

# Synchrophasors over GOOSE



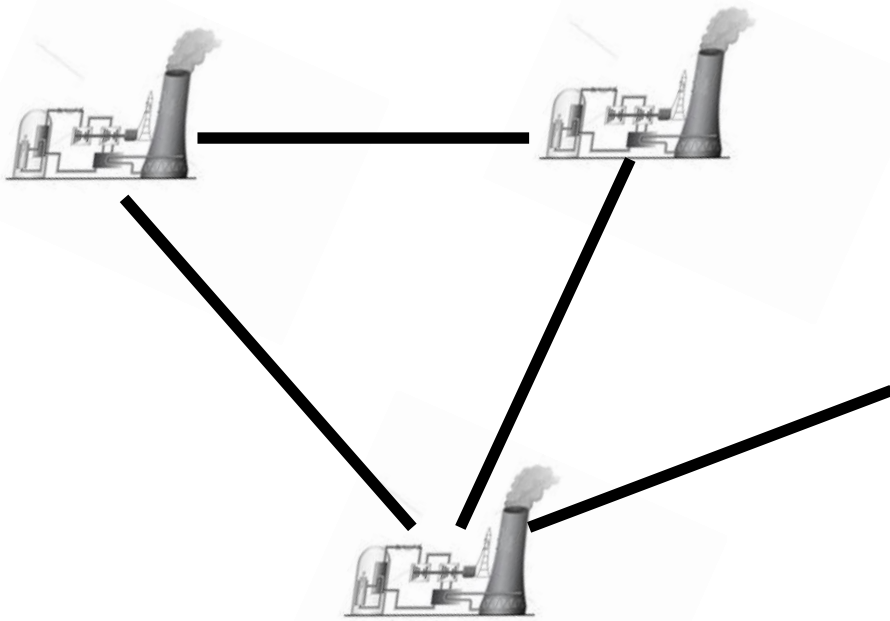
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# Typical Synchrophasor Data Access: Streaming Data



