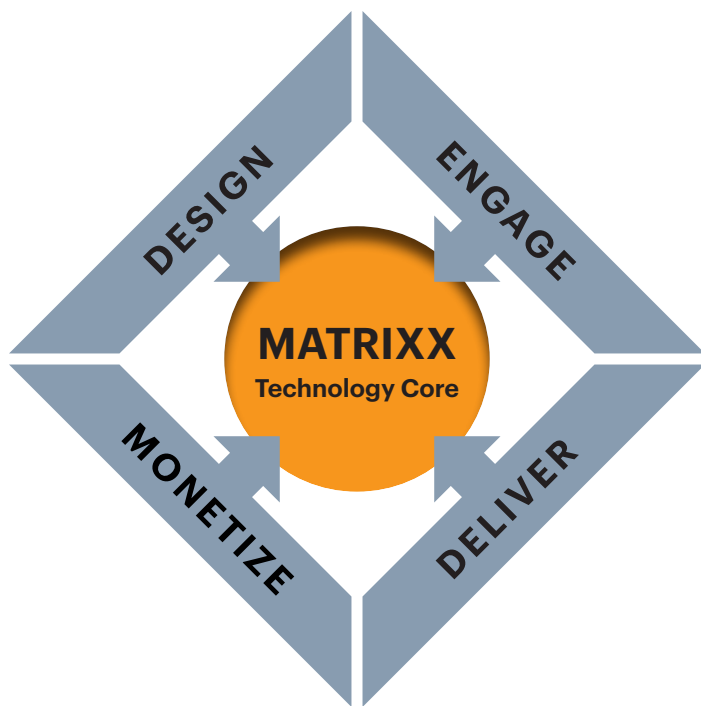


MATRIXX Digital Commerce

MATRIXX Digital Commerce empowers companies by improving business agility and lowering operating costs. Our software enables massive flexibility in how products and services are packaged, making it possible to bring personalized offers to market at web speed. With our platform, companies can move off of complex, expensive IT infrastructure and onto a single platform capable of running their entire business at a fraction of the cost.



SUMMARY

The MATRIXX Digital Commerce Platform is a cloud native, 5G ready solution bringing together traditionally separate functions around product design and lifecycle management, customer engagement, service delivery and monetization into a single platform.

Service providers can unwind the tangled web of outdated systems and cumbersome processes by moving to a modern platform that enables a single source of truth for customer transactions and a simpler, more agile operating model. With MATRIXX Digital Commerce, service providers can redefine their value proposition as they rollout 5G to continuously deliver innovation, and new products and services, to their customers.

Customers will enjoy a seamless experience with services that are easily customized with instant access and transparent pricing. By streamlining and simplifying how customers find, buy and pay for services, MATRIXX Digital Commerce enables service providers to deliver the type of personalized experience that customers love.

SOLUTION OVERVIEW

MATRIXX Digital Commerce provides a comprehensive solution to quickly set-up and run a digital telco business.

