

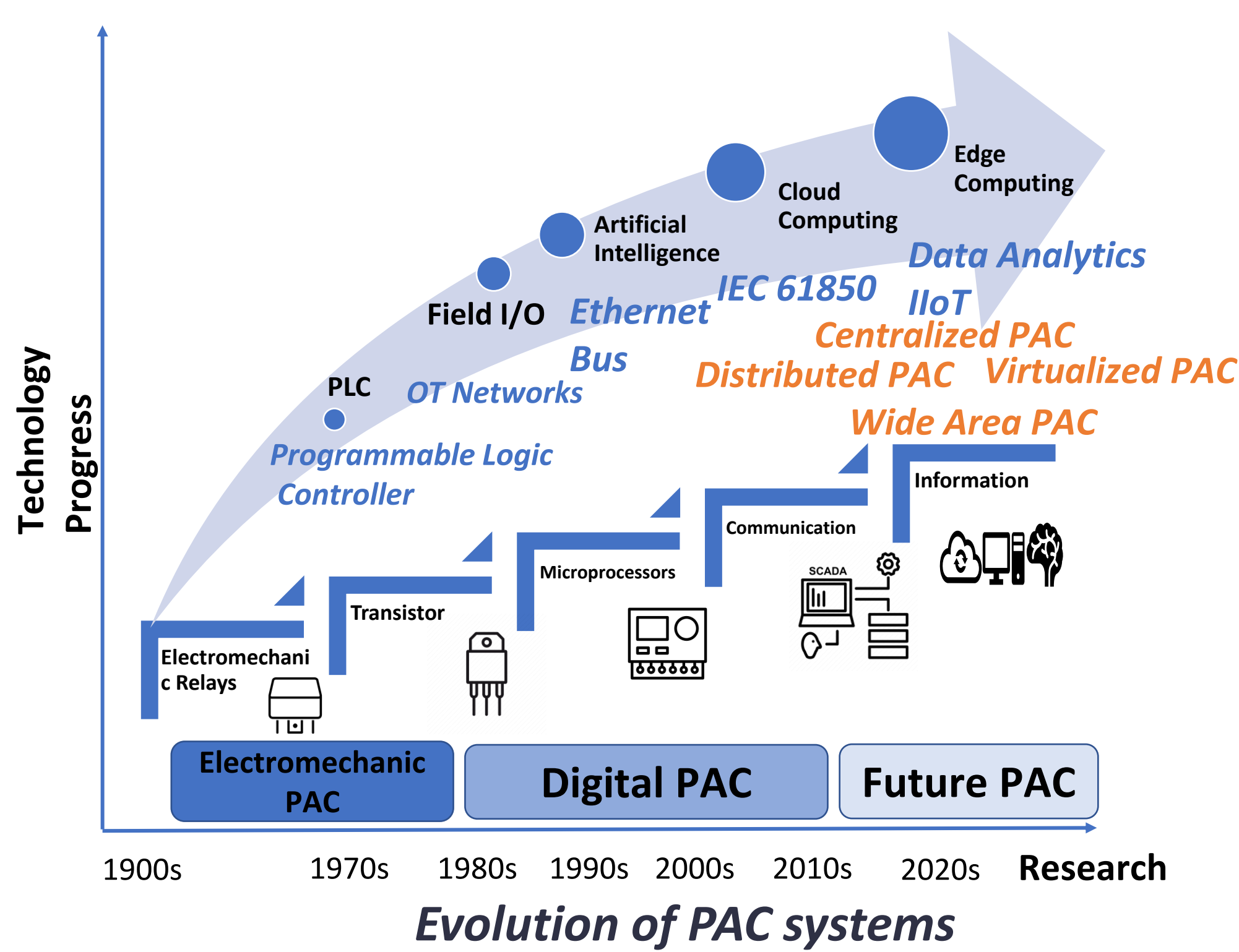
10451 – A Standards-Based Engineering Framework for Virtualized Protection, Automation & Control Systems

