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Problem: Control Systems for a Smarter Planet

Smarter Planet: An IBM initiative to instrument and interconnect the world's systems.

Current developers find it difficult to design, build, and diagnose worldwide control systems on insecure, unreliable networks.

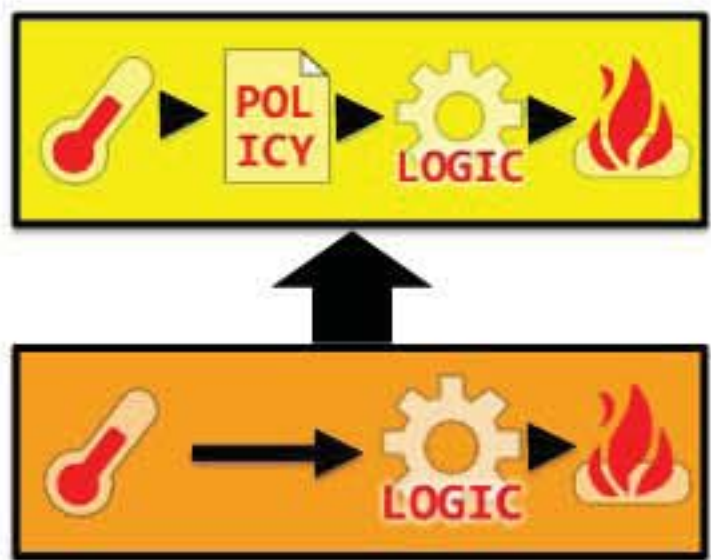
Solution: Comprehensive Platform

Olingua Franca: **unified architecture** for trustworthy distributed control systems.

Programming Model

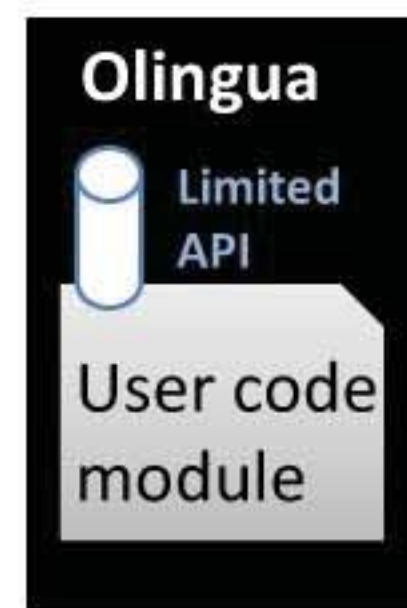
Instead of the existing monolithic approach which forces developers to anticipate and handle all risks of distributed systems, we propose a new approach.

What developers do...



- Define **modular** control systems with simple, contained logic
- Prioritize **hierarchy** of modules

What Olingua does...



- Provide a safe **sandbox** environment in which user modules run
- Factor out problems common to by distributed systems

Security



- handled by Olingua, not programmer
- all traffic is secure **by default**
- use proven underlying technology: RSA encryption, PKI infrastructure

Resilience



- **universal response** to any failure: fall back to prioritized module and rebuild functionality
- no error-handling code required

Prototype: Reduction to Practice

To demonstrate Olingua's advantages, we designed an example control system that could efficiently govern home heating for a model neighborhood on the *Smart Grid*. We then simulated this system on top of Olingua across networked distributed hardware devices.

