



## Packaged power and performance

### **Benchmark results & proven benefits of running WL Pay Front-Office on the Atos BullSequana S platform**

The number of electronic payment transactions continues to rapidly increase globally due to factors such as cash replacement, regulations and e/m commerce expansion. This increase is also influenced by the introduction of new payment instruments such as contactless cards, mobile wallets and instant payments. Whilst this represents a significant opportunity for financial institutions, payment processors and fintechs, this transactional increase also

puts a commoditization strain on the electronic payment business, driven by market competition and regulatory pressure. Thus, to be successful, financial institutions must focus investments on proven and scalable high-volume processing platforms from a capable vendor, with a critical emphasis on efficiency and total cost of ownership over the expected lifespan of the investment.

**Expertise and Benchmark results**

# The benchmarking project

This paper presents the results of a benchmarking project, carried out in the first quarter of 2019 by Worldline and Atos, aiming to characterize the high-volume performance of the WL Pay Front-Office payment transaction switch running on Atos BullSequana S servers.

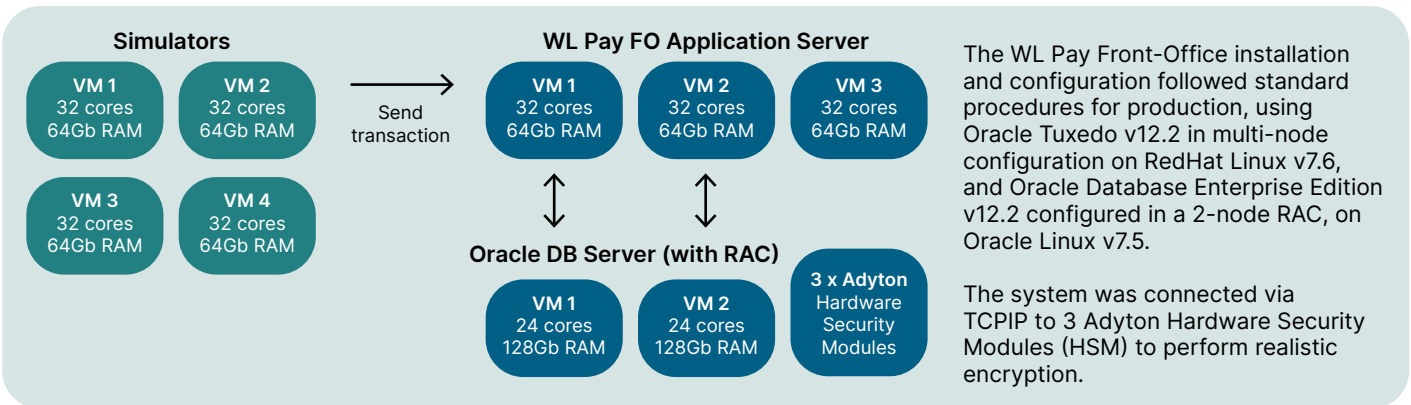
This configuration represents an all-in-one combined offer of both hardware and software to potential clients with the benefits of a simplified procurement and support relationship.

The results demonstrate the impressive linear scalability of WL Pay Front-Office processing up to just over 4,000

transactions per second (TPS) with an efficient use of the high-performance BullSequana S servers. This demonstrates outstanding processing capability under very high transaction loads.

# The infrastructure

The benchmark environment was designed and configured according to real-life production requirements of mission-critical payments processing. As such it was designed as a realistic multi-node fault-tolerant environment. The initial test infrastructure was designed to achieve a minimum 3,000 TPS whilst retaining a minimal hardware footprint. It consists of 3 BullSequana S400 Gold, one of which was 100% dedicated to running all the simulation tools required for the test.



# The test

The simulation software sent random transactions reflecting an expected real-life production transaction mix:

- 80% authorization requests
- 10% reversals
- 10% notifications/advice messages

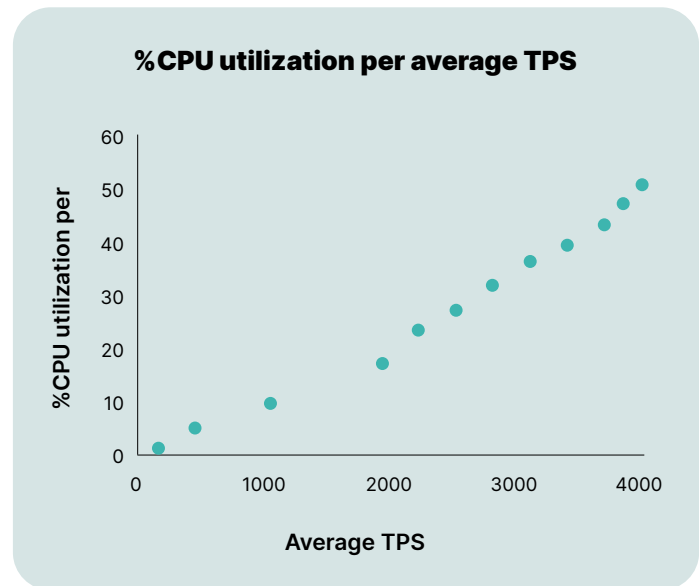
All the relevant cryptographic operations were carried out by the HSM devices using 15 separate communication channels for each device. These operations include:

- PIN Block translations
- PIN validation
- EMV Cryptogram validation
- EMV Cryptogram Response creation
- EMV scripting
- MAC message authentication
- PCI data encryption

# The results

The test results exceeded the initial objectives and demonstrated a stable and sustainable transaction processing capability of 4,050 TPS for 1.5 hours, in line with the expected processing capacity of the Adyton HSM devices. At these high-throughput conditions, the systems processed all transactions as expected with an average response time of just under 100 milliseconds. The Atos BullSequana S servers were continuously monitored during the tests, confirming their high-performance capabilities for transaction processing, and in particular with WL Pay Front-Office.

