

# Become a Customer-First Retail Bank in the Digital Age

## Overview

Customer Intelligence & Insights (CI&I) for Banking is software created specifically to help banks deliver personalized and differentiated experiences that build customer loyalty and engagement.

Today’s customers want a simplified experience that's immediate, relevant, secure and dependable. Further, they expect a level of personalization and convenience that's established by digital heavyweights such as Google and Amazon. Progressive retail banks understand this and are starting to focus on the experience, not the product, to set themselves apart.

CI&I for Banking runs on a scalable, agile and open platform and is designed for the business user to access and analyze their data quickly, reducing reliance on IT and data scientists and long cycles of iteration typical for Big Data analytics. Prebuilt industry applications and use cases, out of the box reporting and dashboards, and extended web services are all designed to speed integration with existing (or planned) systems and achieve rapid time to value.

This future ready solution allows retail banks to accelerate their transition from transaction-centric to customer-centric by enabling exceptional end-to-end customer experiences.

## Solution Summary

### Benefits

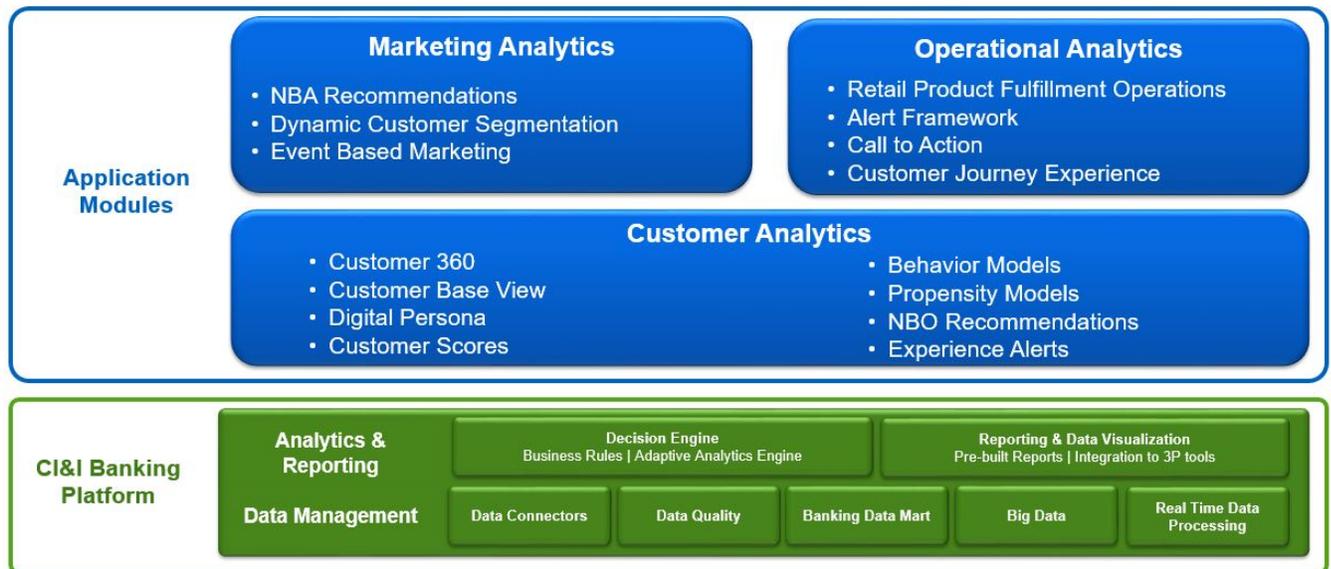
- Purpose-built for modern retail banking
- Open source, future-ready, and secure analytics platform supports development of additional analytics use cases
- Backed by award-winning expertise

