Analytics:
Improving Network Fault Management Efficiency

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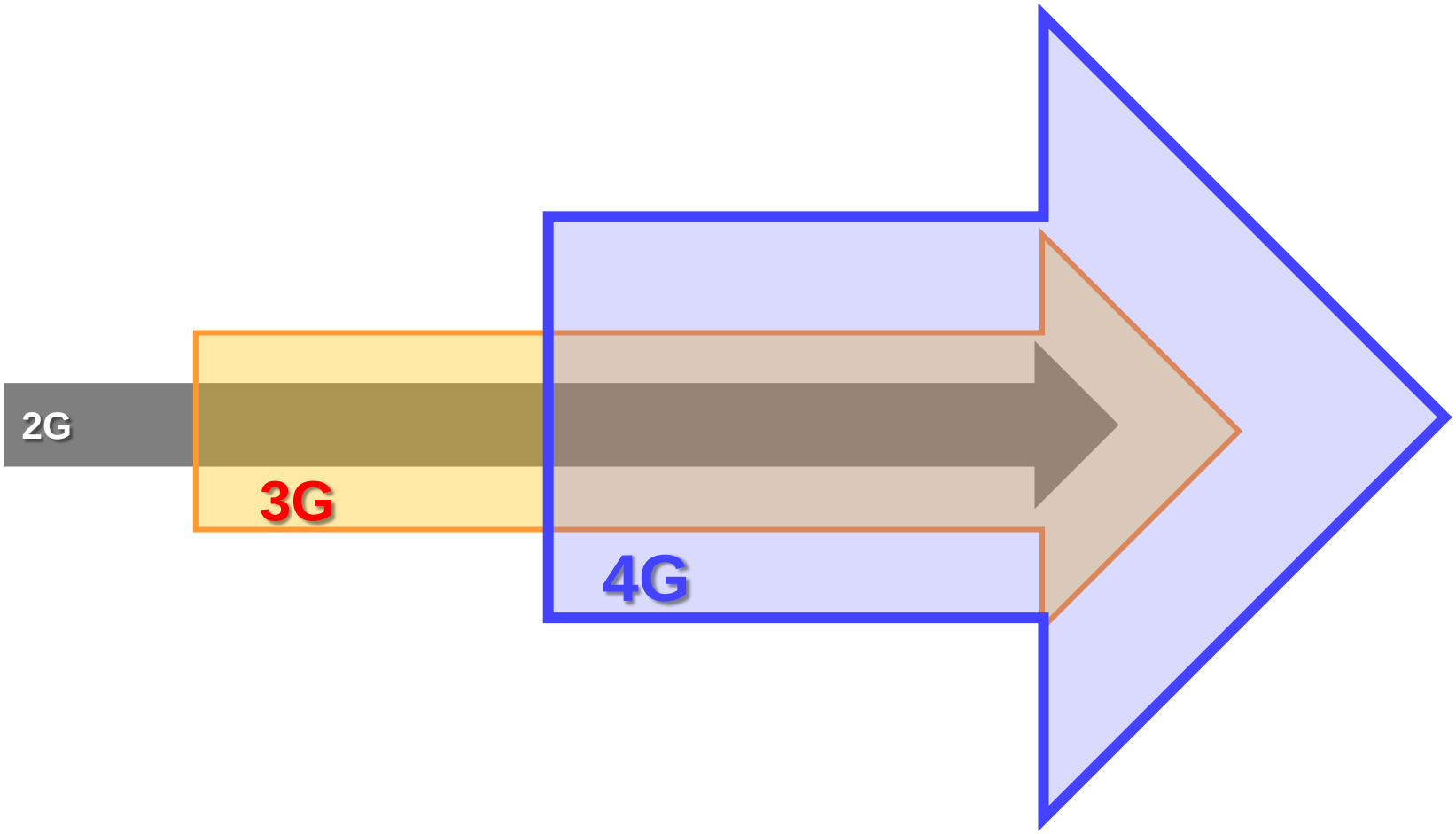
Wireless Network Transitions



It is typical within evolving networks to have multiple generations of technologies present until older ones have been phased out

