

## NRIC Council Meeting

Focus Group 3A

**Gap Analysis of Best Practices  
Aimed at the Reliability of  
Wireless Networks**

Focus Group 3B

**Gap Analysis of Best Practices  
Aimed at the Reliability of  
Internet Data Services**

December 6, 2004



Network Reliability and Interoperability Council VII

# Focus Group 3A Charter

---

“By December 17, 2004, the Council shall provide a report describing the results of the **gap analysis of Best Practices aimed at the reliability of wireless networks.**”

*The full Focus Group 3A Charter can be found at [www.NRIC.org](http://www.NRIC.org)*



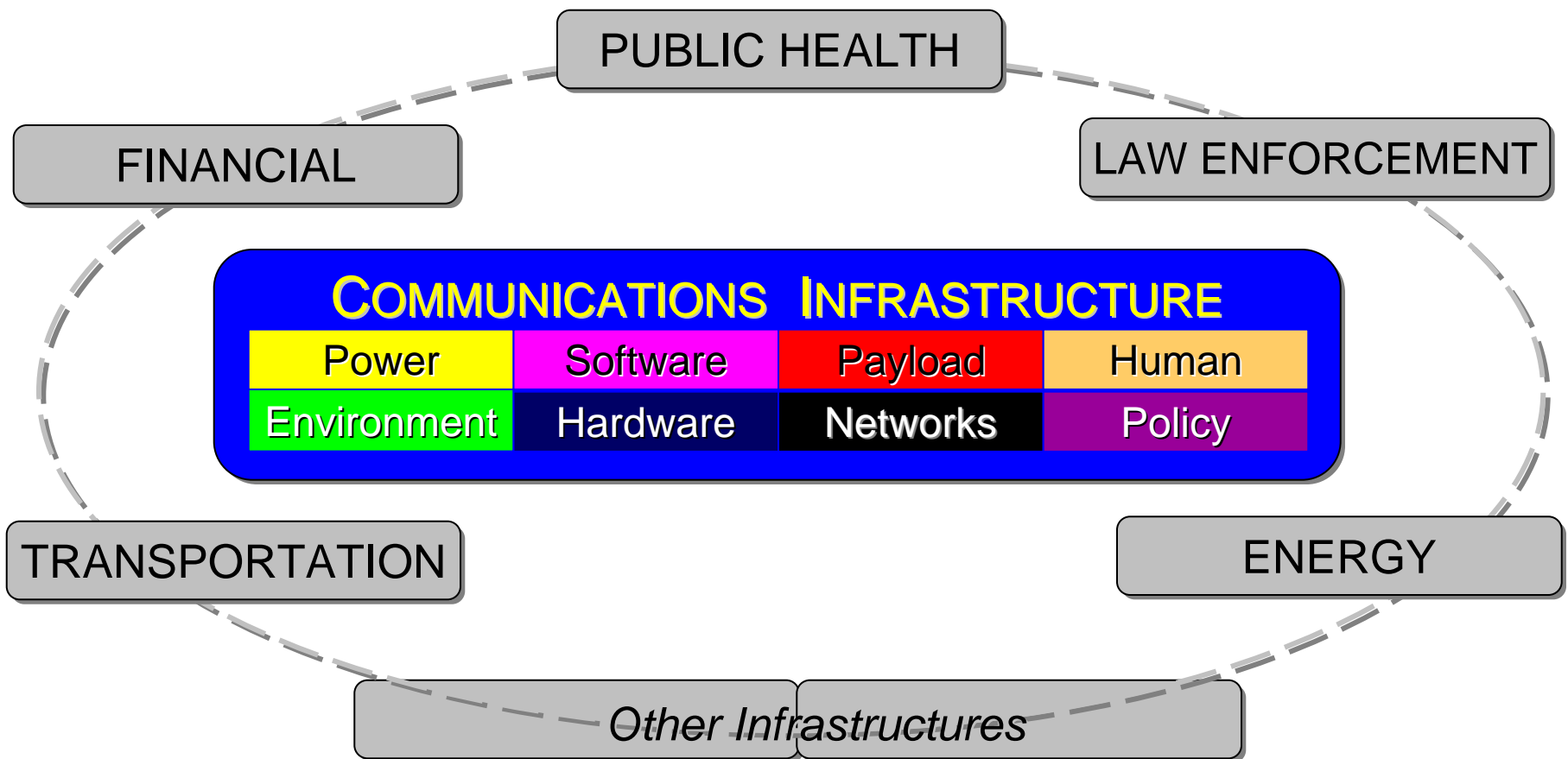
Network Reliability and Interoperability Council VII