Requires Much Bandwidth –  
.....Streaming Not Always Needed

# Problem Statement #1: Island Detection



Example Drift Rate: 0.1 Hz

# Classic Solution – Streaming Synchronphasors

Rate: 30 sets/sec

Bandwidth: 24kb/sec for ONE phasor

Detection rate:  $36^\circ$  per second;  $3.6^\circ/100\text{ms}$

# GOOSE Solution:

Angle mapped into GOOSE

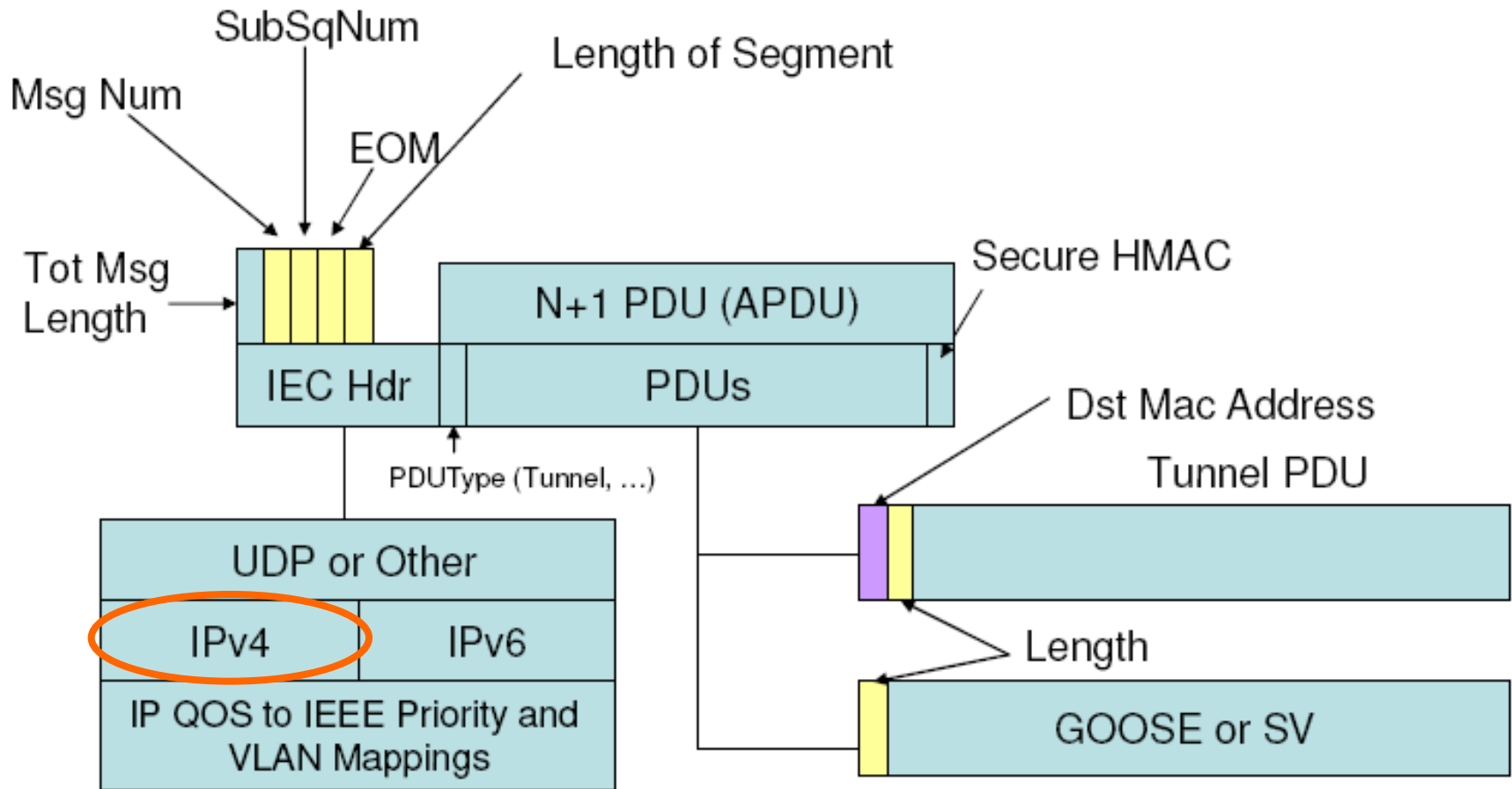
Analog Value Scan Rate: 100ms

Ethernet Frame size: 134 bytes (20 char names)

