# AUTONOMY SAP

# Enabling Mobility as a Service At-scale

White Paper 2021

Prepared by Autonomy, Nagarro and SAP

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## **Table of Contents**

04	Executive Summary
06	Mobility as a Service: A Global View
08	The MaaS User's Journey
10	Why SAP?
12	Rethinking Ticketing and Financials Management
14	SAP Commerce Cloud with Omnitiq
18	SAP Billing and Revenue Innovation Management
23	Omnitiq and BRIM in Action
27	A Partnership for Solving the Complexities of Maa

## **Executive Summary**

#### The Current State of Play

Even before the COVID-19 health crisis began, there were rapid and transformational changes taking place within the mobility ecosystem. With increased political support for mobility solutions that meet public policy objectives like reducing pollution and congestion in cities, combined with strong innovation in the sector, many traditional conceptions of moving citizens from point A to B were in the process of being reimagined.

With the rise of Mobility as a Service (MaaS), an immense opportunity has arrived for mobility stakeholders to combine public sector goals with technical solutions to create a seamless and efficient user journey. With a simple concept of an app that connects users to a range of transport options, paid for by a universal token accepted by all operators, the idea has captured the imagination of mobility players worldwide. The desire for MaaS is pervasive: cities want it, urbanites want it, corporates and startups alike want it, and in 2020 it became a central pillar of the <u>EU's Sustainable and Smart Mobility Strategy</u>. In short, MaaS is set to play a pivotal role in the transition to more sustainable, integrated, and intelligent mobility systems, in the process opening incredible opportunities for users and facilitators alike.

For MaaS to work, a user must be able to access all available transport modalities on one application; an application that hosts a variety of mobility operators and transport companies, all with their unique pricings and conditions of service.

#### SAP's Advanced Software Offerings

SAP is responding to this key MaaS challenge through two software offerings:

#### 1

## A full-scope sales and distribution system for MaaS that is built on SAP's e-commerce platform

The Omnitiq solution, built on SAP's Commerce Cloud Platform by Nagarro in collaboration with DB Systel, offers the ability to gather a critical mass of mobility operators and products on one platform to provide customers with one fare, one journey, one payment, and one ticket.

#### 2

## An account-based system that enables multisided business models for MaaS operators

The modular solution, SAP Billing and Revenue Innovation Management (SAP BRIM), is a tested and proven telecommunications-grade set of products that enables a multisided business model backend, essential for aggregating many mobility operators to provide a MaaS service. AcuitLabs, an SAP partner has built Acuiti-Mobi, a configuration package that helps in accelerating BRIM implementations for MaaS Operators and Fare Management systems.





With a global reputation of trusted software and technological solutions, SAP has the scale and expertise needed to apply over 45 years innovation experience to MaaS. Sustainability is one of SAP's long-term strategic goals and part of its vision and purpose. SAP is therefore working cross-sectorally to improve the sustainability of an entire industry, which is what MaaS is about. At the heart of MaaS is more sustainable, inclusive, and efficient mobility for all.

## Mobility as a Service: A Global View

#### The promise of MaaS

The current political support for MaaS, particularly in Europe, has created the perfect setting for its adoption. MaaS has the potential to benefit society, the environment and the economy over the long term, and in the immediate term help authorities respond to COVID-19 and other public health issues. A MaaS future could dramatically change how urban areas look and feel. The only way that cities will be able to realize this new era will be by giving citizens an equivalent alternative to car ownership. Across the mobility industry, many agree that this alternative will be MaaS.

The restrictions put in place to limit the impacts and spread of the COVID-19 virus in 2020 essentially flipped the transportation system as we know it on its head. Although these circumstances surrounding the pandemic posed a whole new set of challenges for urban mobility, particularly as it relates to maintaining social distancing measures on public and shared transportation, they have also presented new opportunities for the wider adoption of mobility systems that support multimodal usage.

The allure of MaaS lies in how can it can help cities adapt to changing circumstances, such as a pandemic, or other user-specific needs like physical accessibility or availability of the most efficient modalities. As a tool that provides a density of services to a variety of different users, all in real-time, MaaS's ability to provide such an aggregation has yet to be matched by any other urban mobility solution. This flexibility plays into MaaS's reputation as the potential crowning glory of a future mobility system that incorporates all actors while meeting sustainability objectives, principally through the capacity to reduce single car ownership in urban settings.



#### So why has MaaS been slow to catch on?

A personal car is still a great door-to-door solution. Consumer behavior changes quickly when a new service is unquestionably better or cheaper than the incumbent. To offer an alternative that is truly superior to owning a car is a challenge that involves many moving parts. MaaS must ultimately be as convenient, if not more so, than single car ownership.

