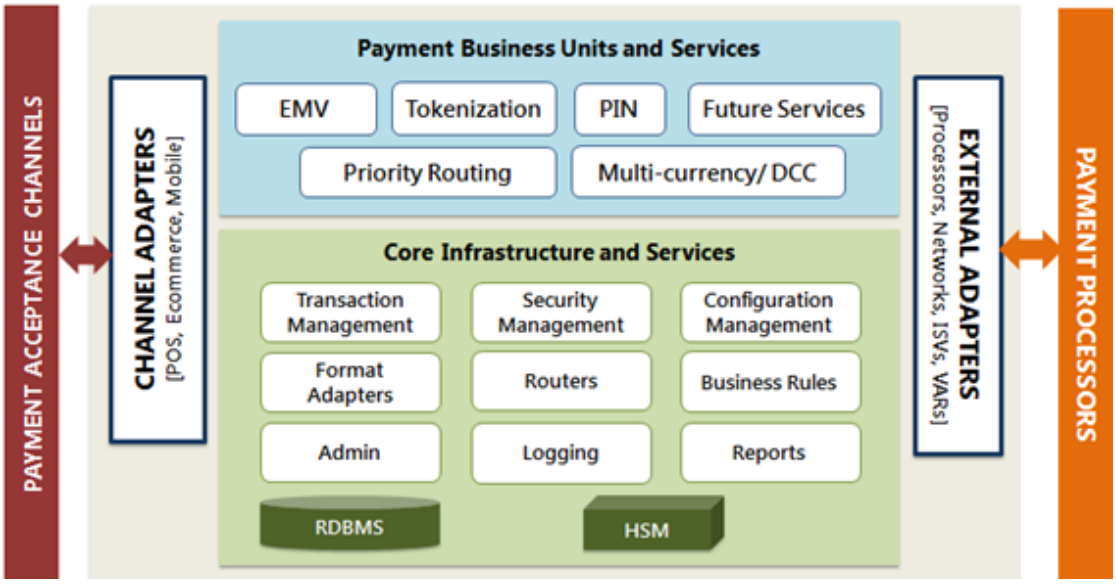
RS iFinSwitch™

The Race for Market Share

With the rapidly changing payments ecosystem across the world, the need for faster payments at increased ROI has become the key differentiator for staying ahead in the competition. A payment gateway can significantly change the way payment service providers approach the marketplace, by giving them the freedom to own the payment transactions, the ability to connect to multiple payment processors and the flexibility to provide value added services to merchants in terms of reporting and analytics.

RS iFinSwitch™ from RS Software

RS iFinSwitch™ is a digital switching platform from RS Software. It is designed with all the basic features of an authorization switch supporting rule-based transaction orchestration, workflow management, routing, format adapters, time-out processing, assured transaction response, encryption management, logging and audit trails. Built using modular microservice based architecture, the multi-purpose platform can be used like a payment gateway, a front-end processor or a fully functional processing platform. Its API based communication ensures it can communicate with the most modern devices using API based calls. A contextual view is presented below.



RS iFinSwitch™ Basic feature set

1. Supports both Card Present (CP) and Card Not Present (CNP) transactions
2. Capable of EMV transactions both Contact and contactless
3. The following transaction types are supported:
   - Authorization
   - Partial Authorization
   - Sale
   - Void
   - Return
   - Reversal
4. Capable of routing to major processor defined formats
5. Logs all transactional activities at all stages
6. Capable of sending batch files to processors on a daily basis
7. Generate reports
8. Convenience fee processing by splitting transactions
9. PA-DSS certified

RS iFinSwitch™ Extended feature set

1. Tokenization
2. Recurring payments
3. Batch processing
4. ACH payment
5. Virtual Terminal
6. Admin portal and Dashboard
7. SMS Services (integrated with SMS Service Provider messaging APIs)

Technology

RS iFinSwitch™ provides REST APIs for clients to support transactions using payment methods that include Card / ACH. Clients will be able to communicate with RS iFinSwitch™ using JSON / XML message formats. The RS iFinSwitch™ platform is integrated with TSYS Multipass and Sierra interfaces to process card transactions.

The platform is based on microservice architecture, and has been developed using Java based open technology.

Key Technical Features

- Supports both Active-Active as well as Active-Passive [DR] architecture for high throughput
- Horizontally and vertically scalable with highest throughput benchmarked at 2500 TPS
- End-to-end data encryption with as high as 2048-bit encryption supporting all standard algorithms like TDES, SHA2, AES, TLS etc.
- Open Software languages
- Support for open source databases and middleware
- Context-free servers and asynchronous queues
- Configuration and scripting to achieve localization
- Resilience through clustering with DR via the database
- Memory-based queuing and NoSQL for transaction data
- Reduces need for specialist resources
- Agile product lifecycle to feed continuous integration pipeline

Other Key Features

Scalable: The platform has the ability to scale up and down to support varying numbers of users or transaction volumes. The application is able to scale horizontally (by adding more servers) or vertically (by increasing hardware capacity or software efficiency).