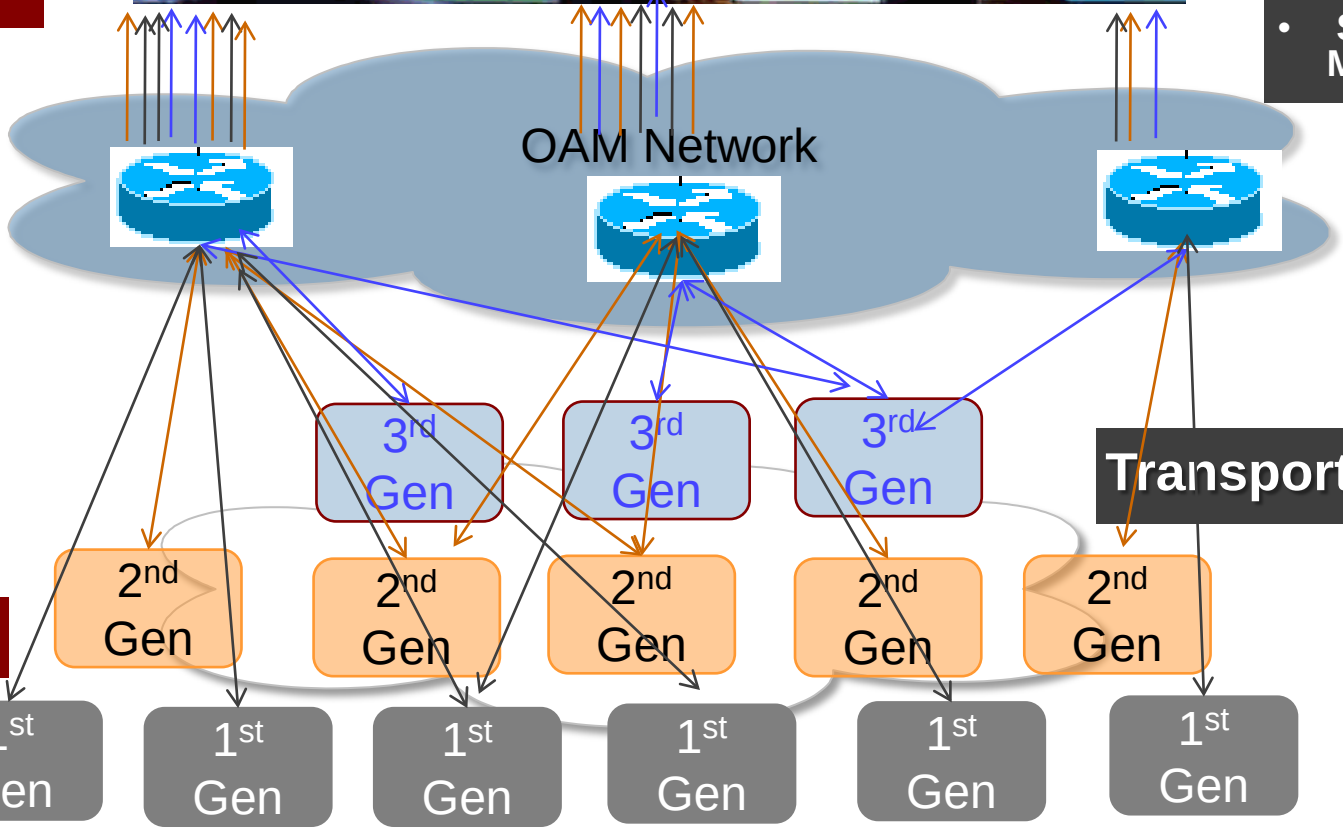
Multi-Generational Network Management Architecture

Links

- SNMP Traps (RFC 1157)
- Syslog

Databases

- OSS
- Vendor Specific
- Pollers
- Service Managers



Elements

Typical Network Management Model

Tickets Dispatches Vendor Support

Operator Ignore

System Discard

ALARMS

Service Impact

Network Impact

Network

An overlooked resource of Fault Management Operations is Human Capital

- BSc / MSc
- CCNA/IE/MP

Potential Impact of Increasing Alarms

- **Fault Management Network**
  - Server Volume, Capacity, Space
  - Fault Management Transport Latency

- **Operating Center**
  - Headcount Pressures
  - Redundant Tickets
  - Operator Errors
  - Reduced Remote Resolution
  - Increased Mean Time to Repair (MTTR)

Achieving Fault Management Efficiency

SYSTEM	OPERATOR
n : traps generated	a: informational tickets
m : traps discarded	b: dispatch tickets
	c: Tier II support (Vendor) tickets