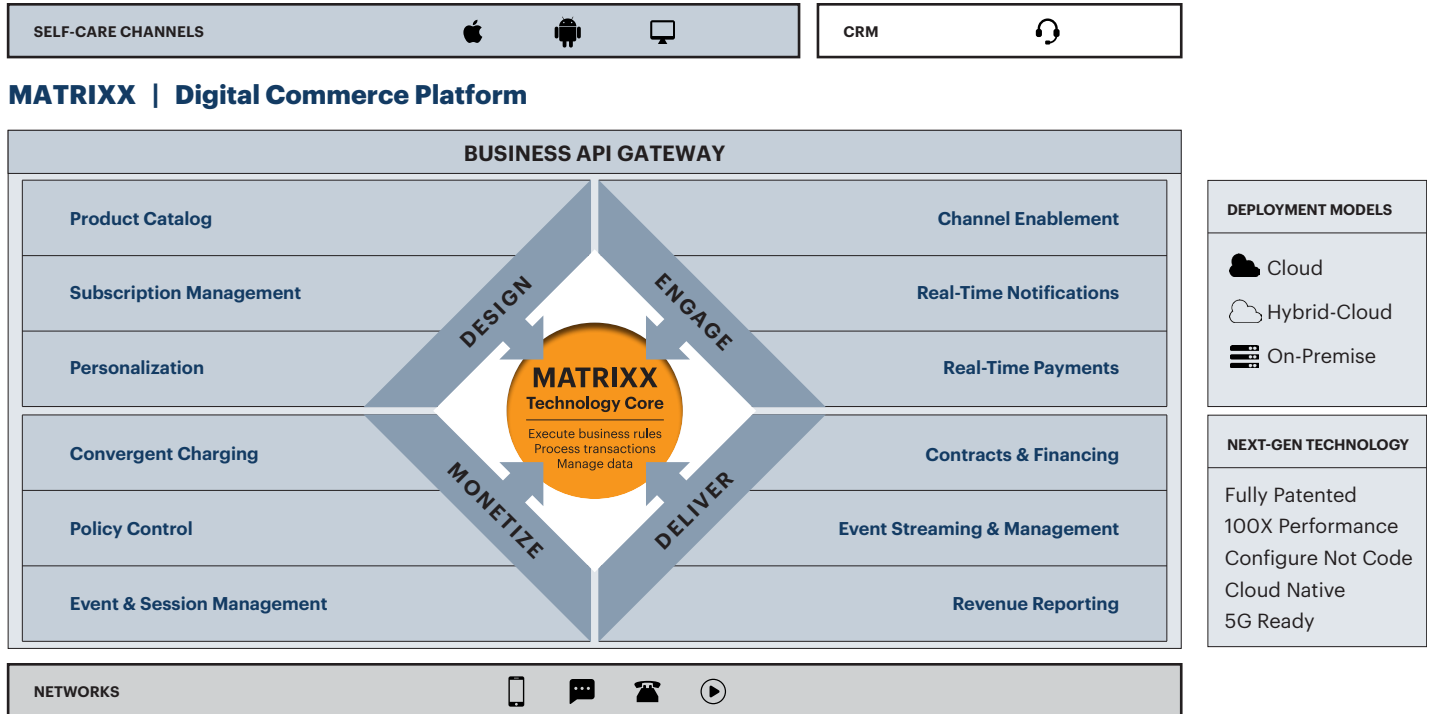


Figure 1: MATRIXX Digital Commerce Summary View

Customer Channels

Rapidly integrate mobile apps, web self-care, CRM and other channels via a flexible Business API Gateway. Front-end interactions and on-demand purchases are instantly reflected in the back-end platform providing a single, always accurate, customer view.

Digital Commerce Platform

- **Design** – Define your digital product catalog, build pricing via reusable templates, configure policy and call control rules, package products into propositions and set triggers for real-time event-based promotions.
- **Engage** – Deliver best-in-class digital care, including always accurate balances, full transaction history, contextual push notifications and products that can be personalized to fit customer needs. Offer real-time card payments alongside traditional payment methods.

- **Deliver** – Create new digital customer journeys, with on-demand access to services while simplifying network operations and architecture by managing data, voice, messaging, content and new digital services on a single platform.
- **Monetize** – Eliminate traditional silos by letting customers pay on their terms for different services instead of locking them into prepaid or postpaid payment methods. Charge and collect for services in real-time based on creative pricing and consumption models.

MATRIXX Technology Core

The MATRIXX Technology Core is the proprietary high-speed decision engine and in-memory database that enables the transformative capabilities of our commerce platform. Its patented decision-table architecture enables a click not code capability, eliminating the need for custom development to support new business requirements. The high-speed decision engine has a redesigned transaction processing model that eradicates

SOLUTION OVERVIEW (continued)

performance bottlenecks so that every customer interaction is instant and precise. An in-memory database puts an end to data silos, providing a single source of truth for all customer and partner channels. With innovations in business rule execution, transaction processing and data management, the MATRIXX Technology Core provides the market agility and operational scalability critical to digital-first operating environments.

Network – Integrate quickly to core network components via configurable gateways including DIAMETER (all traffic), HTTP/2 (5G core) and SIGTRAN-CAMEL (circuit-switched voice and SMS). Our gateways can be adapted quickly via simple configuration for flexible integration across network types and equipment from different providers.

Deployment Models – Deploy as a cloud solution (public, private or hybrid) or as an on-premise pre-certified hardware configuration.

