



Tu ritmo, tu transporte



# Can EMV Scale Fast and Stay Resilient?

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**The Story  
Behind Madrid's  
6-Month, Multi-  
Operator Rollout**

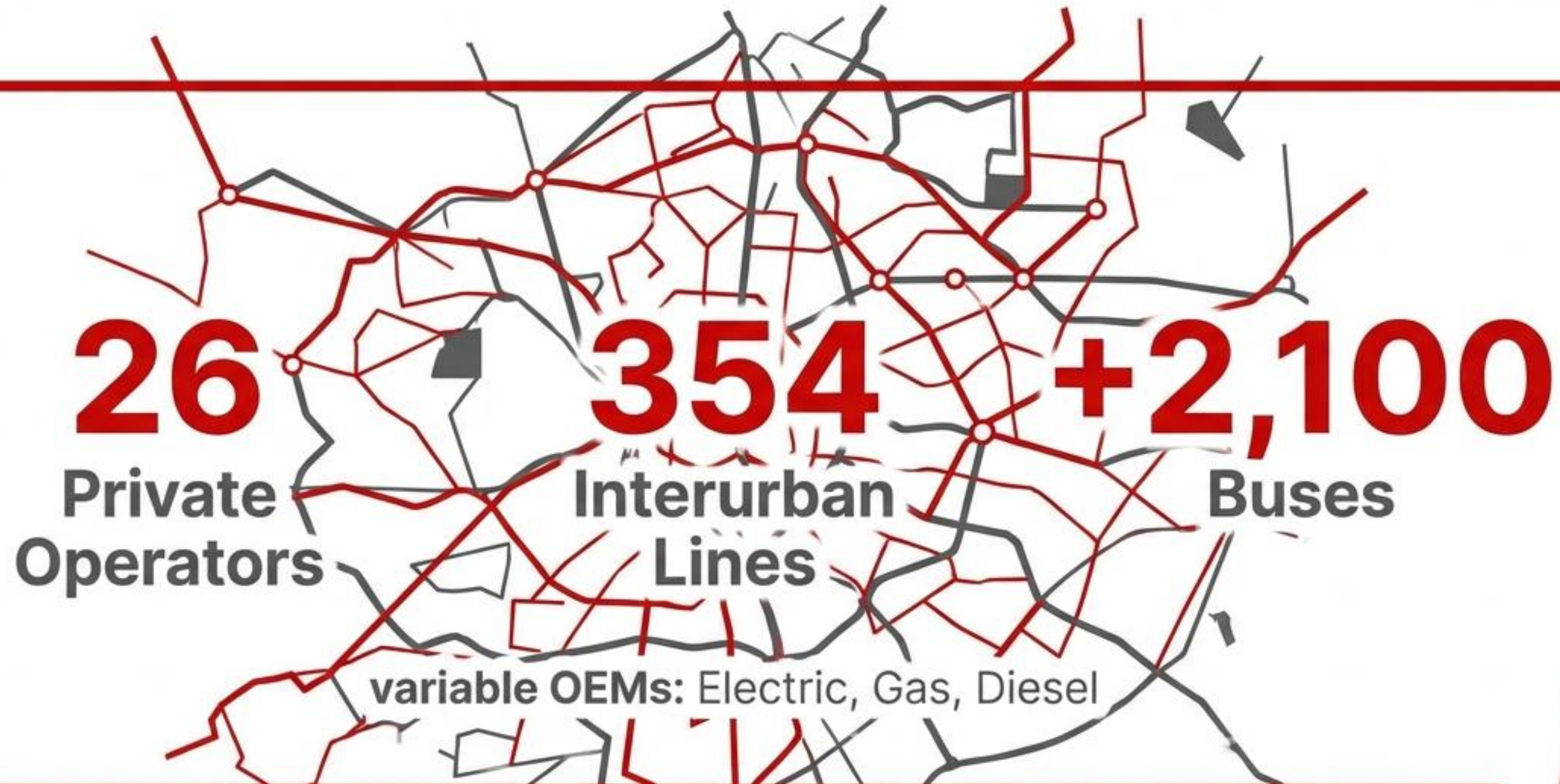
# The €20 Paradox

- The User: Smartwatch, Credit Card, Cash.
- The System: Cash only. Max change €5.
- The Result: Stranded.

