Framework for Automatic Verification of GALS Systems

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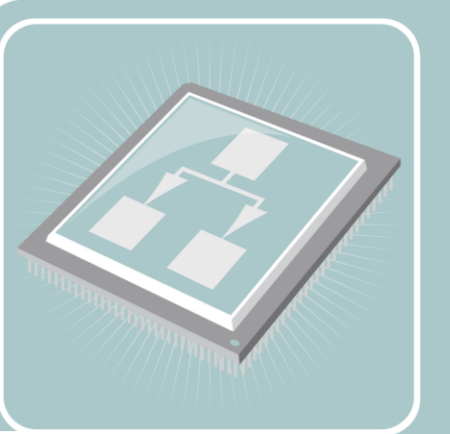
Globally-Asynchronous Locally-Synchronous (GALS) Systems

- Complex safety-critical systems
- Networks of synchronous systems communicating asynchronously
- High level of concurrency: synchronous and asynchronous
- Heterogeneous computations: deterministic and nondeterministic

Challenging design and debug

Construction and Analysis of Distributed Processes

- 50 tools based on formal methods
- Design and verification of asynchronous concurrent systems
- Explicit-state techniques (model checking, equivalence checking, visual checking)

**Expertise required**

(concurrency theory, formal methods)

How to bridge the gap between GALS design tools and formal verification tools
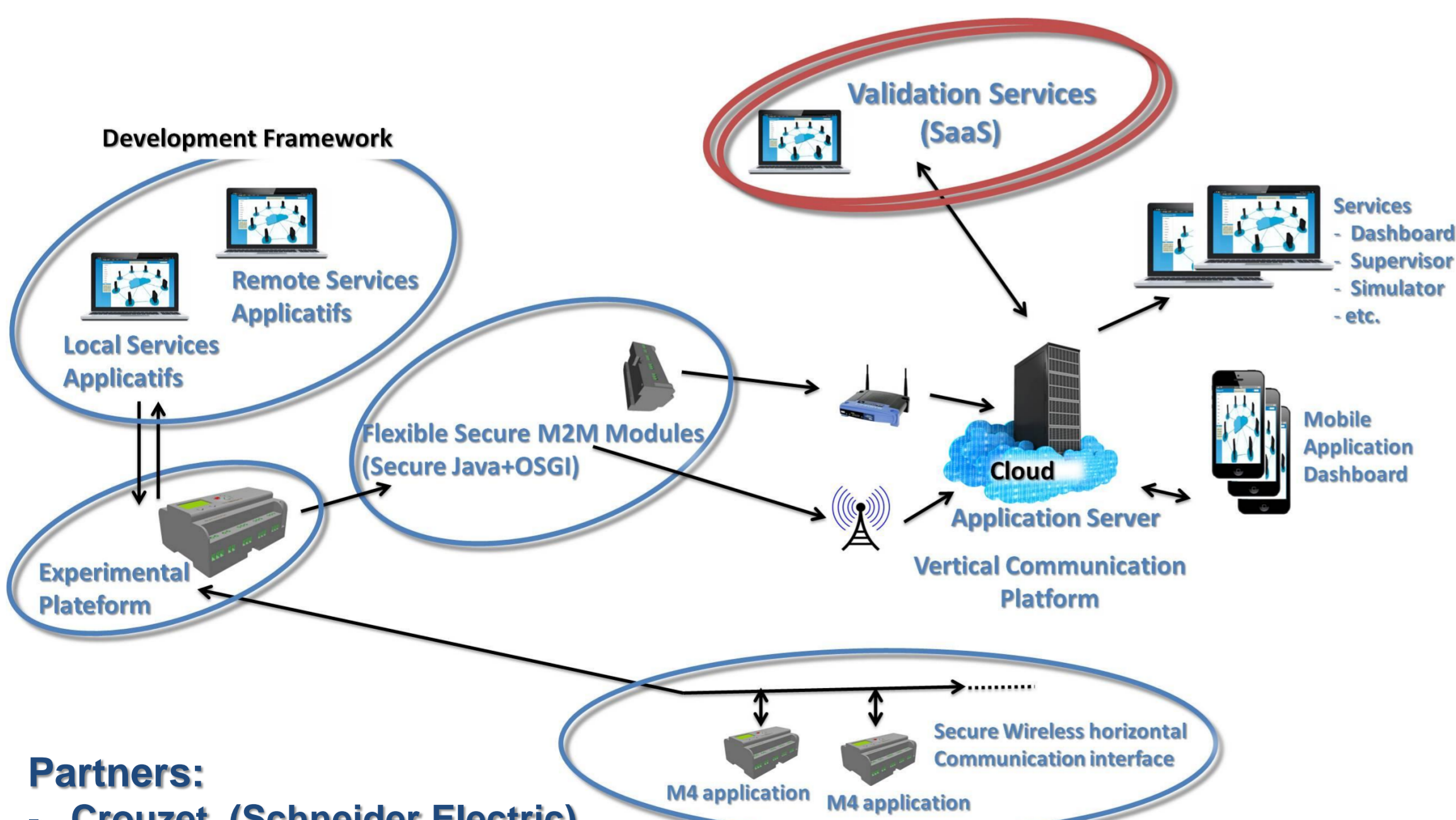
Our approach

