A trust in time saves millions

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1. Which came first?
Ordering Problem:
2. Is it Fresh?
Timeliness Problem:
3. Is it Coordinated?  
Synchronization Problem:
Time Stack

UTC time

Application

Software

counts

Hardware

counters / timers

periodic events

Resonating Element (Oscillator)
Attacks

Time Integrity Attack

Time Transfer Attack

- Time Servers
- Application
- Software
- Hardware counters / timers
- Resonating Element (Oscillator)
- UTC time
- time
- counts
- periodic events
TimeSeal:
Secure time based primitives across all layers of a stack - hardware timers, software, and time packets
Do not assume “Clockless” systems
Do not take “Time” for granted
Illegal Trade
Location Theft
Smart Grid Attack
UI Delays
Forge Timestamp
Loading