# When the Future Cannot Wait



# A Fragmented Ecosystem



**The Barrier: Legacy ITS & Closed-Loop Systems**

**ALSA**

**avanza**  
INTERURBAN BUS

**ARRIVA**  
madrid

**Ruiz**

**De Blas**

**De Blas**

Madrid de MADRID  
interurban

**MADRID**

**electric bus**

**DE BLAS**  
MADRID INTERURBAN OPERATORS



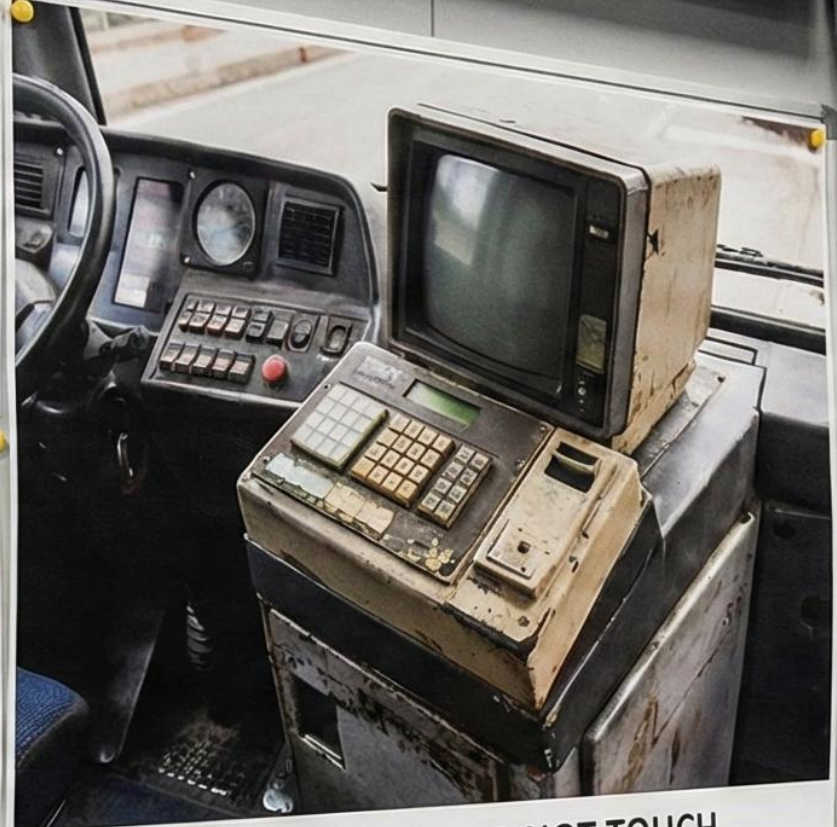
Diesel coach



CNG gas bus



ELECTRIC BUS



LEGACY SAE - DO NOT TOUCH



Ersespilla immrante en  
tecnicos de que sovene de  
traneleiliesses en Madrid.

