ICT GROUP InTraffic
Mastering Mobility

CASE

InTraffic designs **new generic infrastructure** for Amsterdam's GVB

It has been common in public transport for every vehicle – bus, tram, metro – to have its own hardware and software, which means that communication with other systems is complex and maintenance and management is time-consuming. This is the reason why GVB was one of the first public transport companies in the Netherlands back in 2016 to start developing a Generic ICT Vehicle Architecture (GIVA). This generic architecture, which is based on the European ITxPT standard, is now used in electric buses, the new 15G trams and the M7 metro trains that are still on order.

René Morel is the GIVA ICT system integrator for the GIVA project on behalf of GVB. He says: "In December 2016 we decided to move away from the traditional approach and start working with a generic architecture. Because we were one of the first public transport companies worldwide to embrace the ITxPT standard so widely, we had to win over a lot of people. After all, this approach was new for almost all suppliers and their subcontractors."
The GIVA standard was first applied in the 15G trams. Even before the trams were delivered, a new project came along: the purchase of 31 electric buses that use the same generic architecture. This was soon followed by an order for 30 M7 metro trains. Before the first software was delivered, the project thus grew into a broad programme that covers all public transport types.

Business benefits

Morel: "On the one hand, these rapid changes caused delays in the tram project. But on the other hand, we immediately saw the business benefits to be gained when you use a generic infrastructure. After all, we were able to develop the software for

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the buses and metros much faster because 80% of the software of these systems is the same as that for trams. About 20 per cent is specific to a vehicle type."
Morel knows that this will also have consequences for maintenance and management.
"We now have one team that can maintain the systems for buses, trams and metros, whereas previously this required several different teams. This saves a considerable amount of costs." At least as important is the fact that it has become much easier to promptly inform travellers about special situations such as a blockage. "We can inform our travellers much faster of changes in the timetable because all modes of transport use GIVA, which exchanges data more easily with other systems thanks to the ITxPT standard."

Complex integration issue

InTraffic has been involved in the project from the very beginning, says Morel. "They have the domain knowledge and competences that are required to properly handle complex system integration issues. This was also evident during this project. You need multiple competencies that can't all be combined in a single person. InTraffic has the resources to involve the right expertise at the time when this is needed. That works very nicely."
During the first phase, InTraffic was responsible for writing the specifications. Information analyst and system architect Peter Verbeek took on this task and translated the information compiled by GVB's architects into software specifications: what functions does a vehicle have and how should they be translated into software? What other systems does GIVA communicate with? Verbeek: "Back then, ITxPT was not yet at the level where the standard is now, so this was quite a difficult task. What's more, the standard was relatively unknown in the market at the time. We are now four years down the road, and the choice for ITxPT has worked out well."

Testing the interfaces and functionalities

GIVA is a broad platform that comprises multiple components. The heart consists of the AVMS (Automated Vehicle Management System) and the travel information systems, for instance SPOT (Single Point of Truth) and RIV (Travel Information In the Vehicles).
In addition, the platform includes several smaller components and of course there is an integration layer that ensures that all those components communicate with each other. InTraffic developed the AVMS as well as SPOT and RIV; the other components were supplied by third parties.
An important part of the programme is testing the software itself and its integration: does everything work as it should? Is all communication between systems proceeding correctly, even if something unexpected happens? Can travellers use their Public Transport chip card to validate their ticket on entering and exiting the vehicle, and will the correct amount be debited? Because of his experience in other public transport chip projects, Henno Willering was in charge of this project component.

"The vehicle systems on the trams were supplied as a black box. The only way to check whether everything works as planned was to try out all possible scenarios."

Leap forward

Since the summer of 2020, the first 18 buses equipped with GIVA have been driving around Amsterdam, followed by the first trams at the end of November. Morel is proud of what has been achieved. "We took on the challenge when the ITxPT specification wasn't even finished. However, we had such confidence in this project that we dared to take the risk. And I don't regret it. Because although we had to invent the wheel ourselves and of course we had to deal with teething problems, we also proved the substantial benefits of working with a generic architecture that is based on standards. We can develop new software faster, we have simplified maintenance and management, and we have improved communications with the traveller.

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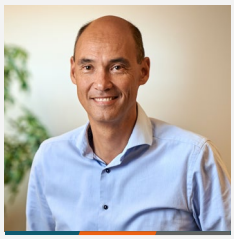
It's a huge leap forward. We have demonstrated that no matter how different all devices on buses, trams and metro trains might be, you can approach and manage them in a generic way, with all the related cost benefits. This is a great achievement."

Would you like to know more about the project or results? Please contact us!



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