PRODUCT FEATURES

MATRIXX | Digital Commerce Platform

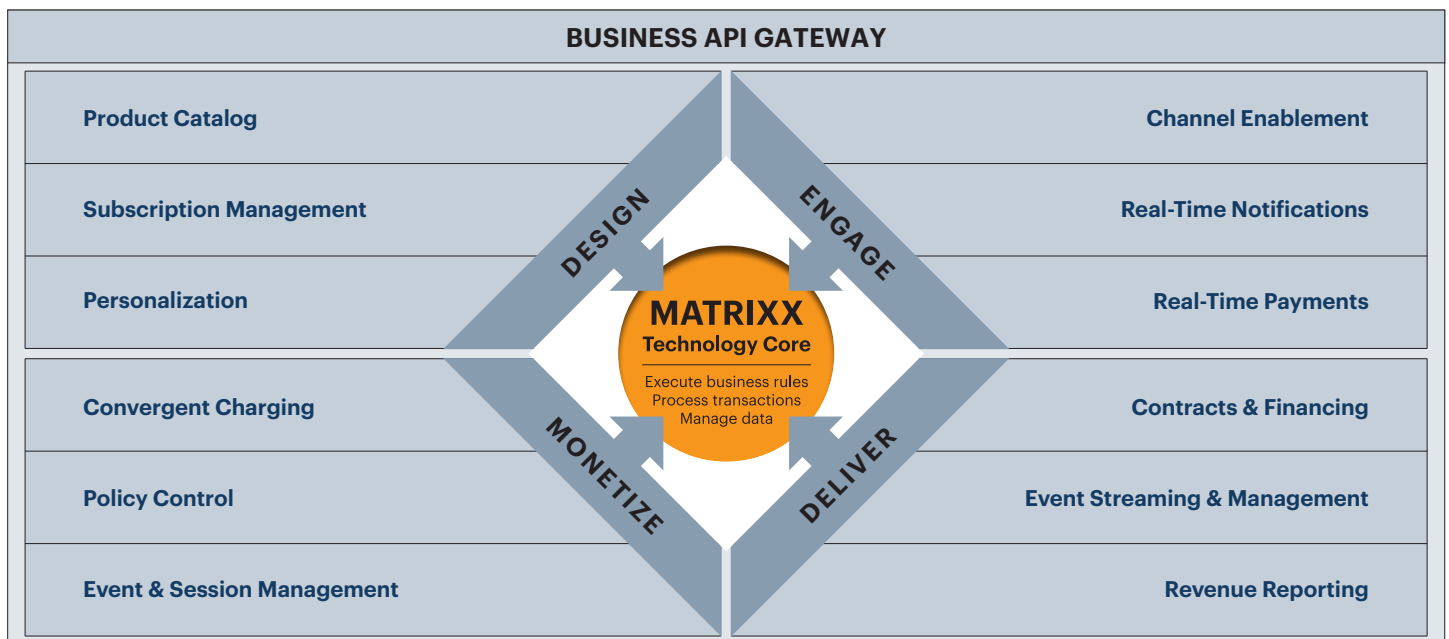


Figure 2: MATRIXX Digital Commerce Component View

PRODUCT FEATURES (continued)

Design Your Product Offering

- **Product Catalog** – All pricing and policy is 100% configuration based with rich charging and promotions support for services, goods and content. MATRXXX incorporates reusable building blocks and parameterization to minimize time to market. Internal bundling and eligibility rules can be defined in MATRXXX or in an external enterprise catalog that is called via an API.
- **Subscription Management** – Full support for recurring subscriptions and one-off purchases with flexible revenue recognition (advanced, deferred, linear and consumption-based). Support for personal and business plans on one device, including enterprise sharing. Cycle management is flexible, with support for auto-renewal and grace periods.
- **Personalization** – Subscribers can buy what they want, when they want it and how they want it. MATRXXX provides a precise view to each subscriber/group of their balances and subscriptions with user-configurable thresholds, spend limits and notifications. Out-of-the-box support for build-your-own-plan and dynamic sharing at any scale.

Engage Your Customers

- **Channel Enablement** – MATRXXX provides REST APIs, SDKs and orchestration journeys to streamline integration to self-care, CRM and other channels. Includes Android, iOS and web frameworks for embedding in customer-built apps to auto-generate MATRXXX and third-party APIs, which are mapped through the Business API Gateway. MATRXXX also provides a foundation app with common features including landing page, signup, onboarding, user login, marketplace and manage account that can be quickly adapted with minimal development and server configuration. The SDK and foundation app enables mobile and web app developers to use native MATRXXX technology within the client codebase in a pre-integrated and authenticated environment for accelerating app development timescales and providing best practice implementations of use cases.
- **Real-Time Notifications** – Support for push, SMS, USSD and email delivery of system and customer notifications with templates for personalized messages. Triggers can be set for promotions, spend control and regulatory compliance with actionable information delivered via URL/meta-data.
- **Real-Time Payments** – MATRXXX can process credit card and bank debit charges in real-time or by deferred settlement with functionality to cater to ad-hoc purchases, recurring auto-pay and threshold-based auto-pay. MATRXXX has built integration libraries to several external payment gateways, including Braintree, Cyber Source, Foo Masterpass, PayFort and RomCard.

PRODUCT FEATURES (continued)

Monetize in New Ways

- **Convergent Charging** – Highly configurable, sophisticated real-time charging for any services, goods and content. 3GPP compliant, fully convergent across all offerings, segments and payment models with supports 3G, 4G and 5G on the same platform. The same platform can support enterprise and consumer customers across prepay, postpay and pay now payment methods consuming fixed, mobile and cable services. Custom fields can be added to the data model which are then instantly available for rating rules.
- **Policy Control** – Native policy control provides the business logic for real-time policy decisions and rules. It allows charging and network quality of service (QoS) to be flexibly and dynamically linked to customer, service and network parameters. 3GPP compliant PCRF with support for static and dynamic policies. Policy is fully unified with convergent charging on a single database enabling instant triggering.
- **Event & Session Management** – Capabilities include session control, network integration, field configurable DIAMETER, CAMEL and SBA gateways, circuit-switched voice and VoLTE charging, 5G policy and charging and adaptive quota management (AQM). AQM is a patented approach for adapting quota sizes and validity times for each customer to reduce core network loads.

Deliver Great Experiences

- **Contracts & Financing** – The contract parameters for duration, initial payments, installments, offer grants, discounts and terms and conditions are configurable through a GUI and exposed to the commercial catalog and provisioning via an API. The contract status and remaining balances can be queried through an offer API, and any customer changes or payments are reflected immediately.
- **Event Streaming & Management** – Ultra-low latency, flexible event streaming framework; features include guaranteed delivery and multiple filterable subscriber streams which can be archived and are auditable. Enables real-time analytics and campaigns, fraud analysis and enterprise notifications. Includes Kafka, Google Pub-Sub and ActiveMQ adaptors plus an SDK for custom applications.
- **Revenue Reporting** – Fully configurable chart of accounts and transaction template definitions. Decision tables are used to map each transaction to correct account codes. Accounts and amounts are calculated in real-time for fully auditable events. Includes daily reports for ERP posting and finance insights.

MATRIXX INTEGRATION

Digital telcos are redefining the model for customer acquisition, engagement and care. This requires a redesign of traditional IT architectures to focus on mobile-first business and operational processes. The systems that support these processes must be “leaner and meaner” than their predecessors, moving away

from traditional silo-based architectures with many different components, multiple databases with subscriber information and the heavy use of middleware platforms. This diagram reflects how MATRIXX Digital Commerce is integrated into a traditional enterprise architecture.