While the concept is simple, to offer a mobility solution that is as competitive as a personal car is, on a technical level, extremely complex. Principally, MaaS must have the software capabilities to integrate the many different mobility actors on one platform, provide a seamless payment and ticketing experience for the user, and continuously incorporate mobility data to inform the app's optimization of services. Without this technical capacity, the concept will never work on a practical level.

## The MaaS User's Journey

The attractivity of MaaS is that it prioritizes the user – be it the commuter, business or leisure traveler, or micromobility consumer. At the heart of the challenges that SAP is working to solve is a seamless user journey from start to finish. With the correct application of the right software and business solutions, this is what the user's journey should look like, and the behind-the-scenes steps being taken care of from a technical and operational perspective.





## Why SAP is Well Positioned to Scale MaaS Adoption

MaaS must be driven by actors who have the technical knowledge and software systems to address the challenges of aggregation, data, and payments, and synchronize the technological, regulatory, and engineering elements of a multimodal transport system. Established players will therefore be key in enabling a functioning MaaS system that meets the needs of commuters as a competitive alternative to car travel.

As a new industry that has yet to reach maturity, MaaS also remains a contested space, with a constant stream of new entrants. Stuck in its experimentation phase as a market that is still developing, paired with competing interests, means that many MaaS stakeholders haven't yet decided what they want their roles to be. With no tried and tested system that can be replicated in different contexts, this has slowed the development of a sector where everything is still up for grabs. While the future of MaaS hinges on effective collaboration between its key players, it is also in need of leading players with enough knowledge and resources to implement the system at scale.

With the technical knowledge, cross-industry experience, and the right set of skills and products, SAP is helping the mobility industry pivot quickly into a new digital paradigm, working to ensure that MaaS is resilient, profitable and sustainable. In all three of these key areas, SAP provides the enabling technological platforms with deep application functional coverage to address both the sales and distribution aspects, as well as the business model design challenges, for companies heading in the direction of being a Mobility as a Service provider.

"Just like we cannot ignore the pandemic... we cannot ignore climate change and the major contributions of enterprises. Together, we can lead this change and become intelligent enterprises, to make sustainability profitable and profitability sustainable."



Christian Klein SAP CEO

## Rethinking Ticketing and Financials Management

SAP has identified software complexity, data management and ticketing and payment as key challenges to be solved in order to accelerate the widespread adoption of MaaS.

#### 1

#### Software Complexity

**Provide enabling software for operators to directly manage customers and their data.** While some operators have the capacity to develop their own software, others don't. But with many differences in approach to software, depending on the operator and their objectives, this creates a disjointed experience for the user and throws up legal and ethical questions about the handling of data.

A platform approach to aggregating mobility services from all parties. Aggregation of all mobility services and operators needs to happen in real time, all on the same platform.

A more cohesive mobility provided by fewer ecosystem players – more integrated, more seamless. Too many software providers creates a fragmented landscape that inhibits an integrated and seamless MaaS!

Higher functionality in customer subscriptions, packaging and contract management. Software needs to be able to address these key factors of MaaS adoptability and uptake.

#### 2

#### Data

A SaaS model to manage data. There are two possibilities for MaaS: tech companies providing the solution for free, in exchange for the commercial exploitation of the rich data of users. The other alternative is to pay for the software service, safeguarding the privacy of commuters' data. The second option is what cities, transport authorities and commuters want, and is also GDPR compliant.

**Open Data for a collective approach.** Agreed-upon data specifications must be streamlined across the industry to optimize the user experience, improve the service, and create supportive public-private partnerships that allow the city to manage a multimodal distribution system.

#### 3

#### **Ticketing & Payment**

**Compatibility and/or upgrade of card-based systems to account-based systems.** Multiple tickets, different payment systems on different platforms, and the lack of an account-based system creates confusion and barriers to adoption for the user.

**Seamless partner settlements and financials management.** This is important for encouraging a critical mass of operators to participate in a single MaaS platform.

**From 'Ticketing systems' to 'Accounts Management systems'.** MaaS must move away from passengers paying with a ticket each time they select a different modality, and toward a system where all transactions are aggregated on the fly and provided as a single view to the end customer. A single real-time view to each MaaS partner for their revenue management, as per their contractual agreement regarding services, must also be provided.

Together with key industry partners, SAP Commerce Cloud (with Omnitiq, built by Nagarro in collaboration with DB Systel) and SAP Billing and Revenue Innovation Management (with the Acuiti-Mobi Accelerator built by AcuitiLabs) are addressing the full range of platform complexity, data management, ticketing, and payment challenges.