# Focus Group 3B Charter

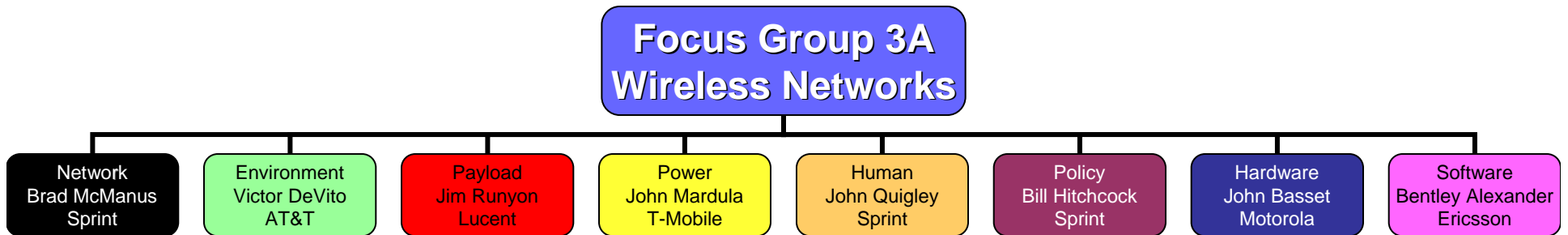
---

“By December 8, 2004, the Council shall provide a report describing the results of the **gap analysis of Best Practices aimed at the reliability of Internet data services.**”

*The full Focus Group 3B Charter can be found at [www.NRIC.org](http://www.NRIC.org)*



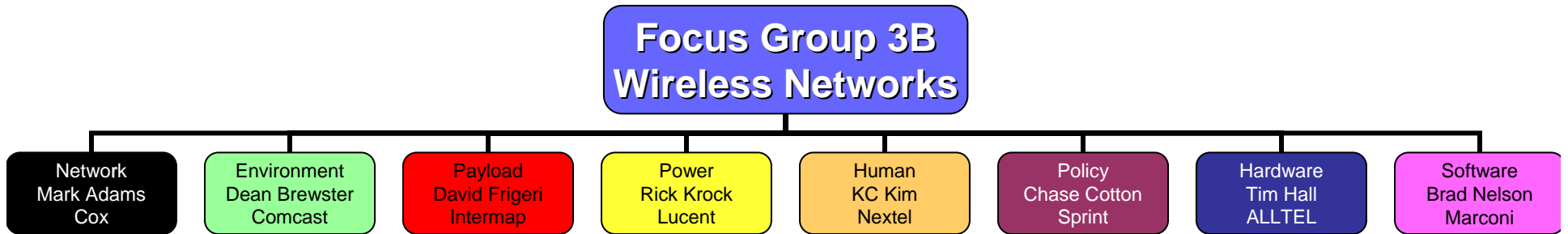
# Focus Group 3A Structure and Report Processes



- engaged over **50 industry subject matter experts**
- articulated over **138 attributes** of Wireless Networks
- considered **285 concerns** regarding Wireless Networks
- formed **8 Task Groups** that provided systematic coverage of communications infrastructure elements



## Focus Group 3B Structure and Report Processes



- engaged over **60 industry subject matter experts**
- articulated over **70 attributes** of Public Data Networks
- considered over **200 concerns** regarding Public Data Networks
- formed **8 Task Groups** that provided systematic coverage of communications infrastructure elements





Network Reliability and Interoperability Council VII

# Focus Group 3A & 3B Expertise and Diversity of Perspectives

## Wireless Network Reliability – Focus Group 3A

Co-Chair: John Quigley\*, Sprint

Co-Chair: Karl F. Rauscher, Lucent Technologies Bell Labs

### Service Providers, Network Operations

ALLTEL	Steven Paton	Nextel	David Proffer
AT&T	Victor Devito*	Nokia	Slawomir Deja
Cingular	Ray Fannon		Mauzio Gallucci
	Rich Moczgamba	Qwest	Sherman W. Phillips
Comcast	Dean Brewster	SBC	John Chapa
Cox	Mark Adams	Sprint	Bill Hitchcock*
Dobson	Scott Jones		Brad McManus*
Intelsat	Mark Neibert	T-Mobile	Tom Ellefson
MCI	Mike Sheffield		John Mardula*