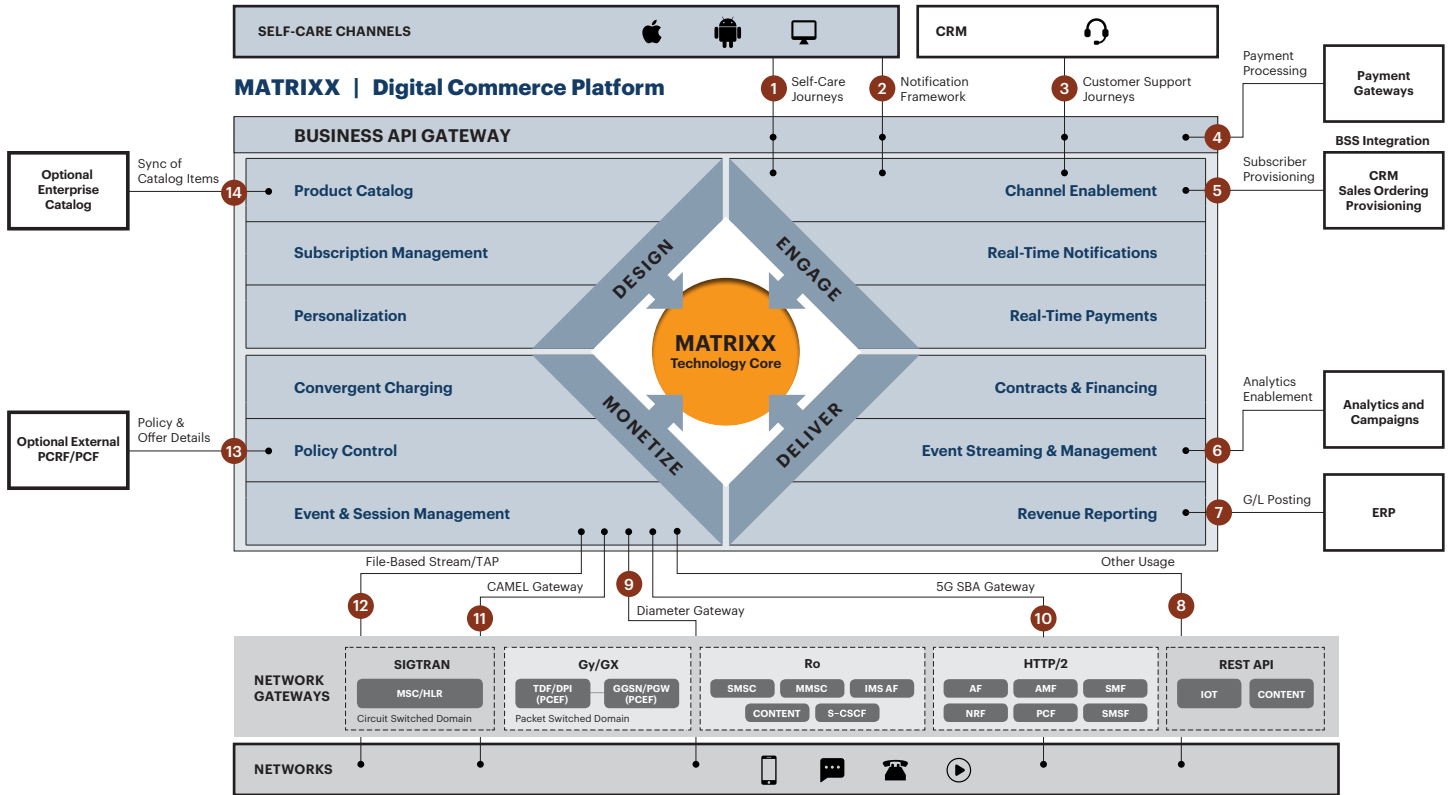


Figure 3: Digital Operator Solution Architecture

The Business API Gateway provides a secure, configurable and extensible REST API Gateway for Northbound apps and OSS/BSS integrations. Features include API routing, call aggregation, transformation and enrichment with full security. It contains a framework and SDK for rapid development of external adaptors and leverages the core database for task state to build orchestration workflows.

Key Interfaces

- 1. Self-Care** – MATRIXX offers client libraries and SDKs for iOS, Android and Javascript to support rapid app development. Native “foundation apps” provide opensource code for common self-care journeys so that app developers don’t need BSS expertise to access MATRIXX functionality.
- 2. Notifications** – Generated based on threshold breaches, low balance, offer purchases and lifecycle changes which may be sent via SMPP, USSD (MAP-SIGTRAN), SMTP or published using a native JMS/XML framework.