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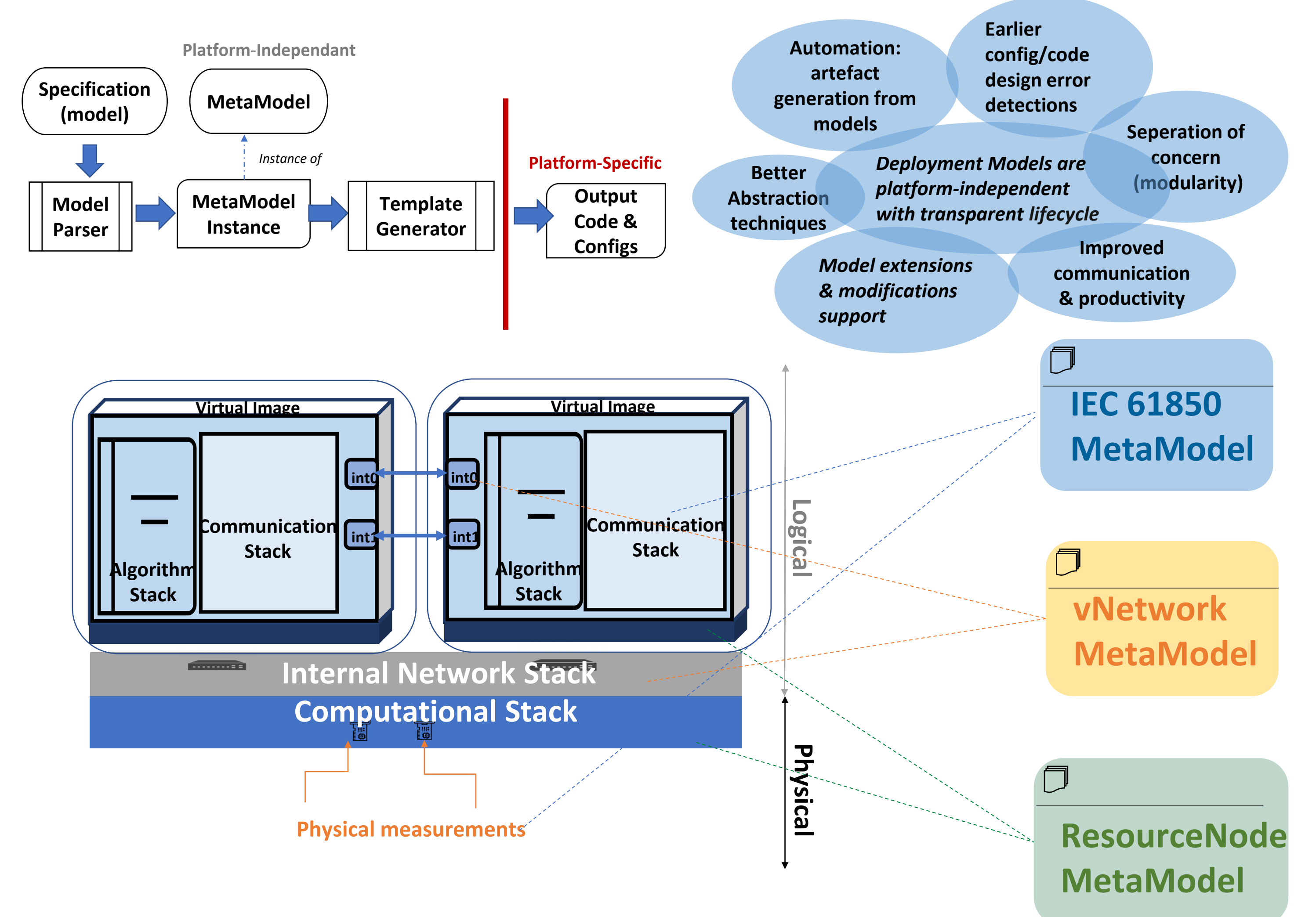
Introduction

Recently, there is a growing interest in implementing adaptive systems as those offered by the Information Technology (IT) field with the reliability and security required for Operational Technology (OT) power system assets.

