, Telex, Fax, and certain proprietary networks such as Cedel and Euroclear.

#### ACH

FLEXCUBE supports an integrated clearing interface both for Automated Clearing House (ACH) and Manual Clearing. It also provides for a flexible file format definition to interface with clearing houses.

#### **Regulatory Reporting**

FLEXCUBE can provide the necessary central bank reports through the use of the standard report generator. FLEXCUBE also has a reporting interface with FiRE from S1 that provides ready reports for the regulatory bodies of over 20 countries.

# SWIFT, Cedel, Euroclear

FLEXCUBE has extensive support for SWIFT. It supports a wide range of SWIFT Message Types (MTs) in the categories MT1xx, MT2xx, MT4xx, MT5xx, MT7xx, and MT9xx. In addition, it supports communication with other proprietary networks such as Cedel and Euroclear.

## **Rate Feeds**

FLEXCUBE can accept input from a number of rate feed systems such as Reuters, Dealing 2000, and Telerate. In addition, it has the capability to accept price feeds from various stock exchanges.

# SOFTWARE ARCHITECTURE



The FLEXCUBE on Intel<sup>®</sup> Architecture takes n-tier design one-step further for high-volume, transaction-based, client/server architecture. High performance is ensured by deploying the product on an n-tier Architecture, using messaging—and by developing the middle-ware as highly-optimized and tuned in-memory processes. The FLEXCUBE product is composed of the following logical tiers:

## CLIENT LAYER

## **FLEXCUBE** Teller

The FLEXCUBE Teller, an integrated branch solution, is designed to handle branch operations and teller functions—it has a browser based interface drastically reducing the investment in hardware and environmental software at the branch.

## **Customer Touch Points**

This is the front-end client contact layer. All interaction between end users and bank is done via this layer. FLEXCUBE is able to support the following touch points:

- Internet
- Mobile Devices
- ATM
- IVR
- PDA

## **APPLICATION LAYER**

## FLEXCUBE Middleware

The FLEXCUBE Middleware acts as the single gateway for communication between FLEXCUBE Teller and the FLEXCUBE Database. It receives transaction requests from all the branches and invokes the appropriate business logic components. The middleware ensures high online transaction processing Capability (OLTP) in FLEXCUBE and seamless scalability.

#### **FLEXCUBE** @ Channel Gateway

This component integrates various delivery channels. It processes transaction requests from various delivery channels and responds back in a format that is suitable for the requesting device.

## DATABASE LAYER

#### **FLEXCUBE** Database

This is the centralized data store of FLEXCUBE. It acts as the single repository for storing all static and transactional data such as Account Information, Transaction Logs, Audit Logs, Product Definitions, Currency Definitions, Bank Operation Parameters. 24/7 "uptime" of the FLEXCUBE Database is crucial to the operations of the bank. This high availability is ensured by using Oracle9*i*\* Real Application Clusters on Windows\* 2000.

#### **High Availability**

Oracle9*i*\* Real Application Clusters is one of the key technologies used to provide high availability for the Oracle9*i*\* Database. This unique technology provides the ability to create highly available solutions with near linear scalability, improved availability, and manageability features. Oracle9*i*\* Real Application Clusters also provides features like rapid recovery from failures, support for physical and logical standby databases, online maintenance operations, sophisticated diagnosis, and repair of failure conditions and transparent application failover.

Parallel Database Clusters on *ProLiant*<sup>™</sup> servers provide significantly improved uptime and lower operating costs, as well as lower hardware, maintenance, and support costs. Unlike single-server solutions, the *ProLiant*<sup>™</sup> Parallel Database Clusters give you multiple ways to expand your processing power, storage capacity, and connectivity limits without making any major modifications to your application. Clustering offers high performance and scalability while protecting the application from both unplanned and planned outages. Servers can be taken offline or brought online, without disrupting access to the data stored in the Oracle\* database. Customers can add nodes to the cluster or upgrade processors and memory as needed to extend performance beyond the limitations of a single system. With only one database to manage, operations costs are reduced. Further, all database management tasks can be performed from a single workstation console, which is configurable and easy to use.

FLEXCUBE leverages the availability and scalability of Oracle9*i*\* Real Application Clusters on *ProLiant*<sup>™</sup> servers. The extensive testing done jointly by Compaq (now part of HP) and Oracle\* ensures that Oracle9*i*\* Real Application Clusters with the Microsoft\* Windows\* 2000\* operating system on *ProLiant*<sup>™</sup> servers provides a robust, reliable platform for the FLEXCUBE solution. HP has certified configurations for multiple *ProLiant*<sup>™</sup> server models running Oracle9*i*\* Real Application Clusters and Windows\* 2000. The variety of servers includes multiple processor and memory configurations that enable FLEXCUBE users to optimally size platforms to accurately meet their demanding business requirements while providing ample headroom for future growth.

Built into every *ProLiant*<sup>™</sup> server, the Insight Management Suite simplifies IT management in today's dynamic, 24/7 computing environments. The Insight Management Suite provides a comprehensive set of offerings that simplify and improve how enterprises of all sizes manage IT resources, including leading software and hardware features, tools and utilities, as well as services and partnerships. HP management tools address issues from simple operator error to major power disruptions. These solutions enable customers to plan effectively, deploy systems quickly, manage change proactively, and ensure smooth, continuous server operations. They also are completely scalable, managing a single server or thousands, whether the servers are local or remote. When you put these unique tools to work, you can deliver both performance and availability so your skilled IT professionals have more time to focus on critical business issues rather than technical details.

# SYSTEMS ARCHITECTURE

The System Architecture design of FLEXCUBE in a live deployment scenario depends on a number of factors such as, transaction volumes, module set, account base, etc. However, a typical data center set-up for a large bank was replicated and benchmarked at Intel labs in India.



## LEARN MORE ABOUT THIS INNOVATIVE SOLUTION

For general information about the products described in this solution blueprint, visit: www.iflexsolutions.com www.intel.com/go/solutionblueprints

For additional information on *ProLiant*<sup>™</sup> server Parallel Database Clusters for Oracle, please visit:

www.compaq.com/solutions/enterprise/highavailability/oracle/oracle9i.html

For additional information on *ProLiant*<sup>™</sup> server Certified Configurations for Oracle9*i*, please visit:

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If you have a specific question about implementing this solution within your organization, contact your Intel representative or e-mail us at: **solutionblueprints@intel.com** 

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