MATRIX X INTEGRATION (continued)

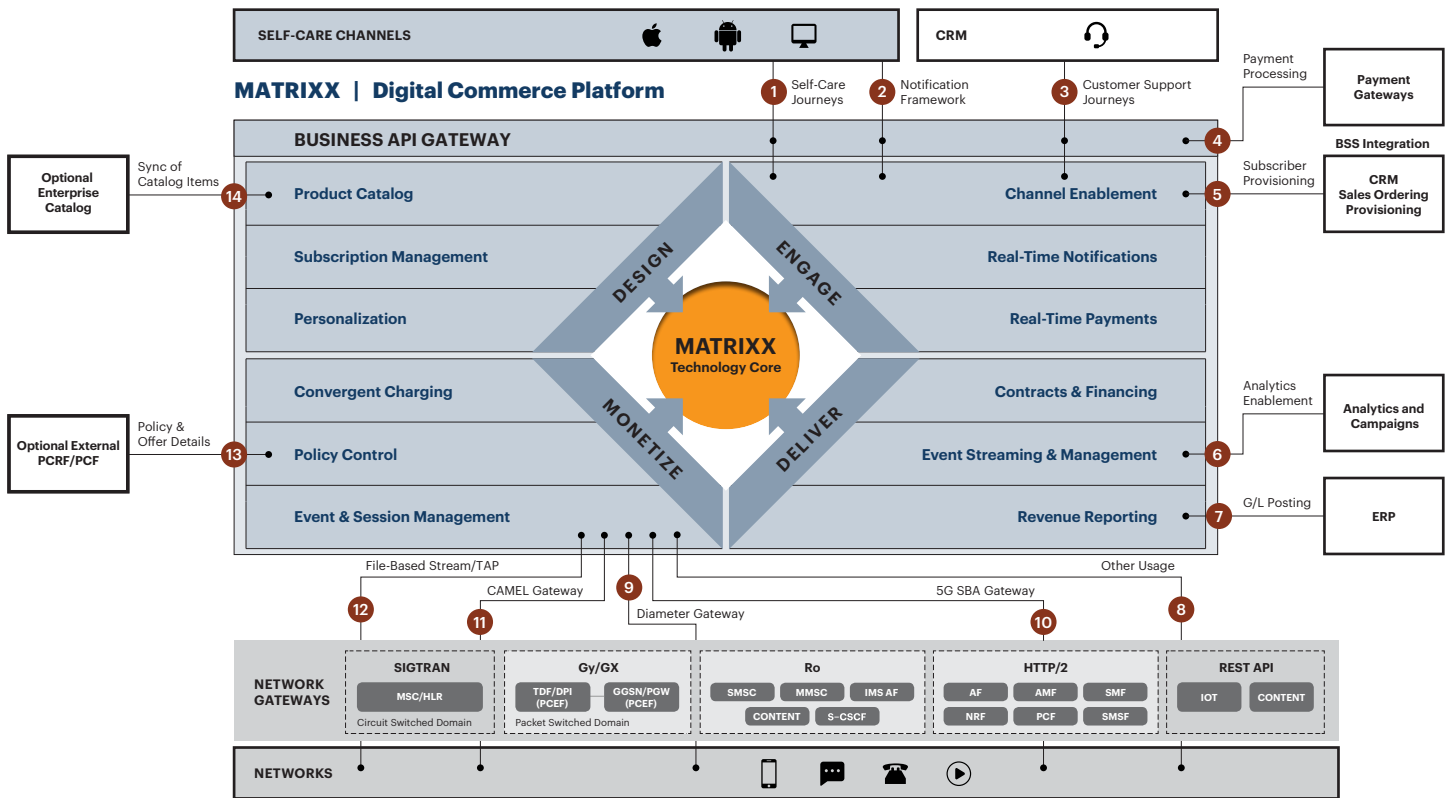


Figure 3: Digital Operator Solution Architecture

Key Interfaces (continued)

- 3. Customer Support** – CRM and other customer-facing channels can interact with MATRIX X through the Business API Gateway. A joint solution, Go Digital™, is available with Vlocity that incorporates cloud-based CRM. MATRIX X also provides a light-weight subscriber lookup and repair services for back-office IT personnel or customer service representatives (CSRs).
- 4. Payment Processing** – An extendable payment framework is pre-integrated into the Braintree, CyberSource, Foo Masterpass, PayFort and RomCard payment gateway and can be adapted for other payment gateways.
- 5. Subscriber Provisioning** – A provisioning API simplifies the integration of CRM, sales ordering, provisioning and BSS systems by performing data model translation, interface abstraction, error checking and catering for multiple integration protocols.
- 6. Analytics Enablement** – Events or aggregated events are generated for every session and interaction, and these can be integrated into campaign management and analytics platforms via MATRIX X events and notifications. MATRIX X provides an event streaming server and Apache Kafka connector to manage and deliver event stream to external target system.
- 7. General Ledger Posting** – Event Detail Records (EDRs) are generated for all General Ledger (G/L) balance changes and all charging transactions. Each record contains detailed charge record and balance impact information including taxation and discount breakdown and all G/L assignments. The associated G/L information for all EDRs is processed daily to provide aggregate G/L posting information that can be integrated with an ERP financial system.

