SIEMENS

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Mobility Made Easy: Digital Solutions for Seamless Transportation

From public to private transit, from fixed route to demand-responsive transport (DRT), by bike, taxi, car sharing, and other new mobility offerings – passengers increasingly use a variety of different transport modes to get from point A to point B. The ability to make choices at the touch of their fingertips is now a daily reality for most of them. Digitalization plays a key role when enabling single applications that integrate real-time private and public traffic information allowing people to easily evaluate which transportation option will result in the shortest or least expensive commute.

As cities grow, so do congestion and pollution. In many cities worldwide, commuters spend more than a work week a year sitting in traffic jams. In the 15 most-congested US cities, they even spent up to 119 hours stuck in traffic in 2017[i]. The integrated use of transport options can relieve cities – and their travelers – from this situation. The combination of different modes of transport (intermodal travel chains) increases freedom of choice and contributes towards more sustainable transportation with increased flexibility and reliability. A simple example is a "car – park – ride-a-train – use-a-local-bus" transportation chain. If reliable and presented well, commuters are more likely to opt for such solutions rather than using their car to drive all the way downtown.

The key to promoting the usage of intermodal solutions is ensuring that these are transparent, reliable and easy to use: multiple transportation options become available in one single Mobility as a Service (MaaS) application which allows passengers to pick, book and pay for the fastest, most efficient option. The app provides suggestions, according to the passengers' individual preferences and needs, with personalized and proactive features. On the move, passengers receive

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exactly the information they need for route planning, booking and payment, as well as updates during their trip – MaaS at its best.

Mobility apps also provide transportation operators with more data about their passengers' demand and mode selection. Mobility Data Analytics allow to better understand travel patterns and their impact on the transportation network. This information enables mobility strategists and planners to make better decisions and provide a more cost efficient and attractive service to their passengers.

Queuing for public transport tickets, worrying to pick the right one? Public transport is the backbone for urban mobility – but to make (or keep) it attractive, it has to be easy, too. Smart ticketing is a key to this. Siemens Mobility's new approaches like smartphone based Check-in/Check-out or Be-in/Be-out make it simple for travelers to use public transport – and they always get the best price.

Siemens Mobility also offers solutions to provide demand driven mobility services. DRT (demand-responsive transit) is a cost effective and passenger friendly alternative in rural areas or during off peak hours. Intelligent, AI-driven algorithms bundle individual rides so that transportation is always available when it is needed.

Siemens Mobility Intermodal Solutions provide digital solutions and services powered by subsidiaries like HaCon, eos.uptrade and Bytemark or the start-up Padam Mobility, a member of the extended Siemens family. All of them are experts in their specific business areas and share one common goal: enhancing the passenger experience with their combined power for mobility.

HaCon

HaCon, headquartered in Hannover, Germany, provides cutting-edge software solutions for public transportation, mobility and logistics. With 35 years of experience and a dedicated team of more than 400 IT and transport planning specialists, HaCon technology covers all aspects of Intelligent Transportation Systems and creates the ultimate end user experience.

HaCon offers transportation operators with an advanced platform for Mobility as a Service (MaaS), HAFAS, which allows intermodal trip planning and integrated

ticketing in several countries and major cities, in Europe, the Middle East and the United States. HAFAS has been deployed more than 80 times in high-density and high-speed transportation networks, setting new standards in terms of comfort, features and accuracy. For more information: www.hacon.de/en/

eos.uptrade

eos.uptrade provides online sales systems and ticketing solutions for transportation operators throughout Europe. The ticketing specialist also offers a large selection of solutions for integrated timetable and fare information, mobile and web-based ticketing options for passengers, corporate clients, students, service and call centers as well as the integration of third-party sales channels and event tickets. Considering that more than 100 customers in public transport and tourism use mobile and online ticketing solutions by eos.uptrade, the need for a flexible, easy-to-use interface and an efficient payment management is obvious. For more information: www.eos-uptrade.de/en/

Bytemark, Inc.

Working with more than 20 transit agencies worldwide, Bytemark's core offering is a comprehensive suite of products that digitize transit passes, tickets and fare media in a variety of innovative ways. By offering transportation operators with a variety cloud-based, fare validation solutions, Bytemark supports them with back office portal management, data analysis and operational recommendations. For passengers, these solutions make traveling simpler and more instantaneous by means of web-based and smartphone-based purchasing experiences. For more information: www.bytemark.co

Padam Mobility

Newly added to the Siemens Mobility intermodal solution portfolio, Padam Mobility makes public transport more efficient thanks to an AI-powered on-demand transportation software as a service (SaaS). The solution allows passengers to book their shared ride easily and drivers see their itinerary evolve in real time, thanks to a powerful dispatch, algorithms and traffic data integration. Transport operators can easily manage and supervise operations in real time and collect data to improve the service for users with the management interface. In addition, Padam Mobility's simulation tool enables public transport authorities to validate the best solution for

their needs, as it delivers data such as expected waiting times, cost estimations or filling rates. For more information: www.padam-mobility.com/

Connecting from the First to the Last Mile: Intermodal Solutions at work

One Country, One Platform
Denmark
In Denmark, HaCon helped Rejseplanen to integrate several demand-responsive and shared mobility services into one platform. From public transport in Copenhagen to taxis and ride-sharing, passengers can opt for the most efficient intermodal route that gets them where they need to go. Although this has been successfully done in other locations, it is the first time that an entire country's transportation system has been integrated into one platform. Even those in rural areas can benefit from Mobility as a Service (MaaS), offering transportation options independent of private car ownership.