### Equipment Suppliers

Battery Corp.	Harold Washer	Lucent Technologies	Richard Krock
			James P. Runyon*
Cisco Systems	Robin Roberts	Motorola	Lester Buczek*
Ericsson	Bentley Alexander*		John Bassett
Harris Corp.	Steven Warwick	Nortel Networks	Srini Anam

### OTHERS

ATIS	Bill Klein (A)	NCS	Perry Fergus
CTIA	Rick Kemper	NYC DOITT	Mitchell Ahlbaum
FCC	Jeff Goldthorp (A)	SAIC	Hank Kluepfel (A)
	Kent Nilsson (A)	SpectraSite	Ted Abrams

\*Task Group Leaders, (A) Advisors

## Wireless Network Reliability – Focus Group 3B

Co-Chair: David Frigeri\*, Internap

Co-Chair: Karl F. Rauscher, Lucent Technologies Bell Labs

### Service Providers, Network Operations

ALLTEL	<b>Scott Binns</b>	MCI	Barry Briggs
	Tim Hall		Mike Diorio
AT&T	Rick Canaday	Nextel	KC Kim*
BellSouth	Jim L. Johnson	Qwest	Brian Rooks
CenturyTel	Brent Austin	Qwest Wireless	Sherman W. Phillips
Comcast	Dean Brewster*	RCN	Joe Provo
Cox	Mark Adams*	SBC	Joe Chapa
Equinix	William Norton		Ren Provo
Global Crossing	David Cooper	Telefonica	Dennis Di Toro
Ibasis	Solos Arthachinda	Time Warner Cable	William Groh
	Ajay Joseph		Ron da Silva
Internap	Duke McMillin*	Verisign	Ken Silva
Intelsat	Mark Neibert	Verizon	Ron Howard

### Equipment Suppliers

Cisco	Ron Roberts	Marconi	Brad Nelson*
Juniper	Fred Stringer	Nortel	Srini Anam
Lucent Tech.	Richard Krock*	SpectraSite	Ted Abrams
	James P. Runyon*		

### OTHERS

ATIS	Bill Klein (A)	FCC	Jeff Goldthorp (A)
CAIDA	K Claffy		Kent Nilsson (A)
CTIA	Rick Kemper	Harvard Univ.	Scott Bradner
SAIC	Hank Kluepfel (A)		

\*Task Group Leaders, (A) Advisors

# Gap Analysis Methodology

---

- Criteria for Gap:
  - a situation where existing, documented NRIC Best Practices do not address a concern
  - *Note: in most cases the industry appears to have practices (just no collaborative consensus discussion and posting on NRIC web page yet)*
- Best Practices for review were selected by:
  - keywords (e.g, “hardware”, “software”)
  - search strings (e.g., “RF”, “BGP”)
- Best Practices reviews:
  - 845 conducted by Focus Group 3A
  - 1,264 conducted by Focus Group 3B
- *NOT* considered gaps:
  - refinements to existing Best Practices
  - minor modifications to existing Best Practices
- Interim Reports