MATRIXX INTEGRATION (continued)

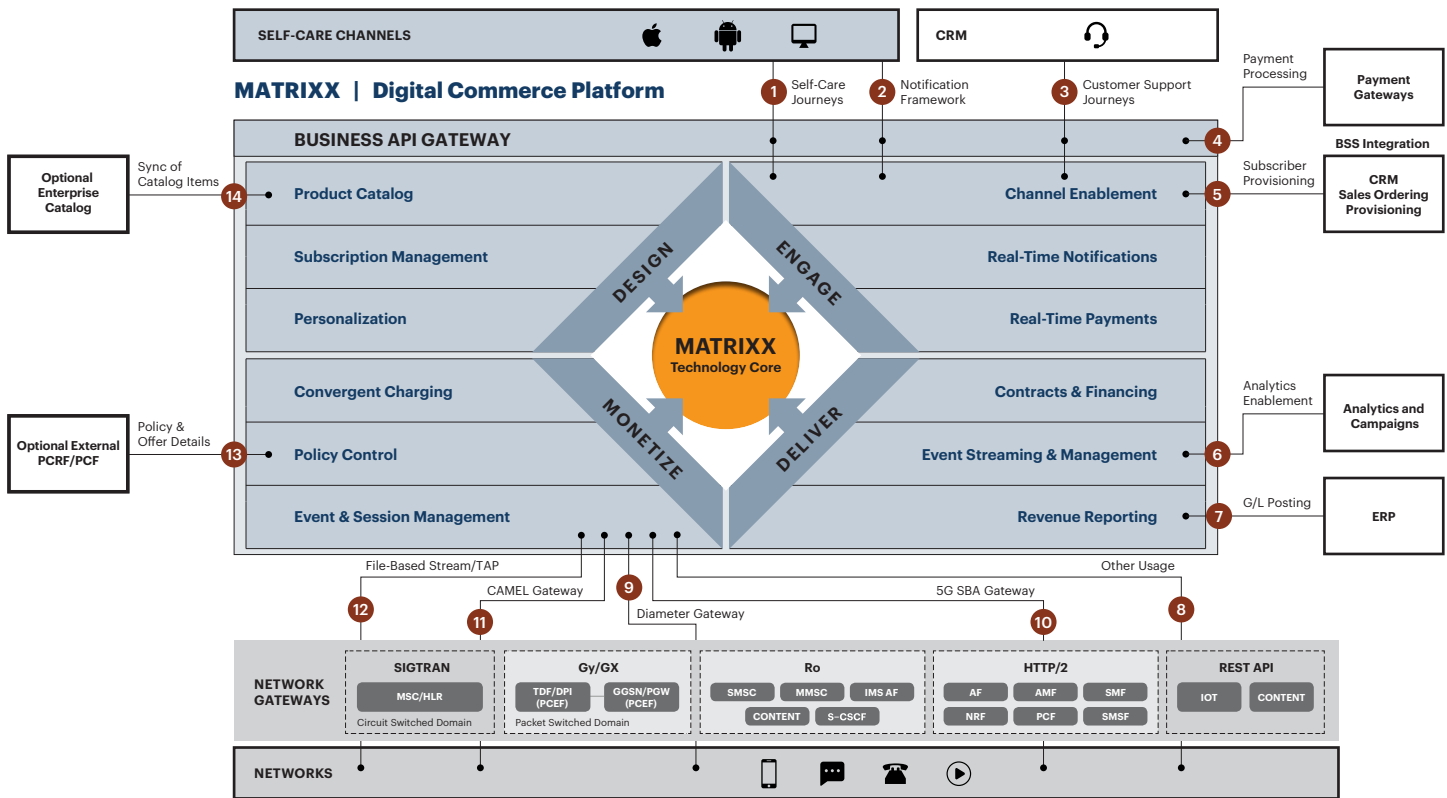


Figure 3: Digital Operator Solution Architecture

Key Interfaces (continued)

- 8. Non-Network Usage** – The MATRIXX platform can also support event-based charging for non-network usage via a REST API for content, IoT and other services.
- 9. Configurable DIAMETER Gateway** – The MATRIXX platform is compliant with 3GPP online charging system (OCS) standards and supports real-time charging for all services using Ro or Gy interfaces. 3GPP compliant policy and charging rules function (PCRF) functionality is supported natively via Gx. All DIAMETER integration is based on local configuration and can be performed without any coding.
- 10. Configurable 5G SBA Gateway** – The MATRIXX platform is compliant with 3GPP release 15 specifications for Service Based Architecture (SBA), Charging Function (CHF) and Network Repository Function (NRF) interworking. MATRIXX provides Converged Charging System (CCS) functionality within a 5G core environment through the CHF providing charging services to Network Functions, with support for converged charging (over N40 reference point) and spend control (over N28 reference point). The SBA gateway provides a flexible parameter mapping mechanism allowing specification changes and vendor-specific parameters to be configured locally without product coding.
- 11. Configurable CAMEL Gateway** – Real-time circuit-switched charging is supported using CAP 1, 2, 3, 4 for voice and CAP 3 for SMS with MAP supported for network queries (MNP and USSD query services support).

MATRIXX INTEGRATION (continued)