REDUCE

X = # total alarms viewed
= n- m

Y = # tickets created
= a + b + c

System Efficiency

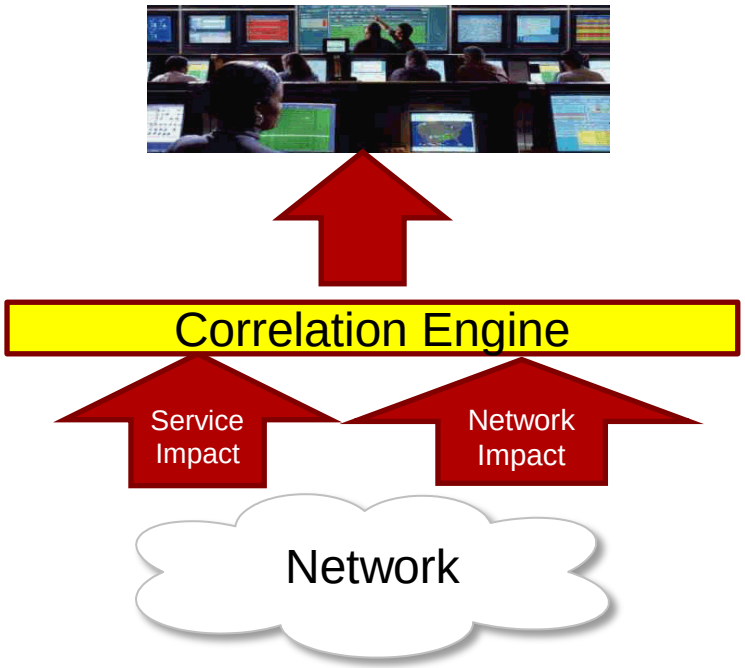
$$= \frac{x}{n} = \frac{(n-m)}{n}$$

Operator Efficiency

$$= \frac{y}{x} = \frac{a+b+c}{(n-m)}$$

“Smart Alarming”

- **Standardized Alert Names & Use of Correlation**
  - Standardize the alarming type
  - Define business rules
  - Collapse and present single alarm
  - Maintain the ability to present correlated alarms for further analysis



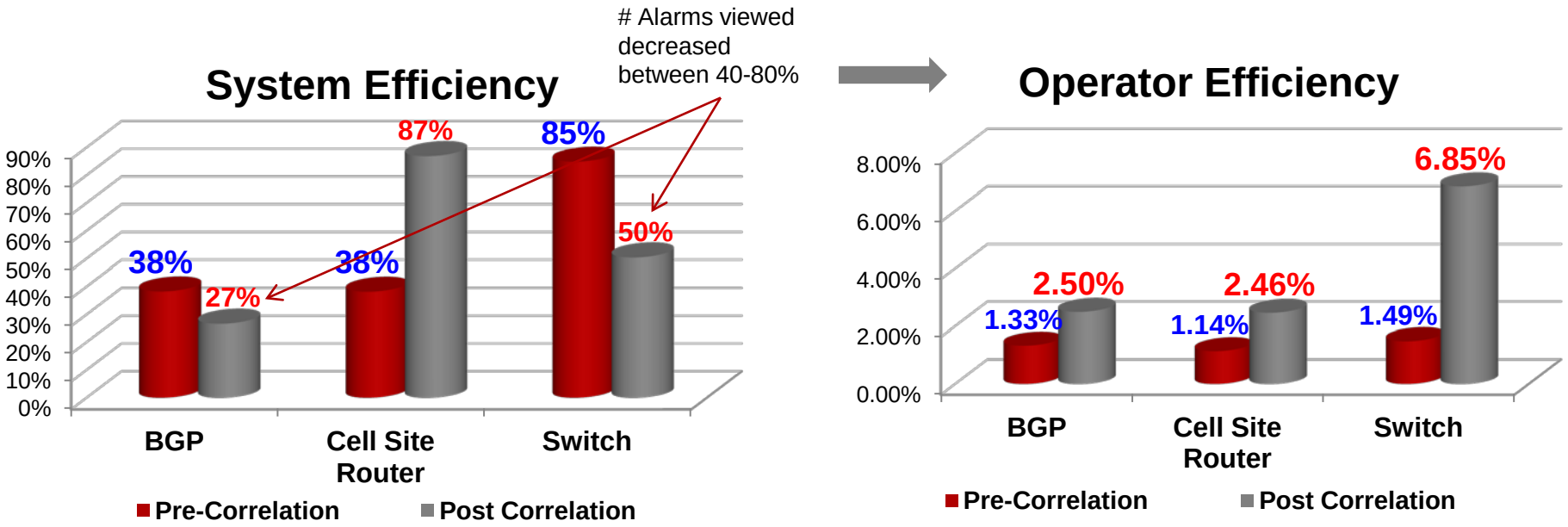
Example – BGP Router Alerts

- As Data Networks become more central to wireless providers' products, there is an urgent need to optimize data alarms.
- Many data networks use BGP (Border Gateway Protocol -RFC 427). It is a protocol for exchanging routing information between gateway hosts.
- Whenever communications between gateways fail, standard and vendor specific BGP alerts are generated
- The result is an "alarm storm" of BGP state alert, through which the fault management operator has to research, or delay/ignore if there are more critical alarms.

Identify types of common alerts for standardization

- ROUTER_cbgFsmStateChange
- CISCO_Cisco-cbgBackwardTransition ⟶ BGP_bgpStateChange

Efficiencies Attained



	Pre-Correlation	Post Correlation
Combined System Efficiency	76%	77%
Combined Operator Efficiency	1.37%	4.26%