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Technologies

White Paper

Connected Bus by Wavecom

Episode 3 – Minimal Time and Reduced Operating Costs

ZTP (Zero-Touch Provisioning) reduces operational costs by automating configuration steps and software updates in **Connected Bus** **modular Gateways**. This process minimizes the amount of time spent on the Bus Operator Site, particularly if its fleet has many bus vehicles. In addition, it reduces the skill level required by the **System Integrator**'s staff and, consequently, the cost.

The **Connected Bus** Project/Delivery/Purchase, defines the basic requirements/functionalities, which will be the basis for the system image software configured in the **Wavecom Technologies** environment, to be installed in **modular Gateways**.

Overall, ZTP improves provision and deployment of a **Wavecom Technologies** **Connected Bus** solution, resulting in a minimal time and reduced operating costs for **Systems Operators**.

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Introduction

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In addition, it reduces the skill level required by the **System Integrator**'s staff and, consequently, the cost.

The **Connected Bus** Project/Delivery/Purchase, defines the basic requirements/functionalities, which will be the basis for the system image software configured in the **Wavecom Technologies** environment, to be installed in **modular Gateways**.

ZTP enables **Systems Integrators** to deploy networking devices such as **modular Gateways** without manual intervention, resulting in a minimal time and reduced operating costs as depicted in Figure 1.

Figure 1 – Minimal Time and Reduced Operating Costs, managed by IoT Manager Platform

Minimal Time and Reduced Operating Costs

ZTP supports **Systems Integrators** scale the secure and easy way, thanks to automation provided by system image software installed in **modular Gateways**. They no longer need to manually configure so many resources, and they can instead count on virtually hands-free provisioning.

Wavecom Technologies provides two types of system image software for two different scenarios:

- **Customized** for a specific Project/Delivery/Purchase, already defined according to requirements and functionalities ordered by the Bus Operator. This includes pre-configuring the cellular network and ports, ensuring secure connectivity both outbound and locally.
- **Generic** with a set of basic configurations, that enables the **modular Gateway** to work at least as a Wi-Fi Router.

In any of the scenarios, the system software images already have the configuration of the VPN tunnels that connect the equipment to the **IoT Manager/Multi-Tenant Platform**. Any factory settings made by default on the **modular Gateways** will remain centrally manageable.

Every part of the deployment process — before, during, and after — is effortless for **Systems Integrators**, when it is automated with ZTP, as presented in Table 1.

Table 1 – Provisioning and deployment tasks

Bus Operator Site	Because ZTP requires only physical installation. Hence, **System Integrators** can simply put minimal (even inexperienced) staff on the Bus Operator Site, which significantly cuts their operating costs.
Modular Gateway Setup	All **System Integrators** need to do is rack, connect, and boot **modular Gateways**, and ZTP's scripts (system image software) are in charge to do the rest.
Deployment and Maintenance	Keeping each deployment running smoothly is simple and can be done remotely. ZTP lets **System Integrators** free-up staff thanks to automated updates, patching, and other changes, Cloud managed by **IoT Manager/Multi-Tenant Platform**.

ZTP helps **Systems Integrators** quickly and automatically provision and deploy network devices such as **modular Gateways** in a large-scale environment such as Bus Operators' fleets, eliminating most of the manual interaction involved. It also eliminates the operating cost of troubleshooting and extra Bus Operator Site visits that are likely to result from errors that occur in manual provisioning processes.

This way, **System Integrators** reduce support costs, eliminate errors & inconsistencies, and streamline every deployment.

ZTP speeds up the time to deploy a new Bus Vehicle's **modular Gateway** and provisions new services. Furthermore, faster service activation times mean Bus Operator can be charged and start paying for services sooner, resulting in a corresponding increase in **System Integrator**'s revenues.

Overall, ZTP improves provision and deployment of a **Wavecom Technologies Connected Bus** solution, resulting in a minimal time and reduced operating costs for **Systems Operators**.

IoT Manager/Multi-Tenant Platform

IoT Manager/Multi-Tenant Platform allows **Systems Integrators** to speed up deployments, optimize operations and maintenance in order to improve the quality, and reduce operating costs.

IoT Manager/Multi-Tenant Platform provides a cloud managed ZTP system multi-tenant approach, as it allows the **System Integrator** to manage multiple **Connected Bus modular Gateways**.

This platform can provision, update and configure **modular Gateways** for **Systems Integrators** wherever the Bus Operator's fleet is, if it is connected to WAN.

In addition to ZTP fully automating provisioning and deployment on **modular Gateways**, there are many benefits, three of which stand out:

- Saves time and costs

Configurating many **modular Gateways** in the Bus Operator' fleet with hundreds or thousands of bus vehicles to be deployed, the use of ZTP helps to set up faster without requiring manual configuration one by one, thus saving time and costs.