### Key Features

- Detailed insight into each customer’s profile with Customer 360
- Customer Base Analysis for holistic analysis across the base
- Digital Persona Discovery and analysis
- Behavior & Propensity Modeling with event based analysis
- Visibility and tracking of customer on-boarding journeys and metrics across product mix
- Next-best Offers/Next-best Recommendations
- Customer Segmentation
- Operational Dashboards
- KPI-based Alerts and Notifications.
- Service Request & Complaint Analysis
- Configurable call-to-action recommendations for front-line resources (branch, call center, etc.)
- APIs support integration with/into front-line systems such as CRM, marketing automation, and more

Purpose-built for modern retail banking	Open-source, future ready and secure	Backed by award-winning expertise
<p>CI&amp;I for Banking includes a built-in industry-specific data model and out-of-the box use cases that accelerate time to value. The use-cases cover a wide spectrum of business outcomes such as improving marketing efficiencies (ROMI), proactive customer retention and customer value growth. These use cases are tailored to the needs of the connected banking customer and are built to accelerate time to value for banks’ customer-centricity initiatives.</p> <p>Marketing, service managers, and all those working to elevate the customer experience can use CI&amp;I for Banking to fully manage the customer experience in alignment with business goals.</p>	<p>CI&amp;I for Banking is built on an innovative open source based architecture that enables fast deployment at lower cost and can scale to accommodate all data sources that are relevant to your customers and their journeys.</p> <p>It leverages existing IT investments, avoids vendor lock-in, enables users to develop and deploy their own additional analytics use cases, making CI&amp;I for retail a one-stop shop for all your analytics needs and promotes integration into and with existing IT infrastructure via standard APIs, platform services, and data models.</p> <p>CI&amp;I for Banking is built with enterprise-grade security. It protects sensitive data with encryption, masking and usage tracking and includes the necessary security protocols and can be configured to support any number of privacy standards based on customer need.</p>	<p>CI&amp;I for Banking is built using extensive TCS expertise gained implementing thousands of solutions for retail banks across the globe. The software is backed by the TCS Experience Certainty commitment and award-winning expertise demonstrated in serving the technology needs of the global retail banking market. Some notable awards for TCS in this industry include:</p> <p><b>IDC Marketscape Leader</b> Worldwide Core Banking Solutions</p> <p><b>Gartner</b> Leader in International Core Banking MQ</p> <p><b>FSTech 2018</b> Shortlist for Best Use of Technology for Customer Services</p>

## CI&I for Banking Functional Architecture



### Base Platform

The base platform provides the foundational elements for data induction and interoperability with the overall IT environment.

- Automated data induction via XML/CSV
- Facilities to automate ETL (extract/transform/load) jobs for batch induction
- A Delivery Engine that manages security and access to software capabilities to business users
- APIs for Data and Meta Data Services
- Ability to send/receive data to/from external systems via Information Exchange Gateway
- Complex Event Processing (CEP) engine analyses data in real-time streams and is used to provide context-based analysis

### Data Management

Core platform component that includes a retail-specific data model, a decision engine and connectors. This layer ensures that data is prepared for analysis and supports the applications modules.

Key features are:

- Connectors for various formats like SFTP, JMS, MQTT and HTTP for exchange of data between the Information Exchange Gateway and external systems in offline and online modes
- A Banking Data Model provides scalable domain specific information, domain specific metadata classification and is customized for customer intelligence and insight use cases.

### Platform Modules - Analytics and Decision Engine

The decision engine is the heart of the software solution and infers intelligence from the vast amounts of data and information. The engine analyses the real-time information from the retailer's infrastructure and derives insights about events through descriptive and predictive analytics.

- Comprised of a rules engine and an analytic engine
- Build rules based on configured thresholds and integrate into enterprise work-flows
- Provides a run-time environment for executing PMML (Predictive Model Mark-Up Language) on data used within the solution

### Platform Modules - Reporting and Data Visualization

Provides the ability to execute pre-configured and real-time visual analytics and reports.

- Can augment or be augmented by 3rd party reporting solutions such as Tableau (or any J2EEcompliant visualization software solution)
- Delivers multiple pre-configured reports for measuring KPI achievement, understanding customer behavior and more.

## Application Modules – Overview

These are the front-end elements for user interaction. While Customer Analytics is a core module, Operational Analytics and Marketing Analytics are optional. Role-based security controls access to the modules. The modules are built to work together.