Development framework for GALS systems

- Design, modeling, and verification of
  - Synchronous systems
  - Communication media
  - Environmental constraints
- Designer-friendly interfaces
- Scale up to industrial-size applications
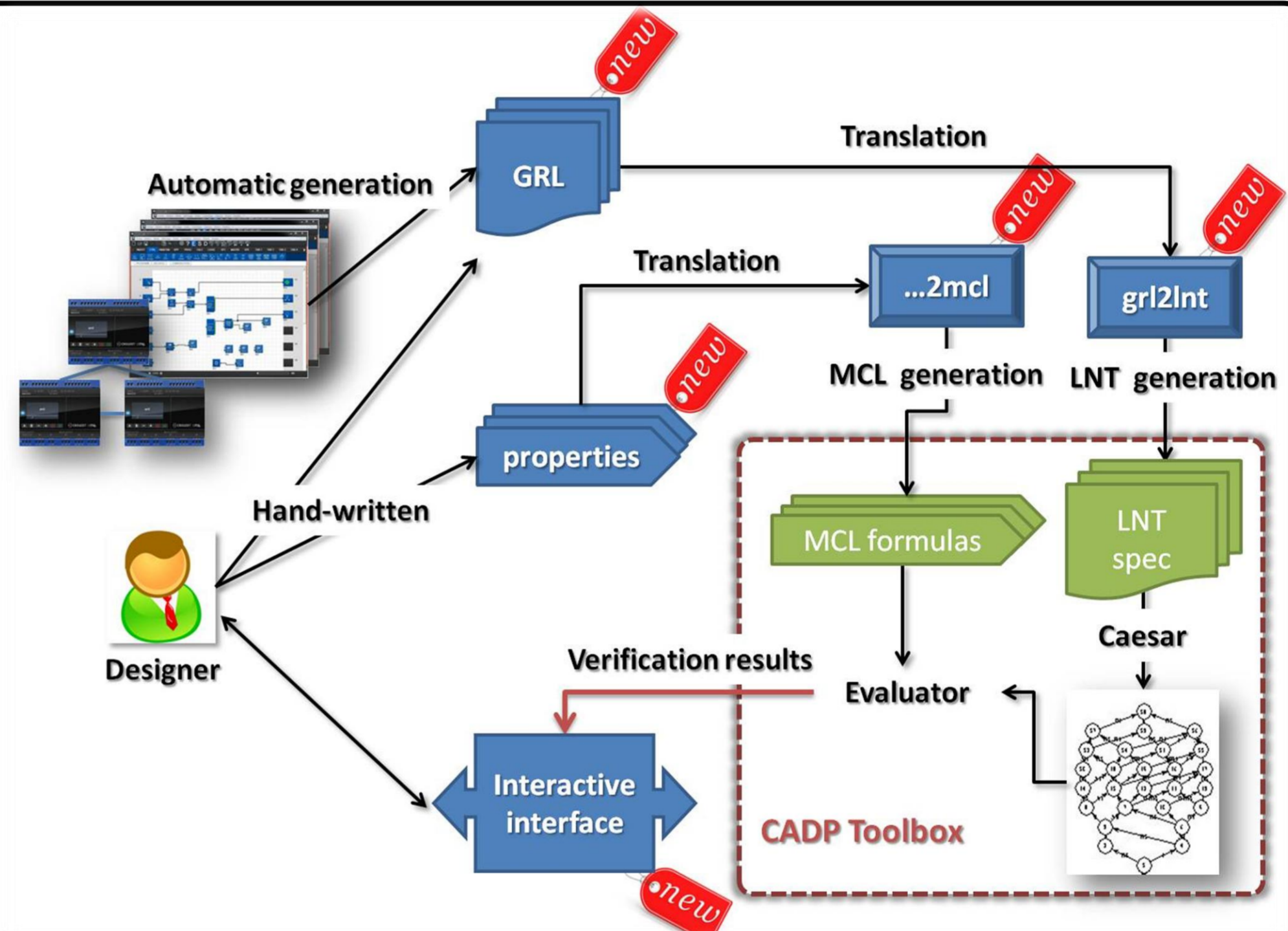
Industrial Case Study: SaaS Verification for PLC-Network Applications

Partners:
- Crouzet (Schneider Electric)
- Inria Grenoble Rhone-Alpes / Convecs
- LCIS Laboratory (Valence)
- Motwin, Vertical M2M

References

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[2] **GRL: A Specification Language for Globally Asynchronous Locally Synchronous Systems (Syntax and Formal semantics).** F. Jebali, F. Lang, and R. Mateescu. Research report RR-8527, 82 pages, INRIA.

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[4] **Modélisation et validation formelle de systèmes globalement asynchrones et localement synchrones.** F. Jebali et al. AFADL, 2014.

[5] **CADP 2011: A Toolbox for the Construction and Analysis of Distributed Processes.** H. Garavel, F. Lang, R. Mateescu, and W. Serwe. STTT, 2013.

"Construction de Systèmes Concurrents Vérifiés"

informatics mathematics — Inria

CONVECS

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