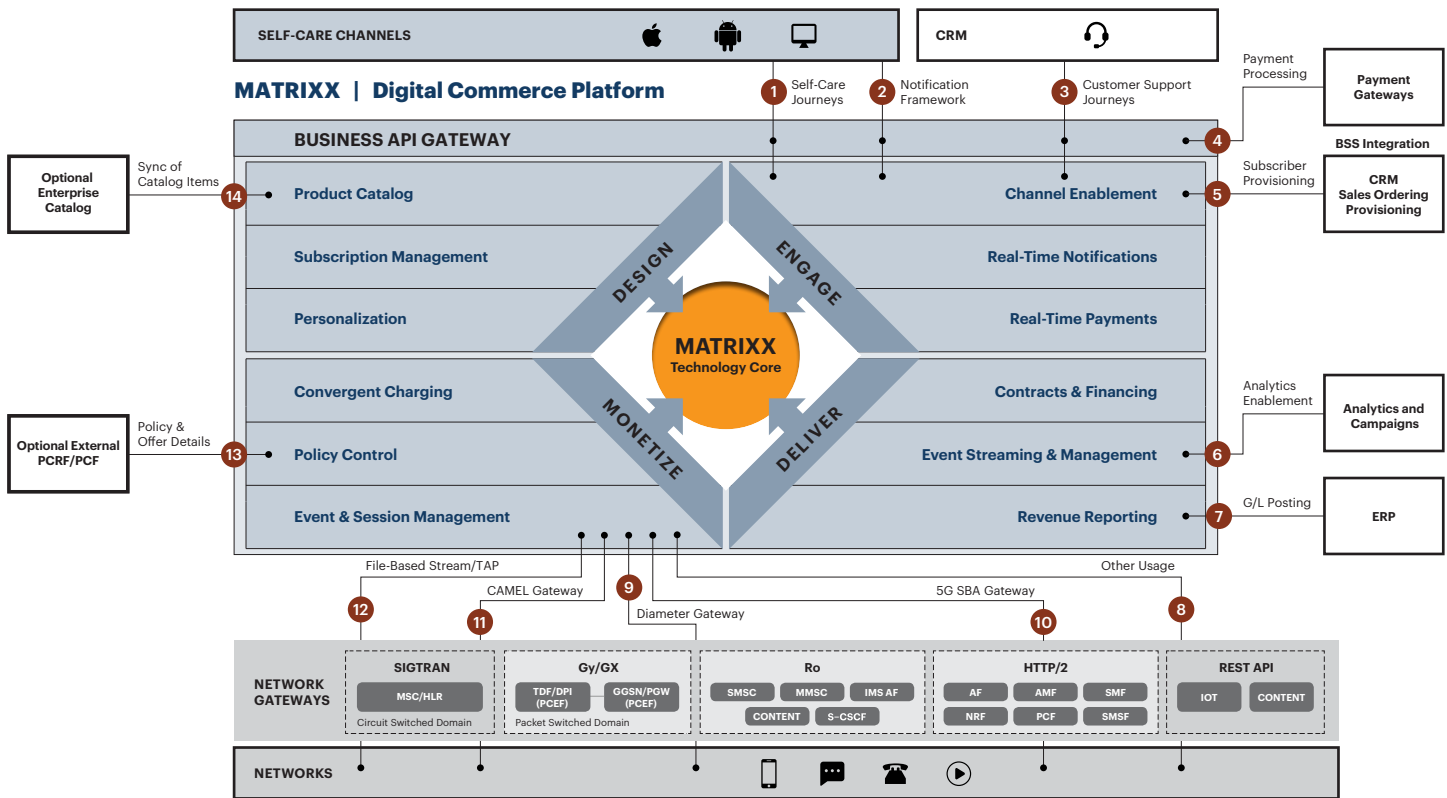


Figure 3: Digital Operator Solution Architecture

Key Interfaces (continued)

12. File-Based Stream/TAP – Offline rating is supported by converting CDRs and TAP records into Diameter Ro requests.

13. External PCRF – The MATRIXX platform can interact with a third-party PCRF via Sy to query counters and via Sh (acting as an Sp reference point) to retrieve subscriber offer details in both pull and push modes. The third-party PCRF (and other Diameter based clients) can also use the Sh interface to retrieve subscriber information using an agreed XML format.

14. External Product Catalog – The commercial catalog items can sync to the technical product catalog in MATRIXX via REST.

DEPLOYMENT OF CLOUD NATIVE ARCHITECTURE

MATRIX Digital Commerce is designed using microservices and cloud native principles. The platform is comprised of loosely coupled components to represent each separate business function. Each layer can be separately scaled and tuned for the desired level of performance and resilience. The architecture has been optimized as to the boundaries of each microservice to

provide the right levels of autonomous control where necessary and ensuring the desired performance levels where it is appropriate to co-locate business functionality.

MATRIX is deployed using containers orchestrated by Kubernetes. The deployment uses 100% native controls and without plugins or an external provisioning overlay.