### Customer Analytics

This includes the ability to leverage a variety of pre-build reports and dashboards as well as perform ad-hoc analysis using the Power Analysis feature. It includes the following features:

- Customer 360 – interactive customer profile
- Customer Base View – analysis across the customer base
- Digital Persona – ability to automatically classify customers into unique personas based on behavioural and other factors
- Customer Scores – ability to calculate and measure against industry scores (NPS, CLTV, etc.)
- Behaviour Models – create segments based on customer persona, value and profitability
- Propensity Models – calculate likelihood to purchase product or use a channel
- Customer Journey Experience – monitor, manage and rectify journeys in a proactive manner
- Experience Alerts - configure thresholds for monitoring customer experience

## Deployment and Implementation

CI&I for Banking includes out-of-the box use cases that can be deployed into production and begin delivering value to the business as soon as the installation is complete. The solution is built to fit into a modern IT environment and can be deployed on-premises, as a private cloud, or via public cloud using stand-alone or virtualized servers. The System Requirements below are the minimum requirements. High performance systems, fail over and other considerations may affect how a system needs to be configured. Actual requirements for a production system are developed collaboratively with TCS to reflect the unique needs of the implementation. Similarly, use case selection is also a collaborative effort undertaken prior to implementation. The information in this document is provided for initial guidance and should not be interpreted as a recommendation.

### Marketing Analytics

This module helps banks focus their marketing efforts using data. It includes the following:

- Dynamic segmentation for self-serve customer selection across demographic, psychographic, behavioral, and predictive criteria
- Next Best Offer that recommends the next best offer based on segment membership and other characteristics

### Operational Analytics

This module helps banks monitor and green-light/red-light processes and sub-processes that impact customer experience, providing banks with the ability to pro-actively correct or prevent experience disconnects. It includes the following:

- Retail Product Fulfilment Operations to monitor the process of product fulfilment, and identifies risks and limitations
- Service Request and Complaints to track and understand service requests and complaints
- Next Best Action Identifying at-risk customers and recommend corrective action
- Call to Action Surface (via email) correction action to relevant stakeholders based on configured data rules

## System requirements (Standard Configuration):

Server Type	Quantity	RAM (GB)	CPU (Core)	HDD (TB)	Remarks
Hadoop – Name Nodes	2	32	8	2	One each for Primary and Secondary Name Node
Hadoop – Data Nodes	5	32	8	10	10 data nodes
OLAP – PostgresDB	1	32	8	5	This is a prerequisite for Data Visualization and Reporting.
Application Server	4	6	4	0.1	The number of server components depends on concurrency and performance requirements.
Web Server(NGINX)	1	4	2	0.05	The number of server components depends on concurrency and performance requirements.
Infrastructure Server (LDAP, Email, and so on)	1	8	4	0.1	The number of server components depends on concurrency and performance requirements.

## Technology Requirements

## Software

Technology	Version	Licensing	Purpose of the Technology
RHEL	6.4	Various	Operating system
Flex Monster	2.1.3	OEM	To provide ad-hoc reports (based on Mondrian schema work bench)
Spring Framework	4.3.2	ASL 2.0	Flexible to integrate with different technologies, modularized, and light weight modules
Maven	3.1.4	ASL 2.0	Framework for building or compiling the source code
JDK	1.8	Oracle corporation binary code license agreement	Environment for writing Java code
PostgreSQL	9.5.8	PostgreSQL license	Stores the following: Aggregate data in OLAP (online analytical processing) schema to enable slice and dice of the measures over dimensions User/role/privilege/purview Information Scheduling / Batch job information Alert set up information
HTML	5	--	Data Access & Visualization
CSS3	3	--	Data Access & Visualization
Hadoop FS	2.7.3	ASL 2.0	Stores and processes data with high volume, veracity and velocity