## NRIC Council Meeting

### Focus Group 3A Wireless Best Practices December 6, 2004 DRAFT

**John Quigley**  
Co-Chair

Wireless Network Reliability Focus Group

Director, Network Integrity  
Network Operations  
Sprint

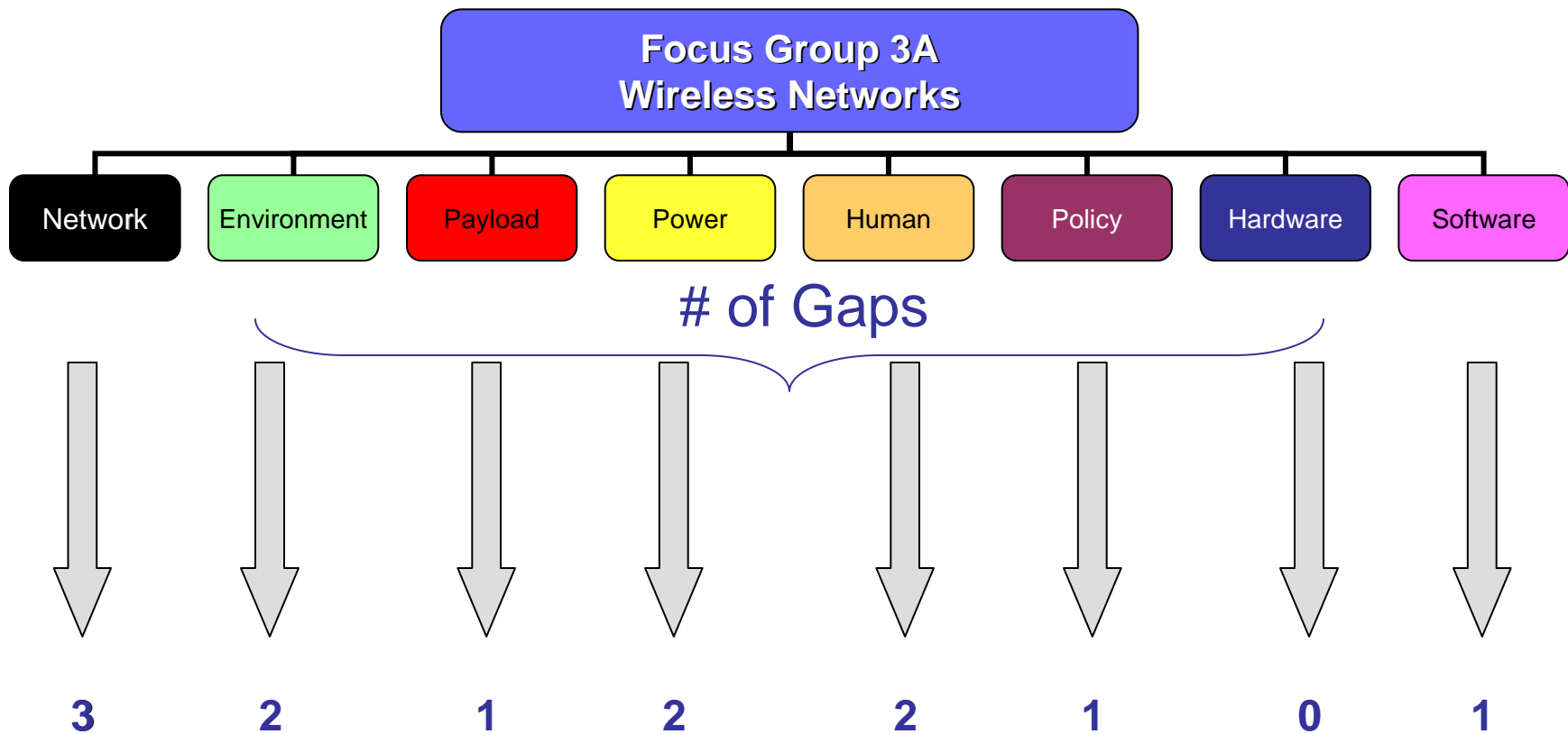
**Karl Rauscher**  
Co-Chair

Wireless Network Reliability Focus Group

Executive Director  
Bell Labs Network Reliability & Security Office,  
Lucent Technologies

# Focus Group Structure and Report Process

Focus Group 3A Identified **12 gaps** in existing NRIC Best Practices



## 3A Gap Detail

### Environment

*Environment – includes buildings, trenches where cables are buried, space where satellites orbit, the ocean where submarine cables reside*

#### 1. Business Continuity Planning

Existing Best Practices do not address potential impacts of collateral damage from adjacencies. In addition, access to remote elements (e.g. cell sites), for restoration of service, is often delayed due to security concerns (e.g. pre-credentialing).

#### 2. Cell Site Administration

Areas of concern include adhering to engineering designs, signage considerations, rogue equipment identification and avian (i.e. bird) populations.

### Human

*Human – includes intentional and unintentional behaviors, limitations, and education and training, human-machine interfaces, and ethics*

#### 1. Technical Support and Escalation

Timely engagement of technical support of the appropriate level during an outage.

#### 2. Offshore Network Operations Control Centers (NOCC)

Location of NOCC's outside of the US poses some potential risk to the management and security of telecommunications networks.

## 3A Gap Detail

### Policy

*Policy – includes the industry standards, industry cooperation, industry interfaces with governments (local, state, federal), and various legal issues*

#### 1. Non-Destructive Fire Suppression

Fire suppression systems (e.g. FM200, Halon) as an equivalent alternative to water based sprinklers that could cause damage to equipment thus expanding or prolonging an outage.