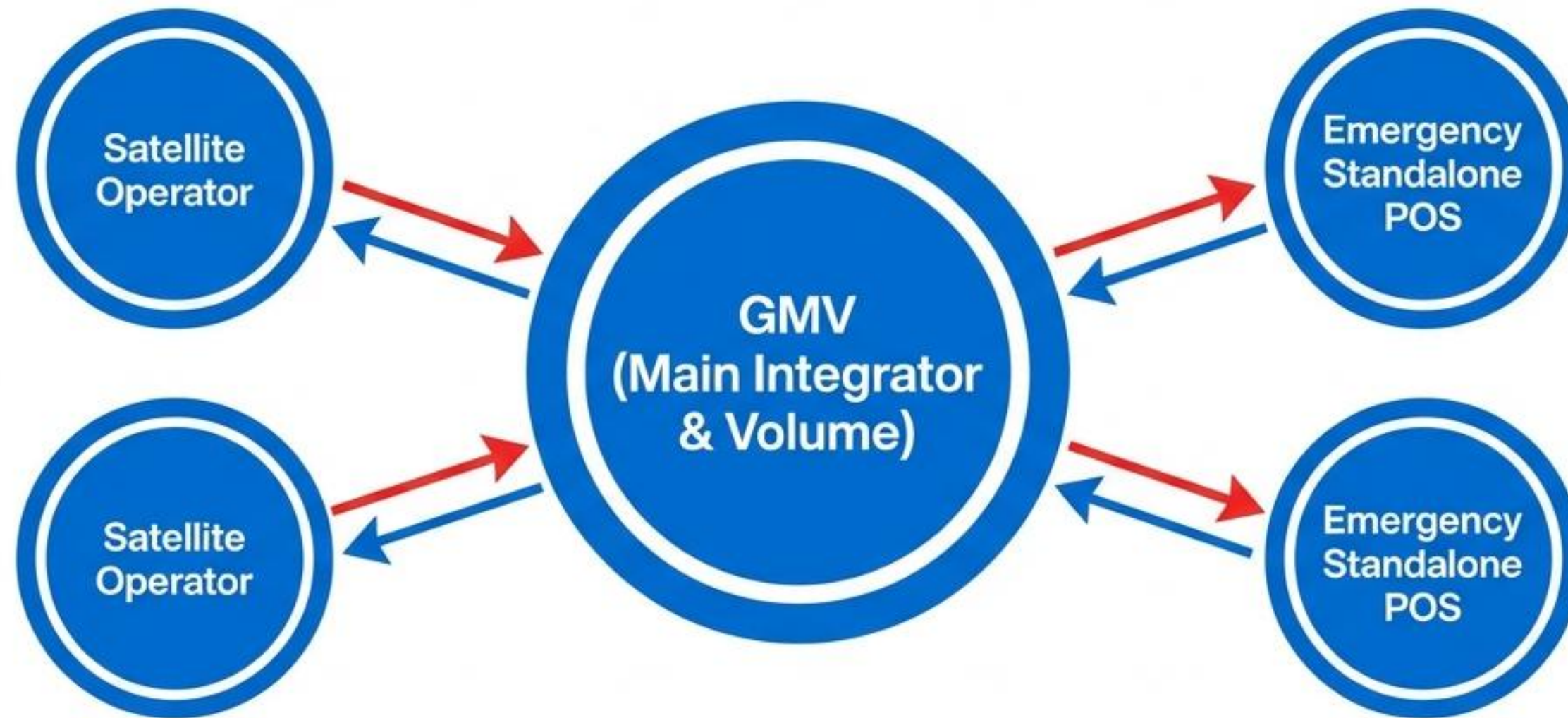


354 LINES

2,100+ BUSES

FRAGMENTED ECOSYSTEM

# Strategy: Mitigating Risk Through Diversification



**GOAL: 100% INTEROPERABILITY ON DAY 1**

A photograph of a bus depot at night. Several technicians wearing high-visibility yellow safety vests are working on a green bus. One technician is kneeling in front of the bus, another is standing to the left, and a third is standing to the right. The bus is parked on a raised platform. The scene is illuminated by overhead lights, creating a professional and industrious atmosphere.

# THE HUMAN FACTOR IN THE DEPOTS

- Overcoming wiring bottlenecks in diverse chassis types.
- Operators' workshop teams deployed overnight.
- Result: Seamless collaboration between CRTM, Integrators, and Operators.

# THE KEY: THE AUTONOMOUS VALIDATOR

## Bridging Legacy & Modernity

- Bypassing legacy driver consoles
- No physical integration required
- Direct SAE integration via Web Service



→ Next: The Technical Architecture (GMV)

# Can EMV Scale Fast and stay Resilient?

## The Story Behind Madrid's 6-Month, Multi-Operator Rollout

### Part 2 – The technical solution



# TV100 - Built for the field.

Processing Power:  
ARM Cortex-A53,  
**4 × 1.4 GHz.**

Industrial Durability:  
IP54 environmental resistance and  
IK08 shock resistance enclosure.

Modular Configuration:  
EMV, QR, GPS, LTE, WiFi modules  
based on LRU approach.

Traveler Interface:  
7-inch capacitive touch screen  
with 4mm vandal-proof glass.  
Daylight viewable (**1000 nits**).