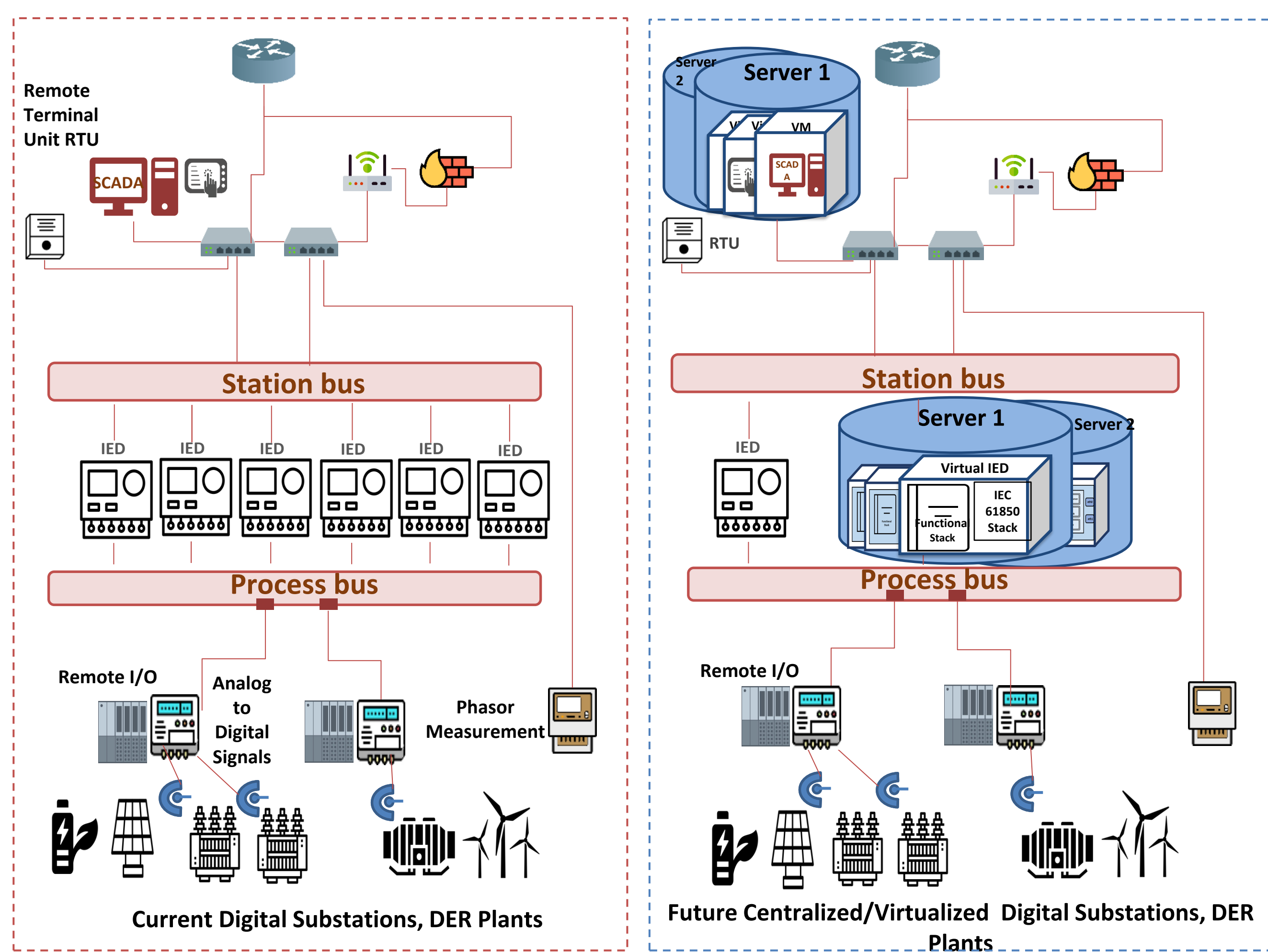


Model Driven Concept & Design

Currently, there is a lack of formal definitions and automated engineering practices for complex virtual IED environments.