### Payload

*Payload – includes the information transported across the infrastructure, traffic patterns and statistics, information interception and information corruption*

#### 1. SPAM Control at Message Centers & MSC's

Concerns regarding SPAM controls between Message Centers and MSC's need to be addressed.

### Network

**Networks** – includes the configuration of nodes, various types of networks, technology, synchronization, redundancy, and physical and logical diversity (need to update with wireless)

#### 1. Business Continuity related to Wireless Networks

There are a number of Best Practices addressing business continuity for communications networks. However, existing NRIC Best Practices do not provide guidance for cell site prioritization and contingency planning for key coverage areas.

#### 2. Air Interface Reliability

The Network Task group has identified insufficient guidance in existing Best Practices for the unique challenges related to the planning, engineering and optimization of the air interface.

#### 3. Cell Site Administration

The Network Task Group identified the need to gather and maintain cell site information related to the performance, connectivity, and maintenance.

### Power

**Power** – includes the internal power infrastructure, batteries, grounding, high voltage and other cabling, fuses, back-up emergency generators and fuel

#### 1. Emergency Power for Cell Sites

Emergency power for backhaul (e.g. T1) equipment. Extended Base Station equipment back-up power.

#### 2. Priority Restoration of Commercial Power to Cell Sites

Critical cell sites need priority restoration of electrical power.



- IEEE CQR hosted a one day session focused on power reliability related to remote telecommunications equipment (e.g. cell sites).
- NRSC has chartered a special study to review the lessons learned from the 4 hurricanes that hit the SE in 2004.
- Both efforts have yielded a opportunities for power and wireless industries to partner.

- FG 3A will develop and complete a survey of the effectiveness of the Best Practices for the wireless industry.
- Continue to utilize the expertise of the wireless industry to augment existing best practices or gain consensus on new best practices to close the gaps reported today.
- Utilize recommendations from other valuable forums such as NRSC, IEEE CQR, NSTAC.

## NRIC Council Meeting

### Focus Group 3B Wireless Best Practices December 6, 2004 DRAFT

**David Frigeri**  
Co-Chair

Wireless Network Reliability Focus Group

Director  
Technical Services  
Internap

**Karl Rauscher**  
Co-Chair

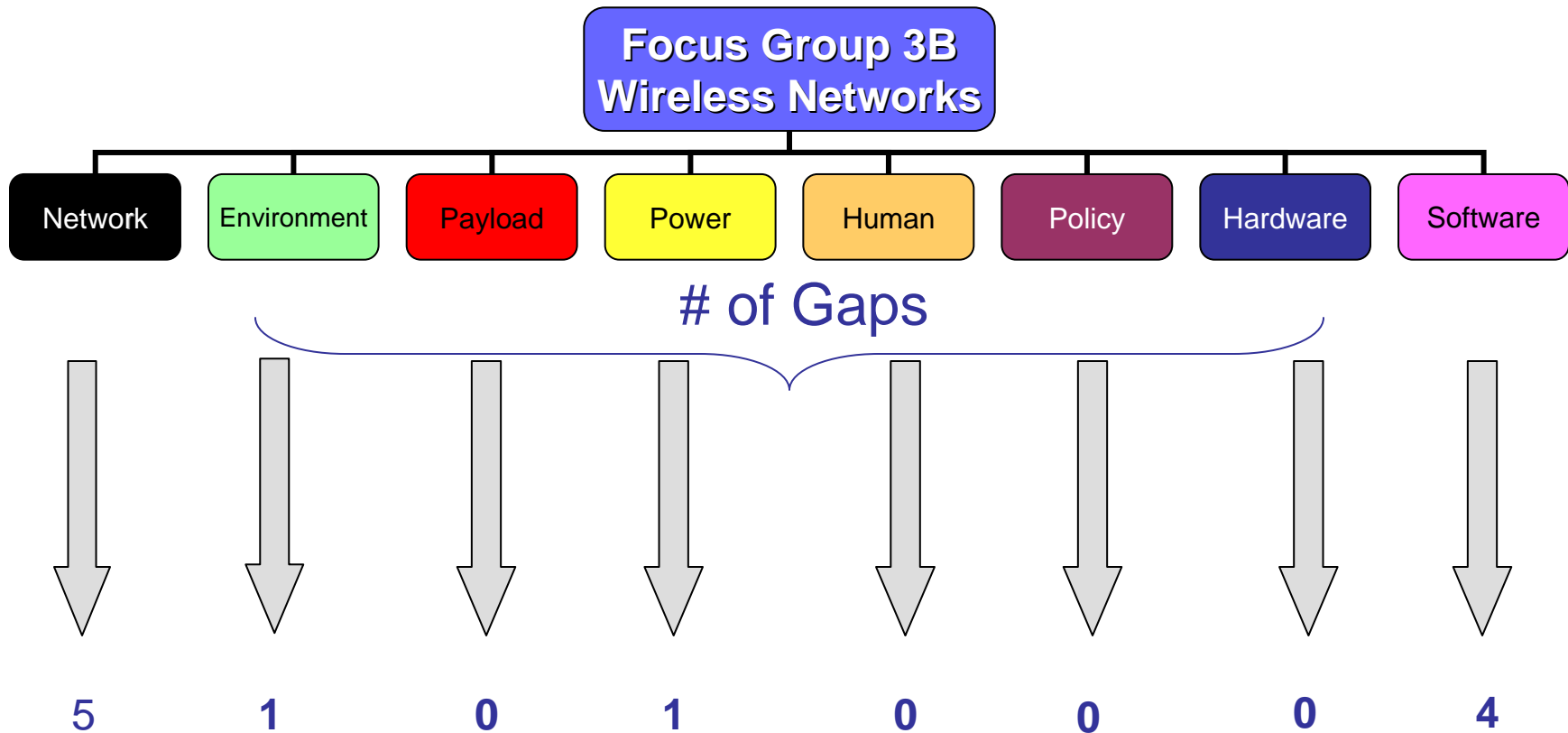
Wireless Network Reliability Focus Group