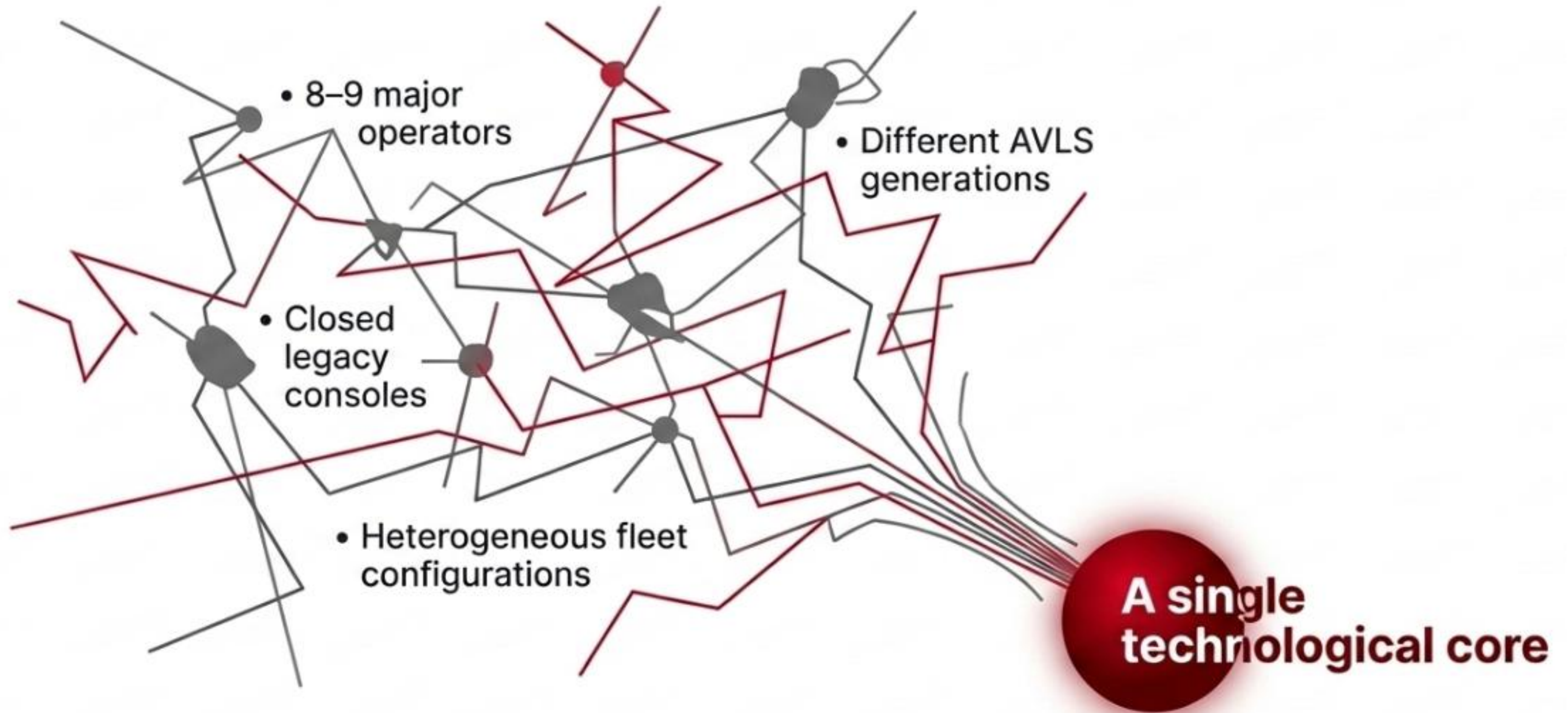
**OPEN BY DEFAULT.**  
Powered by DeepSy® — a Linux long-term support (LTS) abstraction layer decoupling hardware from software.

Global Certification:  
EMV Transit certified L1 & L2  
(**PCI PTS 4.X / SRED**) for secure  
contactless payments.