https://www.youtube.com/watch?reload=9&v=x60CCM28X8E

Andorra
Siemens Mobility, HaCon and eos.uptrade create an intermodal mobility platform for Forces Elèctriques d'Andorra (FEDA), a private company that was appointed with the creation of this platform by the Government and the seven councils of Andorra. The platform will integrate all transportation modes across the entire country. It includes public buses, on- and off-street parking, electric bike-sharing and chargers for electric vehicles. The platform will allow riders to view the information in real time and manage payments across the various modes of transport. Andorra is investing in the platform in order help them achieve their sustainability goals, including lowering carbon emissions and promoting public and multimodal transport.

https://press.siemens.com/global/en/pressrelease/siemens-mobility-create-andorras-multi-modal-transportation-platform

Luxembourg
With heavy commuter traffic on the roads, the government of Luxembourg is taking action to strengthen public transport and significantly reduce congestion in the

Grand Duchy. Initiated by Verkéiersverbond and developed by HaCon, a new intermodal Mobility as a Service platform provides comprehensive information about all mobility options in Luxembourg. In addition to buses, trains and trams, HaCon integrated information for bicycle routing, bike and car sharing as well as charging stations and park and ride options into the new trip planner. Due to its central location right in the heart of Europe and its enormous traffic volume, the importance of the project becomes even more evident, especially for the quality of life in Luxembourg. The application supports the use of sustainable means of transport as an essential measure to reduce congestion and pollution.

https://www.hacon.de/en/news/press/congestion-free-travel-in-luxembourg-powered-by-hacon/

Smart Cities, Smart Platform

Columbus, USA

Siemens Mobility is working with Bytemark, a Siemens Mobility partially-owned subsidiary, to provide a common payment solution for Columbus' Smart Columbus travel app initiative – the first-ever platform managed by a city, rather than a transportation operator or private party. This payment system will now fulfill the backend payment portion of the trip planning capabilities currently provided on the open-source Smart Columbus operating system platform. With this centralized payment capability, Smart Columbus is pushing the boundaries of current "smart city" applications by seamlessly including multiple public and private modes of transportation as choices when choosing multi-leg trips.

https://press.siemens.com/global/en/pressrelease/columbus-launch-first-ever-city-managed-payment-platform

Bay Area, USA

Bay Area Rapid Transit (BART) in California has successfully teamed up with HaCon to provide its riders with the brand-new BART Trip Planner: Available both as a web app and native apps for iOS and Android, the application guarantees a seamless, multimodal door-to-door travel experience including real-time information. It integrates transit data from more than 30 operators in the nine Bay Area counties, including buses, trains, ferries, and cable cars. In addition, the BART Trip Planner

goes beyond just public transportation, by featuring walking, bicycling and car routes, in order to give users a realistic comparison of their transportation options.
https://hacon.de/en/news/press/

Berlin, Germany

Mobility as a Service aims at making mobility easily accessible for all users. "VBB jump" navigates a younger app user group from door to door. Based on the Siemens Mobility Kids App, which utilizes the latest in safety and child-friendly innovations, the mobility app for the federal states of Berlin and Brandenburg is a first step toward safer travel for kids. The Kids App's main feature is the simple and intuitive user interface tailored to meet the needs and abilities of younger passengers. It was developed based on qualitative analyses with numerous children and their parents, interviews at schools in Berlin and extensive usability tests. "VBB jump" makes digital trip planning a breeze and paves the way for children and other passengers with special needs to quickly and easily get around.

Guiding Passengers through Crowded Networks

Mobility as a Service helps to reduce congestion by making it easy for passengers to shift from road to rail or use new mobility offers. But, during rush hours, there are capacity constraints in public transport as well. Siemens Mobility subsidiary HaCon has been developing a solution that aims at effectively guiding passengers to better utilize existing capacity in rail transport in cooperation with ProTrain. The project is funded by the German Federal Ministry of Transport and Digital Infrastructure as part of the mFUND program. Big Data Analysis and machine learning algorithms enable the HaCon trip planning software HAFAS to provide passengers with information to circumvent bottlenecks. At the same time, HAFAS itself is a key source of information for occupancy forecasts since it continuously archives the requests made by travelers. The demand for trip information is used as proxy for occupancy: The typical request numbers and occupancy levels from the archive are compared to current request levels. For each journey, the system accumulates the matched data over time. This information is used to estimate occupancy levels in real time and continuously update them. Passenger affluence can be detected during unusual traffic situations in particular. The forecasts are displayed via symbols in the mobile app helping passengers to choose connections with low occupancy.

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This press release and additional material are available at:

https://press.siemens.com/global/en/event/siemens-mobility-exhibits-innovative-mobility-solutions-ces-2020

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Siemens Mobility is a separately managed company of Siemens AG. As a leader in transport solutions for more than 160 years, Siemens Mobility is constantly innovating its portfolio in its core areas of rolling stock, rail automation and electrification, turnkey systems, intelligent traffic systems as well as related services. With digitalization, Siemens Mobility is enabling mobility operators worldwide to make infrastructure intelligent, increase value sustainably over the entire lifecycle, enhance passenger experience and guarantee availability. In fiscal year 2018, which ended on September 30, 2018, the former Siemens Mobility Division posted revenue of €8.8 billion and had around 34,200 employees worldwide. Further information is available at: www.siemens.com/mobility.

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[i] https://edition.cnn.com/2019/08/22/us/traffic-commute-gridlock-transportation-study-trnd/index.html