Tests were carried-out at different TPS levels demonstrating the hardware utilization increase with growing TPS as expected, providing reliable hardware-sizing data starting at an entry-level platform. As an example, for the processors used in this benchmark, we can estimate a 60 TPS processing capability for a single BullSequana S core, assuming a maximum utilization level of 70%.



## 4,050 TPS peak

Constant for 1.5h  
All transactions processed correctly  
30% more than expected

## 100 Milliseconds

average response time @4,050 TPS

## Low CPU utilization

52% App Server  
25% Database Server @4,050 TPS

## Linear behavior TPS vs CPU

Max TPS for 1 core = 60 TPS (for 70% core utilization)

## Conclusions

The results of the performance assessment not only demonstrate the industrial capability of WL Pay Front-Office as a switching and authorization platform, but also the high-performance computing power of the Atos BullSequana S series platform.

Two key factors in the assessment are that it leveraged only a mid-range solution from the platform family (suggesting further capacity), and involved the seamless integration of the WL Pay Front-Office software platform using standard software with no code changes.

As expected, there was a linear correlation between the peak transactions per second and the number of HSM devices deployed, demonstrating also the unique performance capabilities of the Adyton HSMs, capable of handling just over 1,300 payment transactions per second, each payment transaction consisting of 6 HSM operations. We therefore conclude that adding a fourth HSM would allow for higher transactional throughput on the same server architecture.

Furthermore, this outcome proves an architecture that is technically and commercially scalable to support volumes ranging from entry-level up to the highest capacity requirements within the industry, and significantly creates a unique opportunity for a single-vendor deployment of pre-loaded software providing customers with a simple relationship to deliver a seamless platform, in a cost-effective manner.

## Benefits to financial institutions, payment processors and fintechs

This all-in-one certified solution greatly simplifies the procurement process, assigning clear responsibilities for the overall software and hardware platform supplied from a single vendor.

Clients benefit from a single point of contact for the core infrastructure, from a proven integrated hardware and software solution, with the added potential of the supply of a turnkey solution with preloaded and pre-tested software, reducing the elapsed time and risk from delivery to go-live.

Additionally, this unique capability of a single vendor providing a complete infrastructure can potentially deliver new and unique commercial ownership models wherein the transaction cost can be demonstrated completely as a total cost of ownership.

## WL Pay Front-Office

WL Pay Front-Office delivers a robust real-time switching and authorization platform for processing transactions between banks, card schemes and other financial service networks.

Incorporating a flexible transaction workflow configuration mechanism allows users to define new types of transactions without the need for custom development - a crucial feature for a mission-critical system where availability, reliability and performance are key, and any disruption to the production environment should be minimized.

The WL Pay Front-Office platform delivers high availability Active:Active and Data Replication Architecture solutions while managing a competitive TCO of the infrastructure.

Worldline provides a flexible range of deployment options - licensing, hosting, application management and BPO - supporting hybrid combinations. Clients can decide which deployment model fits their organization and strategy best, and have the option to change the deployment model at a later stage if needed.

WL Pay Front-Office is part of Worldline Pay, a suite of next-generation, end-to-end payment software solutions with modular function deployment options, enabling our clients to choose the solutions most suitable to their specific requirements.

## Atos BullSequana S

With the BullSequana S series, Atos introduces a new kind of enterprise server - ready to meet the accelerating demand for computing power experienced across every public and private sector enterprise. Affordable, expandable and intelligent, the BullSequana S series delivers the computing power demanded by every forward-thinking enterprise.

The BullSequana S series is the latest addition to the BullSequana range of computers. With the S series, we have taken the exceptional computing power of the high-performance X series and applied it to the enterprise environment.

The innovative BullSequana S design delivers clear and critically important benefits:

- Power and scalability
- Reduced TCO
- Future-ready

## Worldline Adyton Hardware Security Modules (HSM)

The Adyton HSM from Worldline offers a revolutionary solution, with a radically new hardware-based cryptographic accelerator providing unprecedented security, speed and user-friendliness. Meeting all current international standards such as FIPS 140-2, Adyton is also ready to match future regulatory requirements. It combines the strongest security, performance and reliability features with a user-friendly operation and useful cloning capabilities.

# About Worldline

Worldline [Euronext: WLN] is a global leader in the payments industry and the technology partner of choice for merchants, banks and acquirers. Powered by 20,000 employees in more than 50 countries, Worldline provides its clients with sustainable, trusted and innovative solutions fostering their growth. Services offered by Worldline include instore and online commercial acquiring, highly secure payment transaction processing and numerous digital services. In 2021 Worldline generated a proforma revenue close to 4 billion euros. [worldline.com](https://www.worldline.com)

Worldline's corporate purpose ("raison d'être") is to design and operate leading digital payment and transactional solutions that enable sustainable economic growth and reinforce trust and security in our societies. Worldline makes them environmentally friendly, widely accessible, and supports social transformation..



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