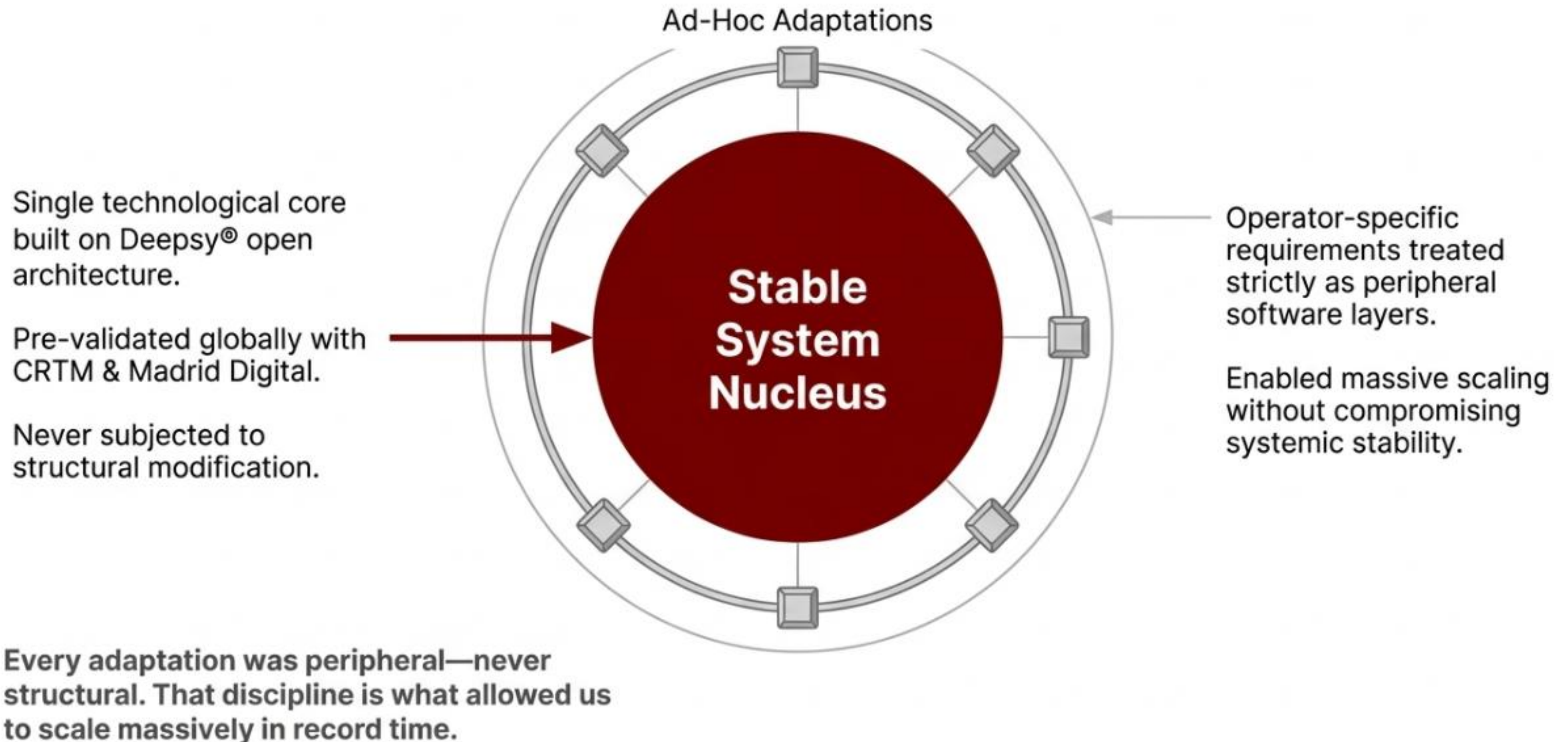
Stand Alone Capability:  
In its most advanced configuration,  
it can even support FMS functions.

Accelerated in-house life testing guarantees  
extreme reliability before massive deployment.