Flexible: RS iFinSwitch™ is built on a modular architecture, which isolates the complexity of integration, presentation, and business logic in order to allow for the easy integration of new technologies and processes within the application.

Fault tolerant: The platform is built on N+1 architecture, eliminating any single point of failure.

Standards-Based: Standards include HTML, XML, J2EE and JSON.

Design Patterns

- Front Controller
  The Front Controller pattern helps to implement a centralized entry point that controls and manages user (screen) request handling.
- Business Delegate
  The Business Delegate pattern helps to reduce coupling between presentation-tier clients and business services.
- Data Access Object
  Data Access Object (DAO) pattern is used to separate low level data accessing API or operations from high level business services.
- Value Object
  The Value Object design pattern, also known as the Data Transfer Object, efficiently transfers remote, fine-grained data by sending a coarse-grained view of the data.
- Reactor
  The reactor design pattern is an event handling pattern for handling service requests delivered concurrently to a service handler by one or more inputs. The service handler then demultiplexes the incoming requests and dispatches them synchronously to the associated request handlers.

Software and tools

Software/Tool	Version	Source	Description
J2SDK	1.8.0_112	http://www.oracle.com/	Java SDK for API
Maven	3.3.9	https://maven.apache.org	To Build and Deploy for Development
Spring Boot	1.5.1	https://projects.spring.io/spring-boot/	J2EE application Framework
Apache Tomcat	7.0.75	This would be automatically deployed with Spring Boot 1.5.1	Runtime for SpringBoot Framework
Postgres-XL	9.5r1.4	http://www.postgres-xl.org/	Transaction Database
Apache Kafka	0.10.1.1	https://kafka.apache.org/downloads.html	Message Queue
Redis	3.2	https://redis.io/download	Cache

Deployment

The RS iFinSwitch™ application will be deployed in cloud using the Amazon Web Services (AWS) cloud that provides a highly reliable and scalable infrastructure for deploying web-scale solutions, with minimal support and administration costs, and more flexibility.

The following are the high level features of AWS used to build the RS iFinSwitch™ application.

Amazon EC2: Amazon Elastic Compute Cloud is a web service that provides resizable compute capacity in the cloud. These instances include varying combinations of CPU, memory, storage and networking capacity.

Amazon Machine Image: The operating system, application software and associated configuration settings can be bundled into an Amazon Machine Image (AMI) and use these AMIs to multiply virtualized instances as well as remove them using simple web service calls to scale capacity up and down quickly, as the capacity requirement changes.

Auto Scaling: Using the Auto-scaling feature, an Auto-scaling Group may be created which automatically scales the capacity on certain conditions based on metrics that Amazon CloudWatch collects. Instances will be automatically scaled when the threshold is reached and it can be reduced when the network traffic reduces.

Load Balancing: Incoming traffic is distributed by creating an elastic load balancer using the Elastic Load Balancing service. For external interfaces, RS iFinSwitch™ uses Classic Load Balancer. For routing messages between two services, Application Load Balancer will be used for Context Based routing. This will facilitate failover by switching from Primary to Secondary Site.

Availability Zones: Using this feature RS iFinSwitch™ may be deployed to at least two availability zones to ensure high availability. Primary services will be deployed in one zone and the secondary services will be setup in another zone.

Message Queues: Apache KAFKA with AWS as a message queue is used. During transaction processing through RS iFinSwitch™, the persistence of the transaction data in the database will happen through message queue in an asynchronous manner. This ensures high throughput during transaction cycle and the overall system continues to perform even if parts of components are momentarily unavailable or if persistence fails.

Elasticache: Redis cache is integrated with AWS to store transactional data in cache to achieve faster processing of data and high throughput.

Postgres: Postgres 9.5 R1.4 version will be used as transaction data store. Multiple active nodes will be used to store transaction data and user related data.

Amazon Instance Configuration: As the switch is completely scalable, the AWS instances can be scaled up at any time. The recommended configuration for the AWS instance is 6 (six) M4 instances (which may be scaled up/down after analyzing the volume of transactions).

Security

- All the communication across all instances of AWS will utilize TLS 1.2
- Security in Amazon VPC
  - Applications Zones – Establish AWS Zones and complimentary Rules for access
  - Data Zones – Establish Data zones and complimentary rules for access
    - Shared Zones
    - Public
    - DAO
    - APP
    - System
    - Private Zones
    - No External/Store Linked to Application
- OWASP vulnerabilities, if a message is invalid, interface services will disconnect the session without returning a response.

Why RS Software

RS Software is the leading custom software development house for the payments industry. With more than 25 years in the payments industry, we have participated in and helped create the products and services that have transformed this marketplace. Our proven methodologies, comprehensive set of services and continuing innovation are focused specifically on the needs of the space we have served exclusively since we opened our doors in 1991. No other provider in our space can deliver more industry knowledge and experience.