Executive Director  
Bell Labs Network Reliability & Security Office,  
Lucent Technologies



# Focus Group Structure and Report Process

Focus Group 3B identified **11 gaps** in existing NRIC Best Practices



## 3B Gap Detail

### Environment

*Environment – includes buildings, trenches where cables are buried, space where satellites orbit, the ocean where submarine cables reside*

#### 1. Managing Growth in Multi-Tenant Facilities

Complexity of managing growth in third party and multi-tenant environments (e.g., space, power, cooling).

### Power

*Power – includes the internal power infrastructure, batteries, grounding, high voltage and other cabling, fuses, back-up emergency generators and fuel.*

#### 1. Back-Up Power for On-Premise Emerging Data Services Equipment

Emerging data services, such as Voice Over IP (VOIP) are increasingly viewed as critical services. As such, this equipment may need to continue to function even during commercial power outages. Because the end user equipment is increasingly powered by local sources, back-up power consideration should be explored.

### Network

**Networks** – includes the configuration of nodes, various types of networks, technology, synchronization, redundancy, and physical and logical diversity (need to update with wireless)

#### 1. Network Design & Planning

Enhance NRIC Best Practices in the following areas: the treatment of private address space, routing practice, and design audit.

#### 2. Network Spares Administration

Improve guidance in the area of spares management.

#### 3. Network Measurement & Management

Expand and clarify the scope of the Best Practice to include Service Providers and Network Operators

#### 4. Maintenance Window

Improve guidance in the communication of maintenance timeframes.

#### 5. Proper Identification of Cables

Establish guidance for proper cable labeling.

### Software

**Software** – includes the physical storage of software releases, development and test loads, version control and management, chain of control delivery.

#### 1. Management Information Base (MIB)

Enhance NRIC Best Practices in the areas of MIB support, standardization, and documentation.

#### 2. Crash Diagnostic Memory

Enhance NRIC Best Practices in the area of crash diagnostic memory storage and the use non-volatile memory

#### 3. Software Configuration

Enhance NRIC Best Practices in the area of software configuration change management and version control.

#### 4. Test Environment Descriptions and Published Capacity

Enhance NRIC Best Practices in the area of test environment descriptions along with the use of “published” capacity in software testing and qualification.

- FG 3B will develop and complete a survey of the effectiveness of the Best Practices for the wireless industry.
- During the gap analysis, two areas were identified which require further investigation.
  - Software Warranty as it pertains to maintaining the integrity and security of outdated operating systems and network management software. Specifically, where networks may be operating software code that is not under a Service Level Agreement (SLA) with the equipment manufacturer.
  - Spans Expert Systems/Knowledge Base Systems (a.k.a. pseudo Artificial Intelligence) and their possible affect on network reliability and interoperability. These systems consist of self-modifying code and may affect software qualification, operations, configuration management, and version control.