# FRAGMENTATION WAS THE REAL CHALLENGE



# COMMON CORE FIRST, AD-HOC LATER



# One Solution. Two Architectures.



## Key Outcome & Benefits:

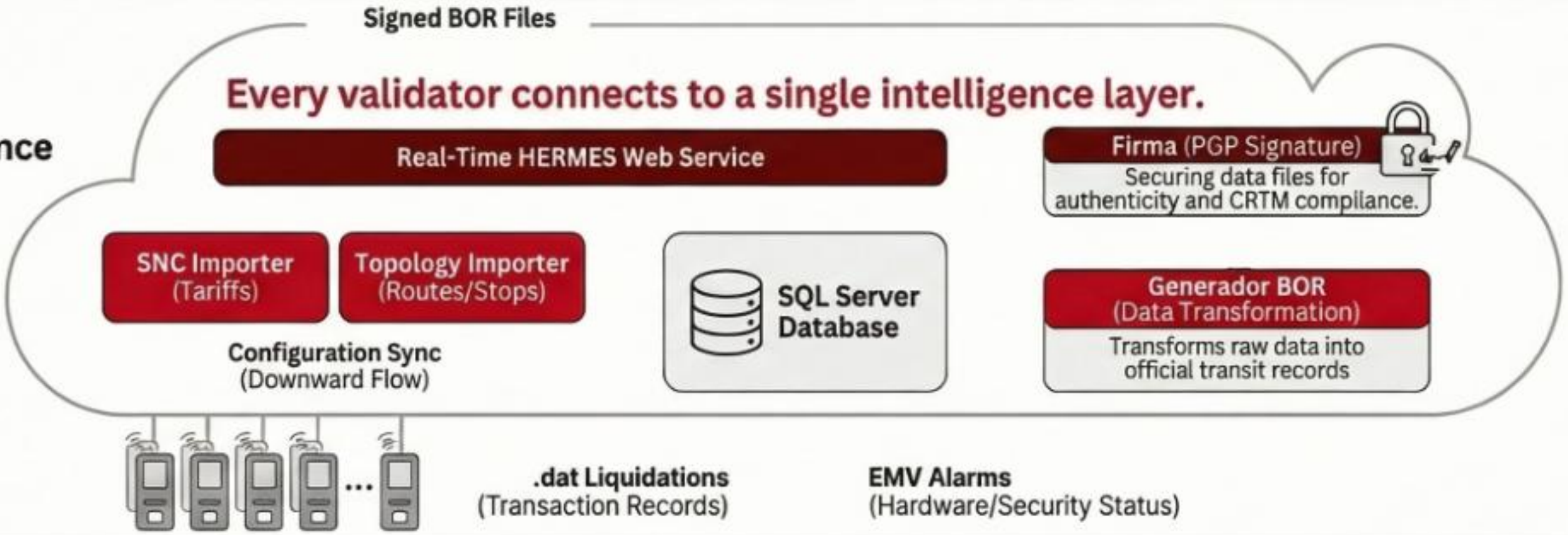
- ✓ 100% regulatory compliance
- ✓ Swift rollout
- ✓ Validation decoupled from legacy infra
- ✓ Reduced installation time
- ✓ Avoided major risk