Bandwidth: 11 kbps

Resolution: 3.6°

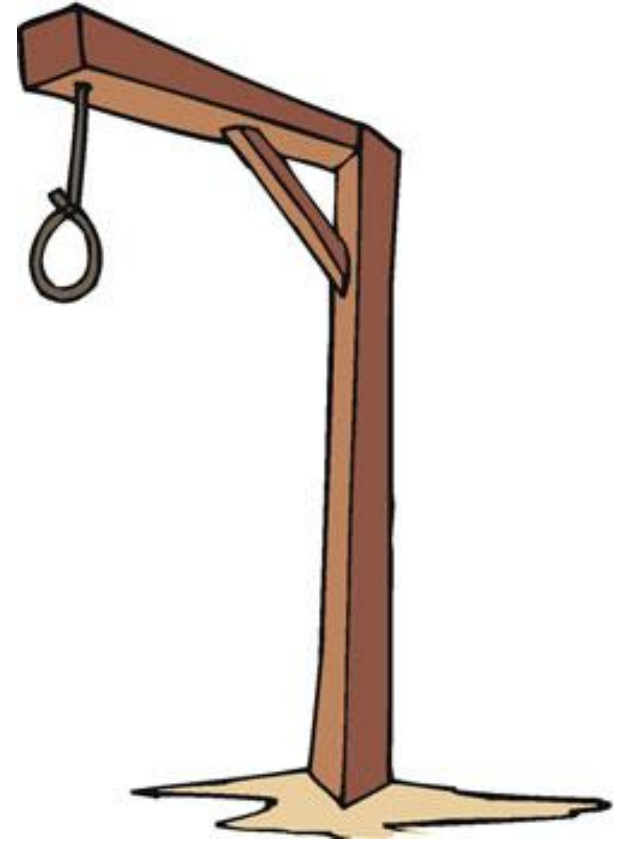
# IEC 61850 Networked GOOSE



# Mark's Proposed name for IEC 90-5: Networked **O**bject **O**riented **S**ubstation **E**vent

## The NOOSE !

...wound up with R-GOOSE



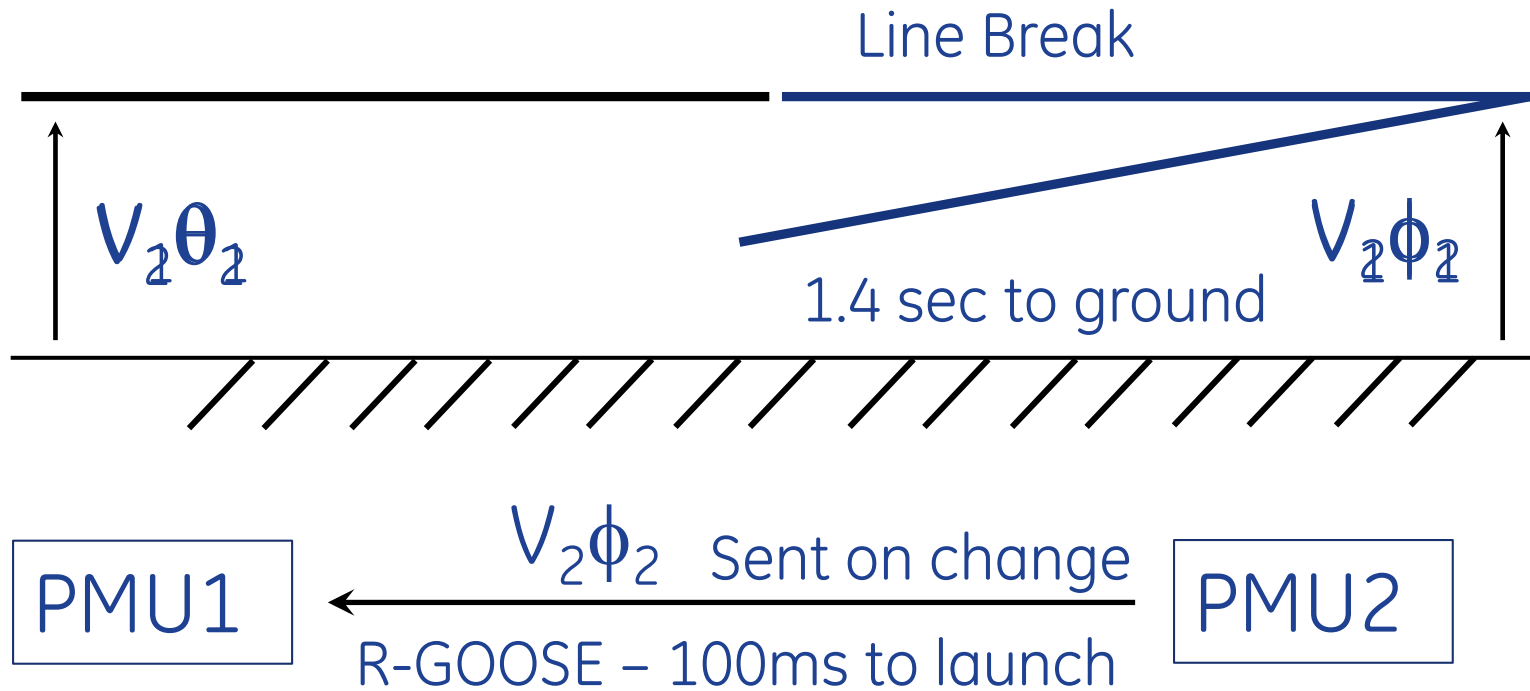
imagination at work

# Security Definition in 90-5

- Defines a Secure Hash Algorithm - SHA2 Hash code for message authentication / integrity
- Defines AES as the encryption algorithm
- Identifies / Extends a Key management system
  - RFC 3547 The Group Domain of Interpretation
  - The publisher manages the keys to all subscribers
  - Same key for Hash and Encryption



# Use Case 2: Downed Conductor Detection



SDG&E work: Change in  
Synchrophasor Values on Line Break