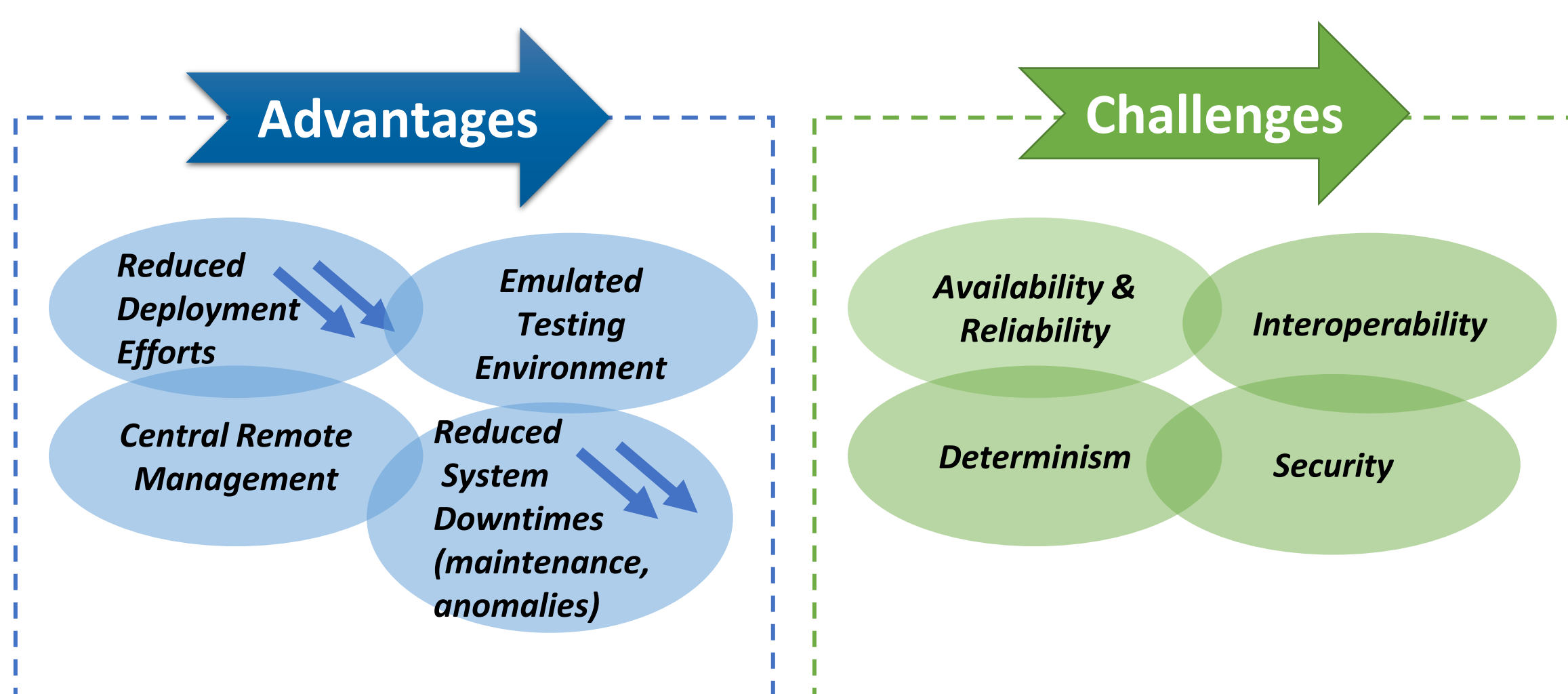


Current PAC Architecture Limitations



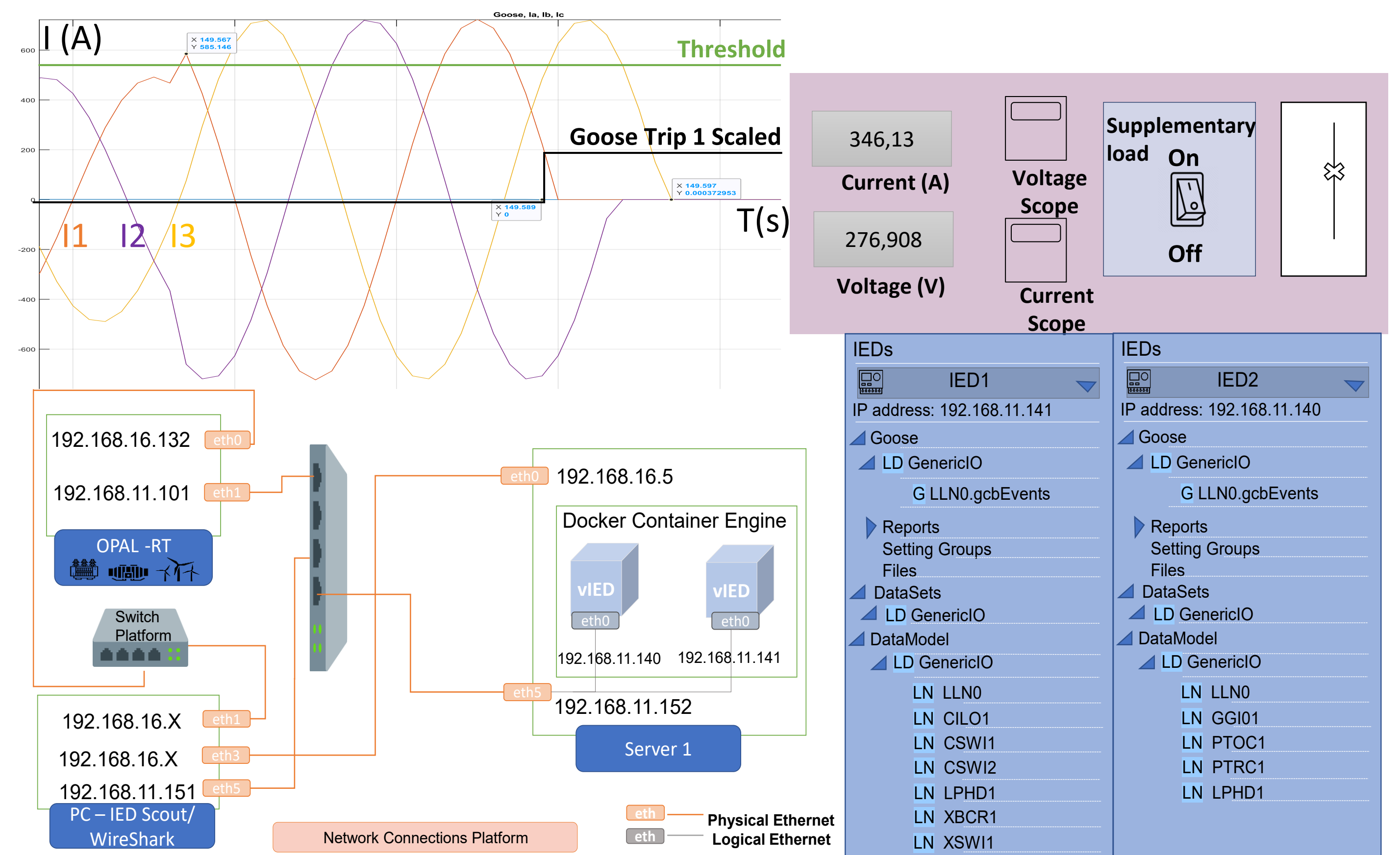
Current vs Future Digital Substations and DER plants architecture

Compared to physical IEDs, transitioning to vIEDs is motivated by different operational use cases with interesting benefits as well as challenges, including:



High level view of the framework for engineering vIEDs based on formalized descriptors including the 61850 SCL, computing and networking meta-models

Lab Validation



An example of the final configured environment with OPAL RT publishing digital electrical signals and two docker containers as 61850 Server/Subscriber on Host and IED Scout as external Client.

Conclusions

- Interoperability & Portability challenges are highly present in vIED environments where IEC 61850 data modelling is necessary but not sufficient → proposed complementary generic descriptors within a formalized methodology
- Such setup is highly promising for vIED validation and testing that is essential for industrial vIED integration