# SAP Commerce Cloud with Omnitiq

A customer centric integrated MaaS platform

## Enabling MaaS with SAP Commerce and Omnitiq

#### Solving the sales and distribution challenges of MaaS

Rather than having to locate, book, and pay for each mode of transportation separately, an Integrated Mobility Platform (IMP) approach to MaaS covers the customer journey experience from the beginning: customization of transit modes, trip planning and booking (including payment), as well as en-route support.

MaaS platforms must move mobility operators toward a more user-centric mobility paradigm: how best to get individual users to their destination based on real-time network conditions and considering all possible options as well as user preference (e.g. time and convenience vs. cost). And all this while facilitating seamless payment.

Nagarro built Omnitiq in collaboration with DB Systel to extend the value of SAP Commerce Cloud by adding mobility related capabilities and integrations from location service providers and transportation systems – making Omnitiq a full scope MaaS platform.

Omnitiq combines public transit and intercity services into a multi-modal travel planning solution, enabling public and private mobility operators to deliver a first-class MaaS experience. The systems provides trip planning, reservation, and ticketing services for multiple modes of transportation into a single back-end server and front-end application.

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# Key coverage of the Omnitiq integrated mobility solution



- One-time registration
- 'Shopping cart'
- Access to all offers
- Change/amend offers

#### **Journey Planning**

- Journey planner / open trip planner
- Service and network design
- Vehicle and carriage admin
- Inventory services
- Seat inventory allocation

#### **Booking**

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- Dynamic pricing
- Passenger fare and type
- Booking business flow
- Mobile app
- Integrates other sales channels

#### **Payment & Ticketing**

- Payments plan
- Pay-as you go
- Issue ticket/Qr Code

#### **Ticket**

- Be in / Be out
- Validation
- Disruption management
- Route info

## Why Omnitiq?



# SAP Billing and Revenue Innovation Management (SAP BRIM)

Digitally transforming the order to cash process for MaaS

## Enabling MaaS with SAP BRIM



The system comes with the capability to host a range of multisided business models, where multiple partners provide a variety of products and services to be created for sales and distribution on an app. The system handles all relevant commissions and/or revenue shares that flow back to the providers automatically.

#### Solving the multisided business model challenge for MaaS operators with an account-based approach

One of the key challenges in aggregating a multitude of products, services, and providers on one app is enabling these actors to perform seamless revenue management and shared contractual obligations across multiple business entities. The SAP BRIM (Billing and Revenue Innovation Management) solution provides a framework for an account-based system that integrates diverse mobility services into the fare and price mix of different providers.





## Enabling MaaS with SAP BRIM



#### Key coverage of SAP BRIM for Mobility Operators

BRIM is modular: each of its parts can connect to another existing system or serve as an entirely endto-end solution. To achieve the full value of an integrated platform, managing all mobility operators' subscriptions and financial needs, the system needs to be aligned from both a **sales** point of view as well as a **financial management** point of view.

For **financials**, the revenue shares are captured in standard processes to prevent revenue leakage and address customer service issues. For **sales**, there is additional value creation for the platform each time a new mobility provider is brought on board. Bringing in third parties increases the value of the offering for end customers, which should spark a virtuous cycle of growing customer loyalty and wider user base, which in turn attracts more third parties. It is this virtuous cycle that will create the most effective multisided platform opportunities.

### To enable such a multisided business model with revenue sharing capabilities, SAP's BRIM solution covers five key areas:



#### **Subcriptions and Products**

- Subscription order processing
- 360 view of accounts
- Installment plans
- Product configuration
- Bundle creation

#### **Transactions and Events**

- Events management
- Events context

#### **Charge and Revenue Share**

- Charge calculations
- Revenue allocations

#### **Invoicing and Payments Statements**

- Rated events collections
- Bill cycle
- Billing & invoicing

#### **Settlement and Financials**

- Accounts receivable (customers)
- Accounts payable (partners)
- Automated payment processing
- Revenue Recognition
- Sub-ledger accounting
- End-to-end traceability

## Omnitiq in Action: Spotlight on Deutsche Bahn

DB Systel - a wholly owned subsidiary of Deutsche Bahn AG and digital partner for all DB Group companies – customized and modified the Omnitiq platform to meet the business needs and feature requirements of different DB-specific use-cases.

"It is always a challenge to provide something new to users when you have to modify multiple systems to launch a new service or product. The main goal of starting to work with Omnitiq was to be able to rely upon the standard features of a platform for most of our needs, and to add specialized features how we want – processes, pricing, after sales, etc.. We wanted a way to focus on specific business requirements while avoiding major development efforts for standard distribution functionality."



**Dr. Hubert Kreutzmann** Application Development & Passenger Transport Integration, DB Systel



#### DB Regio Bus - Wohin Du Willst

DB Regio Bus is the market leader in German local transport. Whether in metropolitan areas, large cities, or in the countryside, the extensive network of DB Regio Bus and its app Wohin Du Willst ensures that passengers can always see the array of mobility options available in their region and beyond. However, with different pricings, timetables, tariffs, and operators, the app had not yet been able to manage pricing, ticket booking and payment capabilities.