MATRIX | Deployment of Cloud Native Architecture

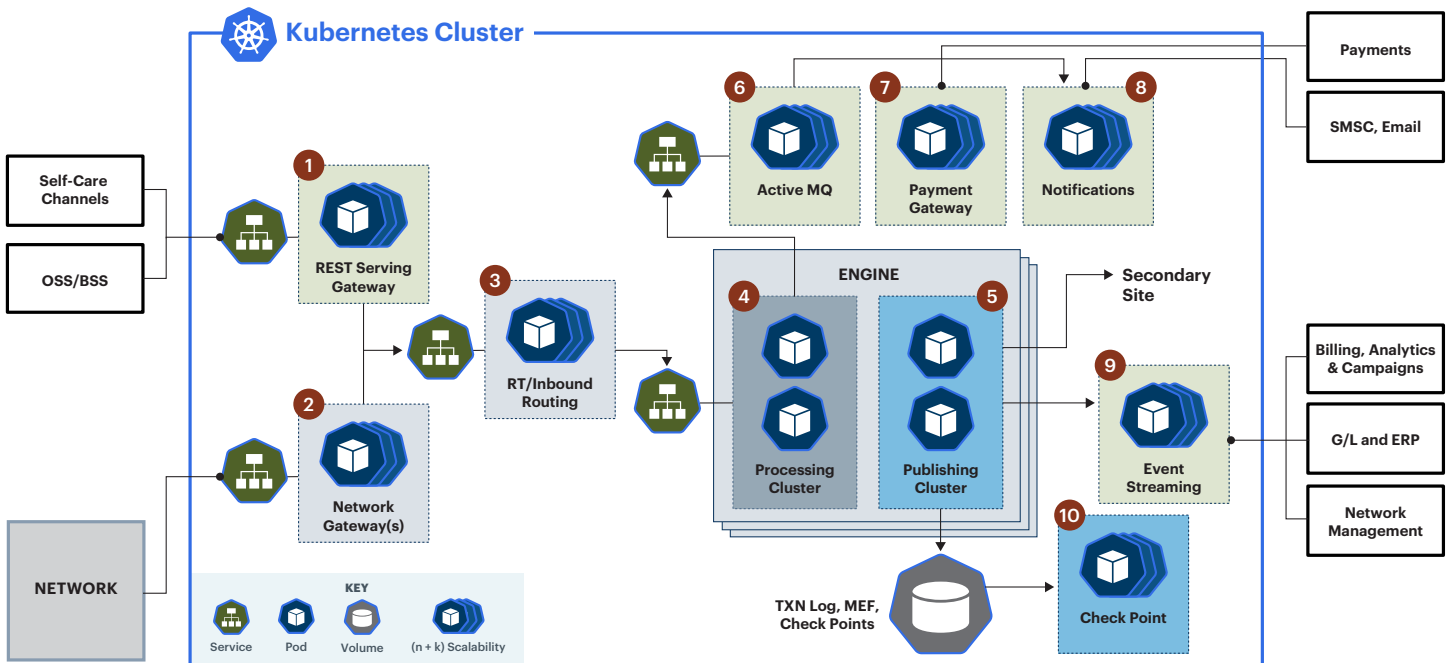


Figure 4: MATRIX Deployment of Cloud Native Architecture

- 1. REST Serving Gateway** – Converts simple RESTful API requests into a MATRIX internal messaging format.
- 2. Network Gateway(s)** – Network interaction is handled through microservices involving DIAMETER, SIGTRAN, HTTP/2, RESTful and other network protocols.
- 3. RT/Inbound Routing** – Load balances and routes all requests to the correct processing pod and manages all responses to the initiator.
- 4. Processing Cluster** – Execute the business logic to process the request and create a response; as a stateful component, this process includes a fully available all-mastered database for resilient persistent storage.
- 5. Publishing Cluster** – Reliably publish events to the event repository to audit files and to high volume, low latency streaming targets.
- 6. Active MQ** – Delivers outbound integration from MATRIX to external services.
- 7. Payment Gateway** – Connects to various payment providers to enable real-time purchases, scheduled payments and threshold-triggered recharges.
- 8. Notifications** – Generates templated human-readable messages and delivers to end-customers via push notifications, SMS or email.
- 9. Event Streaming** – A Kafka adapter provides real-time access to events as they are produced by publishing cluster.
- 10. Check Point** – Processes offline transaction files to periodically recreate a full image of the database and write check point images to be used in the case of disaster recovery and cold start.

BENEFITS OF MATRIXX DIGITAL COMMERCE

A platform for rapidly creating a differentiated proposition that will meet the needs of digital customers. MATRIXX delivers benefits in months, not years, including:

Creating a New Operating Model

- **Mobile-First Interaction** – Customers will find it easier to find, buy and pay for services. Operators can simplify the IT architecture, streamline operations and reset the cost base.
- **Agile to Deploy and Operate** – A modern platform that enables a rapid deployment cycle and ongoing offer delivery by eliminating the need for custom-coding and complex IT integration.
- **Simplified IT Architecture** – Streamlined workflows and simplified architecture that minimizes latency and improves processing efficiency for large volume, complex transactions.
- **Digital-Grade Performance** – Patented technology delivering predictable, scalable and cost-efficient performance across billions of complex customer and network interactions.

Building a Better Business Model

- **Improve NPS via Customer Experience** – MATRIXX delivers a real-time digital experience that improves company NPS; at one of our customers the increase was 30 NPS points.
- **Grow New Revenues** – Transparent data usage and one-click data top-ups via a mobile app have led to ARPU increases; one customer recorded a 5% ARPU increase over 12 months.
- **Lower Cost to Serve** – Highly accurate customer balances, increased self-care and simplified processes can reduce care costs; one customer reduced call center complaints by 40%.
- **Extensive Savings in IT Costs** – The cost to install and run MATRIXX Software is up to 95% lower than other traditional vendors with outdated technology and delivery models.

See our [ROI cheat-sheet](#) for more metrics.

ABOUT MATRIXX SOFTWARE

MATRIXX Software provides next-generation, cloud native digital commerce solutions that transform how companies do business. Serving many of the world's largest communications companies, IoT players and emerging digital service providers, MATRIXX is committed to delivering a modern commerce platform that easily scales to support global marketplaces and consumption-based services. Through its relentless commitment to product excellence and customer success, MATRIXX empowers businesses to reinvent themselves and succeed as digital leaders.

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