Technology	Version	Licensing	Purpose of the Technology
Hive No SQL DB	1.2.1	ASL 2.0	Contains the Integration layer as per the business requirements
Hbase	1.1.2	ASL 2.0	NoSql DB (Hadoop) to store the transactional data of all the customers
Terracotta Quartz Scheduler	2.2.1	ASL 2.0	To schedule the batch jobs
Spring Batch	3.1.2	ASL 2.0	Effective batch processing with several infrastructure elements
Apache Phoenix	4.6.0	ASL 2.0	RDBMS wrapper above HBase
Hibernate	4.3.6	LGPL-2.1	Persistence framework for ORM (object relational mapping)
Log4 J	1.2.15	Apache License Version 2.0	To log the events (debug, error, info, and so on) across the application
Aapache Drill	1.5	Apache License Version 2.0	To achieve data virtualization
Jboss	10.0.0	ASL 2.0	Light weight application server to deploy TCS CI&I for Banking
Spark2	2.2.0	Apache License Version 2.0	Real-time Data Processing
NGINX	1.10.0	BSD	Nginx used for Reverse Proxy and for adding request header to web request.
Zookeeper	3.4.6	Apache License Version 2.0	Required for running Apache Drill & coordinating Hadoop components
Tez	0..7.0	Apache License Version 2.0	Hive Execution Engine
Bootstrap	3.3.6	--	Responsive UI Data Access & Visualization
Python	3.6.3	MIT License	Required for Sentiment Score implementation
Hibernate	4.3.6	LGPL-2.1	Persistence framework for ORM mapping
Ambari	2.5.0.3	Apache License Version 2.0	Managing, and monitoring Apache Hadoop clusters
Ranger	0.7.0.2.6	Apache License Version 2.0	Comprehensive security for Hadoop
Ranger KMS	0.7.0.2.6	Apache License Version 2.0	Key Management Server

## Use Cases Matrix

CI&I for Banking provides out-of-the box use cases developed by retail bank experts. Use cases combine features into a scenario that can become a stand-alone technology implementation. The solution software supports multiple use cases deployed simultaneously. The information is a representative selection of available use cases. A full list can be made available on demand. Use case selection for Proof of Concept (POC) and production is done collaboratively prior to implementation.

PoC Package	Business Value Theme	PoC/Pilot Use Cases
Customer Cross Sell	Drive Customer Value Growth	<b>Customer Personas:</b> Improve customer engagement by discovering Customer Personas <b>Product Affinities:</b> Discover cross sell opportunities and create bundle product offers by gaining insight on product affinities
Marketing Efficiency	Improved Marketing Efficiency and Return on Marketing Investment (ROMI)	<b>Campaign Target Lists:</b> Identify Customer Next Best Offers and create target lists for campaigns <b>Channel Selection:</b> Select the right channels for campaigns based on channel usage of customers
Customer Experience and Retention	Improve Customer Outcomes Across Customer Lifecycle	<b>Customer Onboarding:</b> Improve customer onboarding experience - Track customers' journey experience through a loan application to identify process hotspots and extend communication to customer at time of need <b>Voice of Customer:</b> Discover Voice of Customers for proactive retention and experience improvement <b>Proactive Action:</b> Improve customer experience with proactive action on complaints and service requests <b>Proactive Retention:</b> Improve proactive customer retention with churn prediction

## Learn More

TCS makes the following documents available that contains additional detail on installation, configuration and usage.

Document Name	Description
Solution Specifications and Features Guide	Detailed description of solution features and capabilities
Users Guide	User manual defining usage and best practices
Release Notes	What's new in this release, known issues & limitations
Installation and Configuration Guide	Detailed information on system requirements & installation
Administration Guide	Detailed information for system administrators, such as user management
Integration and Architecture Guide	Detailed information on enterprise fit and integration
Data Definition Document	Specific content of the data model used within the software solution

## Contact Us

For more information about TCS' Customer Intelligence & Insights for Banking (CI&I for Banking) visit [dss.tcs.com](http://dss.tcs.com) or email us at: [dssg.sales@tcs.com](mailto:dssg.sales@tcs.com)

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