Omnitiq offers the backend solution to sell bus tickets through Wohin Du Willst, importing multiple pricing catalogues (with zones, stops, and tariffs) and providing valid offers for chosen routes (station to station). Using this information and chosen user journeys, Omnitiq will for the first time supply a ticket to the customer through the Wohin Du Willst app.

#### **Deutsche Bahn Connect**

Deutsche Bahn Connect's mobility service offers a range of first/last mile fleet concepts and services such as car and bike sharing, thus complementing DB's regional and long-distance transport services.

For a DB Connect application (Bonvoyo) to access public transportation data, Omnitiq was used to integrate essential DB public transport indications (journey planning, offers, sales, and ticketing) into the said app – adding public transit as an additional travel option within a range of other transportation providers (bike sharing, car sharing etc.). The Omnitiq platform acted as a crucial tool during the three month implementation period.

#### DB Vertrieb Check-In/Be-Out

DB Vertrieb is responsible for sales and ticketing for DB's passenger services, as well as for many other transport companies. It connects around 5.8 million passengers (2019) to Germany's railways per day. With new market situations challenging old ticketing and validation systems, Check In/Be Out is DB Vertrieb's first step towards new ticketing technology.

Using Omnitiq to serve as the back-end technology, Check-In/Be-Out allows a customer to enter a public transit system with a valid ticket and execute their journey. The software solution recognizes that the customer has both entered and exited the system, thereby billing them monthly through an automatic process. In addition, the best prices are automatically calculated for the customer, either on a trip or monthly basis, depending on their trips executed. Omnitiq provides the platform for customer management/customer care, payment and billing.

## **SAP BRIM in Action**



#### A I AcuitiLabs



## Accelerating the MaaS experience with Acuiti-Mobi

<u>Acuiti-Mobi</u>, built by AcuitLabs, was created to enable the fast adoption of SAP BRIM in a MaaS operator's use case - including several key elements:

- Accounts registration and management
- Payment integration to PSP and wallets with post-pay and prepay capabilities
- Mediation technology to integrate to new technologies or existing legacy infrastructure
- Digital presentment
- Option to be a pay-as-you-go or prepaid approach
- Flexible billing/invoicing and payment processes
- Automated partner share and revenue management

## Mobility flat rate in the City of Augsburg, Germany

Stadtwerke Augsburg, as a public utility, offers its customers energy, water, public transport, car and bike sharing services. Augsburg combined various mobility services into a centralized product that encouraged the higher use of shared mobility services; becoming the first German city to offer citizens a <u>mobility flat rate</u>. Using the SAP BRIM solution, customers can select the subscription that best fits their needs, incorporating the full range of mobility services available for a more environmentally friendly offer.

### Other industries that have transformed to 'X-as-a-Service' for their business models

#### **Telecommunications: Globenet**

Supporting 23,000 miles of fiber optic cables; find out how GlobeNet is providing **new services and reaching new customers** with a competitive digital platform.

#### Information Technology: Adobe

Powering real-time revenue management innovation; see how Adobe is reimagining revenue management and recurring billing practices as a critical component of its digital journey.



## A Partnership for Solving the Complexities of MaaS

MaaS pilots around the world have not yet achieved the full set of goals foundational to the idea. This, despite the enthusiasm of municipalities and transport professionals, as well as the proliferation of user apps.

One of the main challenges is to aggregate mobility service offers into a One Journey, One Fare, One Payment, One Ticket concept, and to split the revenue generated by the platform between the participating transportation providers. To be attractive, MaaS players must achieve a range of services and options for users at-scale; nudging users – where necessary – in making optimal choices for their personal needs. Anything short of this will not be enough to encourage customers to move away from car ownership. Given this challenge, stakeholders must have a trustworthy partnership with public transport operators, who have much to lose should their assets become under-utilized.

Compounded by the COVID-19 health crisis and the upending of our usual transport patterns, not only have our daily habits around mobility changed, but so too has our mobility psychology. MaaS offers a timely response to our post-pandemic lives, where flexibility, affordability, and user centrality will become key elements of transportation. The answer to a holistic MaaS system is to combine two distinct SAP products: **SAP Commerce Cloud with Omnitiq** for booking, reservation, distribution, payment, and ticketing; and **SAP Billing and Revenue Innovation Management** for subscriptions, products, rating, invoicing, entitlements management, and revenue sharing between transport players.

# Thank you!

### For more information on how SAP solutions can enable your Mobility as a Service journey, visit us online.

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