- Avoids opportunities of human error

Manual configuration is prone to human error. If errors occur during provisioning, the launch of the **Connected Bus** may be delayed causing constraints in the Bus Operators' operation. ZTP helps to eliminate it by avoiding human errors that occur due to repetitive manual tasks typing in the CLI (Command Line Interface).

- Configuration consistency

With ZTP, the configuration across **modular Gateways** will be consistent rather than site-specific configuration.

Provisioning and Deployment Tasks

As presented below in Table 2, while the physical installation, powering, and cabling will continue to require personnel on Bus Operator Site, ZTP enables the remaining tasks, including establishing connectivity, device configuration or software upgrade, to be automated.

Table 2 – Provisioning and deployment tasks

	Manual	**Zero Touch Provisioning**
Physical installation, power, and cabling	System Integrator's Engineer on Bus Operator Site	System Integrator's Technician
Modular Gateway configuration	System Integrator's Engineer on Bus Operator Site	Automated
Software upgrade	System Integrator's Engineer on Bus Operator Site	Automated

In addition, the deployment of the **Connected Bus** solution can be completed by the less skilled **System Integrator**'s staff.

Connected Bus - ZTP Scenarios

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In any of the scenarios, the system software images already have the configuration of the VPN tunnels that connect the equipment to the **IoT Manager/Multi-Tenant Platform**, as illustrated in Figure 2.

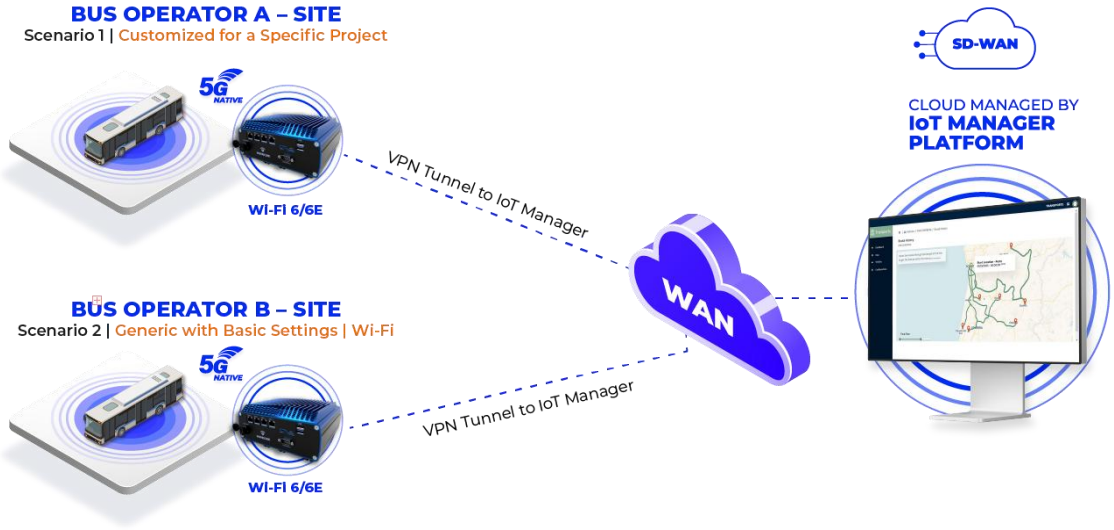

Figure 2 - **Diagram** | System Image Software Scenarios

In both scenarios, by adding multiple **modular Gateways** at once to a Bus Operator Site, ZTP makes this task easier, saving time and money for **Systems Integrators**, by automatically provisioning them.

Conclusion

At the end of **Episode 3**, it is expected you as a **Systems Integrator** knows:

- we provide a Zero-Touch Provisioning tool cloud managed by **IoT Manager/Multi-Tenant Platform** that improves the efficiency of provisioning and deploying of a **Connected Bus** solution.
- how ZTP improves provision and deployment of a **Wavecom Technologies Connected Bus** solution, resulting in a minimal time and reduced operating costs.

The next White Paper, **Episode 4 – Cloud Managed | Reliability and Resilience**, will cover the main role of **IoT Manager/Multi-Tenant Platform** in Reliability and Resilience of a **Connected Bus** solution installed in a fleet of a Bus Operator.

It's coming, so stay tuned!!!

Acronyms

4G	Fourth Generation Mobile Network
5G	Fifth Generation Mobile Network
CLI	Command Line Interface
IP	Internet Protocol
LTE	Long Term Evolution
SD-WAN	Software Defined – Wide Area Network
SDN	Software Defined Network
VPN	Virtual Private Network
WWAN	Wireless Wide Area Network
ZTP	Zero Touch Provisioning

Contacts

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