# Centralised Intelligence: HERMES Back-Office System Architecture

## Layer 3: External Systems & Clearing

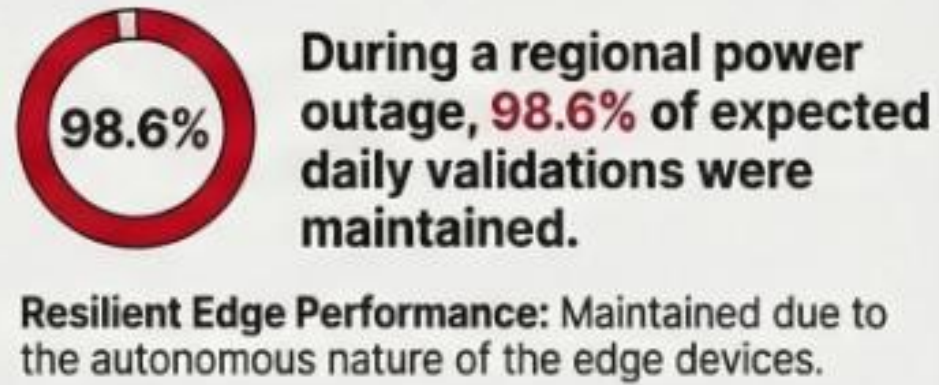


## Layer 2: Cloud Intelligence (HERMES AWS Back-Office)



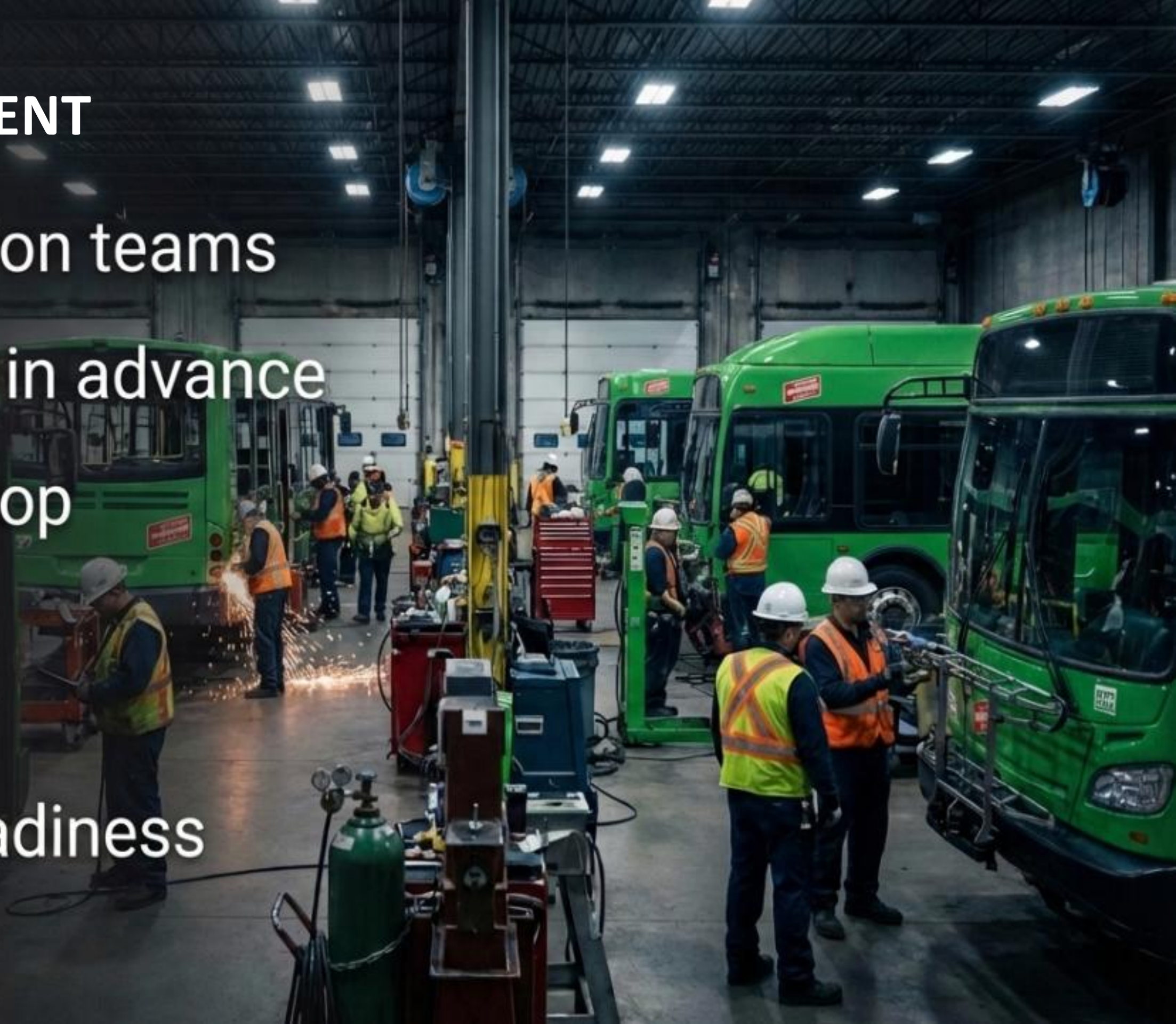
## Layer 1: The Edge (On-Board Validation)

