GridCloud

Cloud-hosted high-assurance system to monitor the electric power grid

sponsored by the Department of Energy ARPA-E program

Goal

Demonstrate a cloud-scale monitoring infrastructure able to host “smart grid” applications: the code that will make the power grid “smart”

Use cases

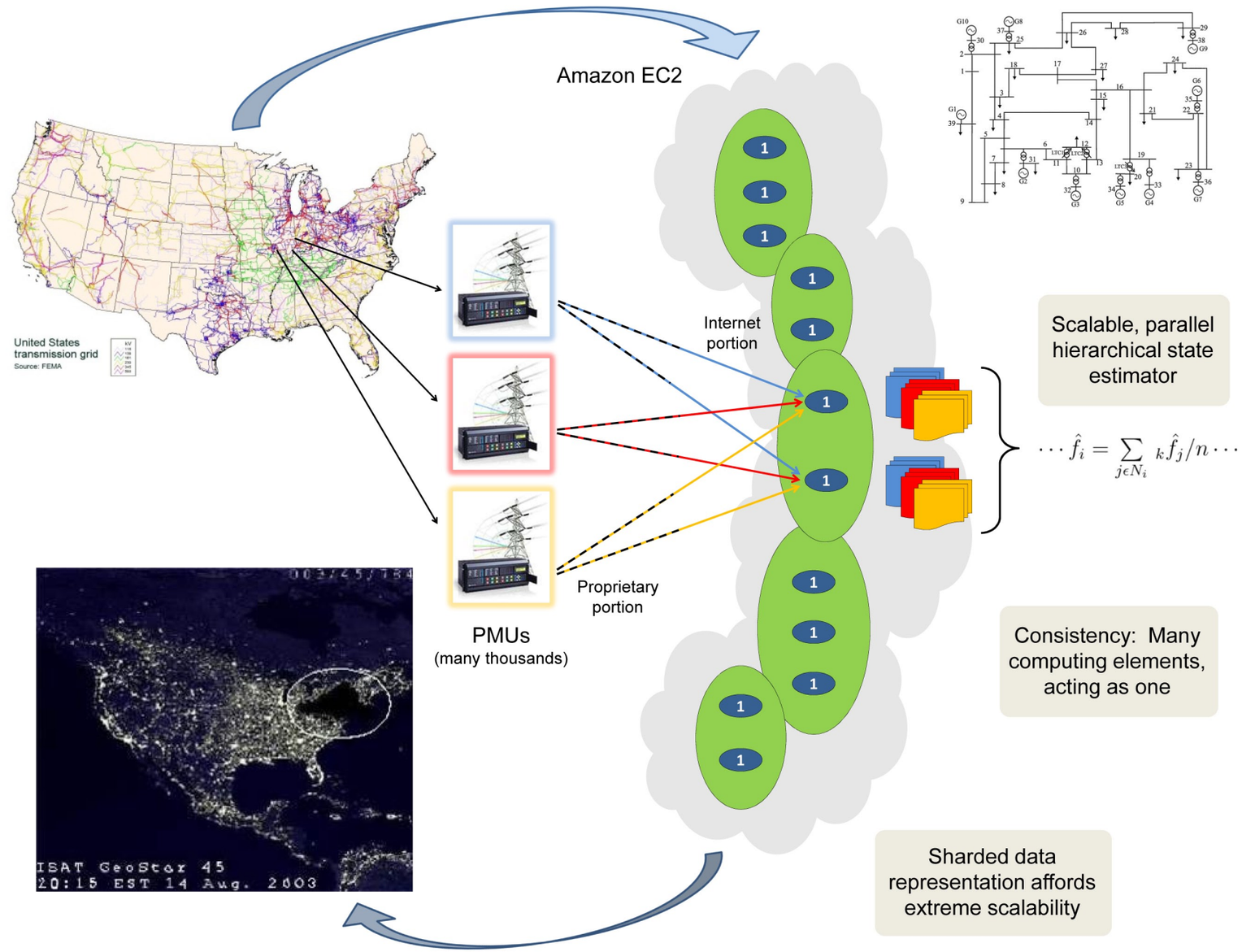
- Routine balancing of loads and generation
- Grid Protection
- Adaptation after topology changes
- Integration of renewable energy

Challenges

Cloud lacks consistency, assurance, and timing guarantees. Industry demands very strong control over data flow with provable security.

Status

We’re using Isis^2 to manage a structure in which replicated data permits high assurance reactive smart-grid monitoring and control. GridCloud features state estimation and GridStat software from Washington State University.



Definitions

PMU

A sensor (synchrophasor) used to measure voltage and phase angle of a power bus

State Estimator (SE)

Code that computes the state of a regional grid using PMU data as input

Cornell University


Ken Birman


Robbert van Renesse


Zhiyuan Teo

Washington State University


Dave Bakken


Anjan Bose


Carl Hauser

www.cs.cornell.edu/Projects/Gridcontrol/

Cornell University

WASHINGTON STATE UNIVERSITY

World Class. Face to Face.