**Token-based EMV logic enables secure offline validation.**

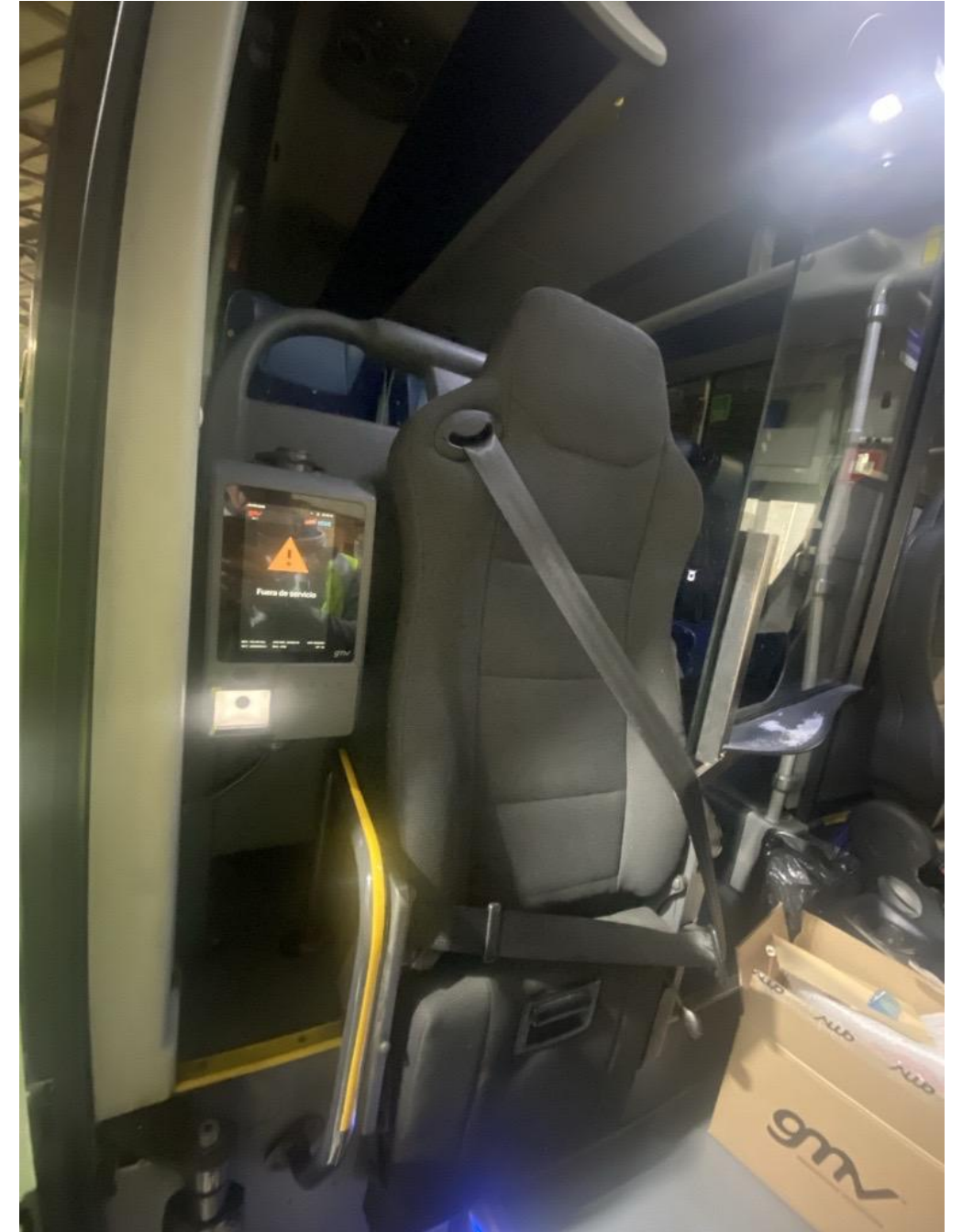


# INDUSTRIAL DEPLOYMENT

- Parallel installation teams
- Pre-installations in advance
- Operator workshop mobilisation
- Night shifts
- Multi-chassis readiness



# INSTALLATIONS REALITY



## UNIFIED LEADERSHIP

- CRTM as programme orchestrator
- Clear decision-making
- Alignment across stakeholders



## SHARED COMMITMENT

- One common roadmap
- Operators trusted the plan

## STRUCTURED EXECUTION

- Defined rollout methodology
- Planning; procedure; perseverance

## JOINT RISK MANAGEMENT

- Shared risk assessment
- Contingency measures defined upfront
- Mitigation activated when needed

# What Madrid Proves

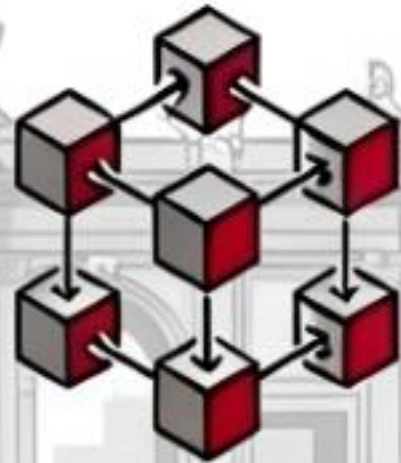
Scaling a fragmented ecosystem

**Industrial-Grade Device**



TV100 device: QR and EMV bank card validator designed for demanding transit environments.

**Standardization in fragmentation**



Integrated or autonomous deployment models built on the same validated core architecture.

**Centralised intelligence**



Single HERMES back-office ensuring unified processing, offline EMV validation and regional future-proof clearing.

**Industrial readiness**



Mass deployment across diesel, gas and electric fleets without service interruption.

**Collaborative deployment**



CRTM-led governance aligning operators, Madrid Digital and GMV under one common roadmap.

**Agility is not brute force, it is engineered.**

# Questions?

# Thank you



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**VISIT US AT STAND D10**

