

Testing to Ensure Service Provider Interoperability

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Today's Discussion

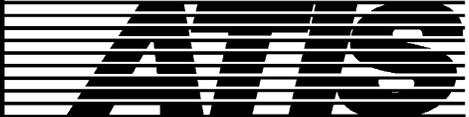
- ◆ An overview of Alliance for Telecommunications Industry Solutions (ATIS)
- ◆ The Internetwork Interoperability Test Coordination Committee (IITC)
- ◆ Scope of ATIS Internetwork Interoperability Testing
- ◆ Significance of Testing to ATIS
- ◆ ATIS Approaches to Testing - The Y2K Example
- ◆ Technical Issues for Testing in ATIS
- ◆ Priorities for Advancing Testing
- ◆ Other Testing Issues

ATIS Mission

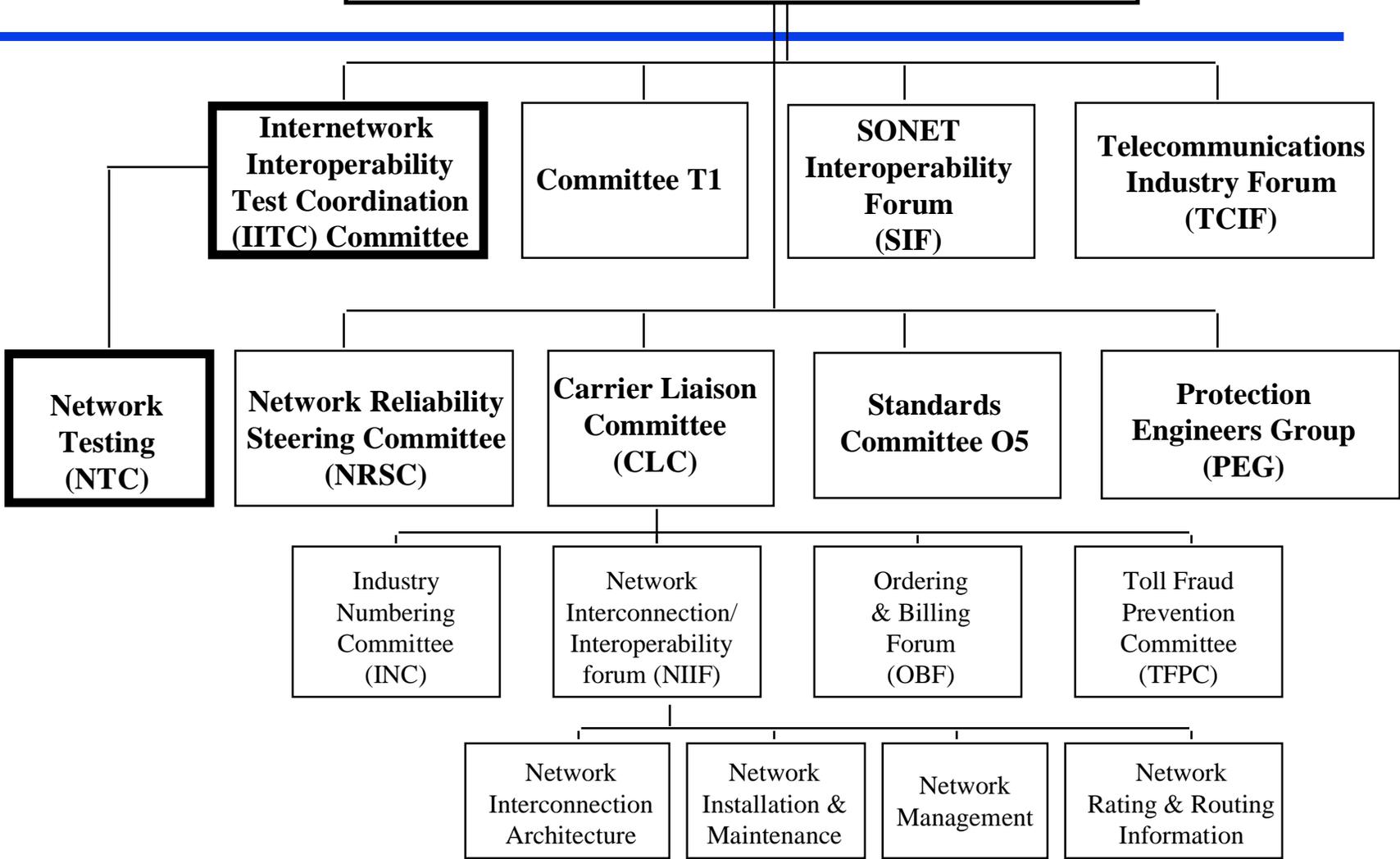


- ◆ Timely resolution of national and international telecommunications issues
- ◆ Initiate and maintain flexible, open industry forums to address technical and operational issues
- ◆ Provide up-to-date information to our members
- ◆ Promote industry progress with minimal regulatory intervention

Alliance for Telecommunications Industry Solutions (ATIS)



Alliance for Telecommunications Industry Solutions

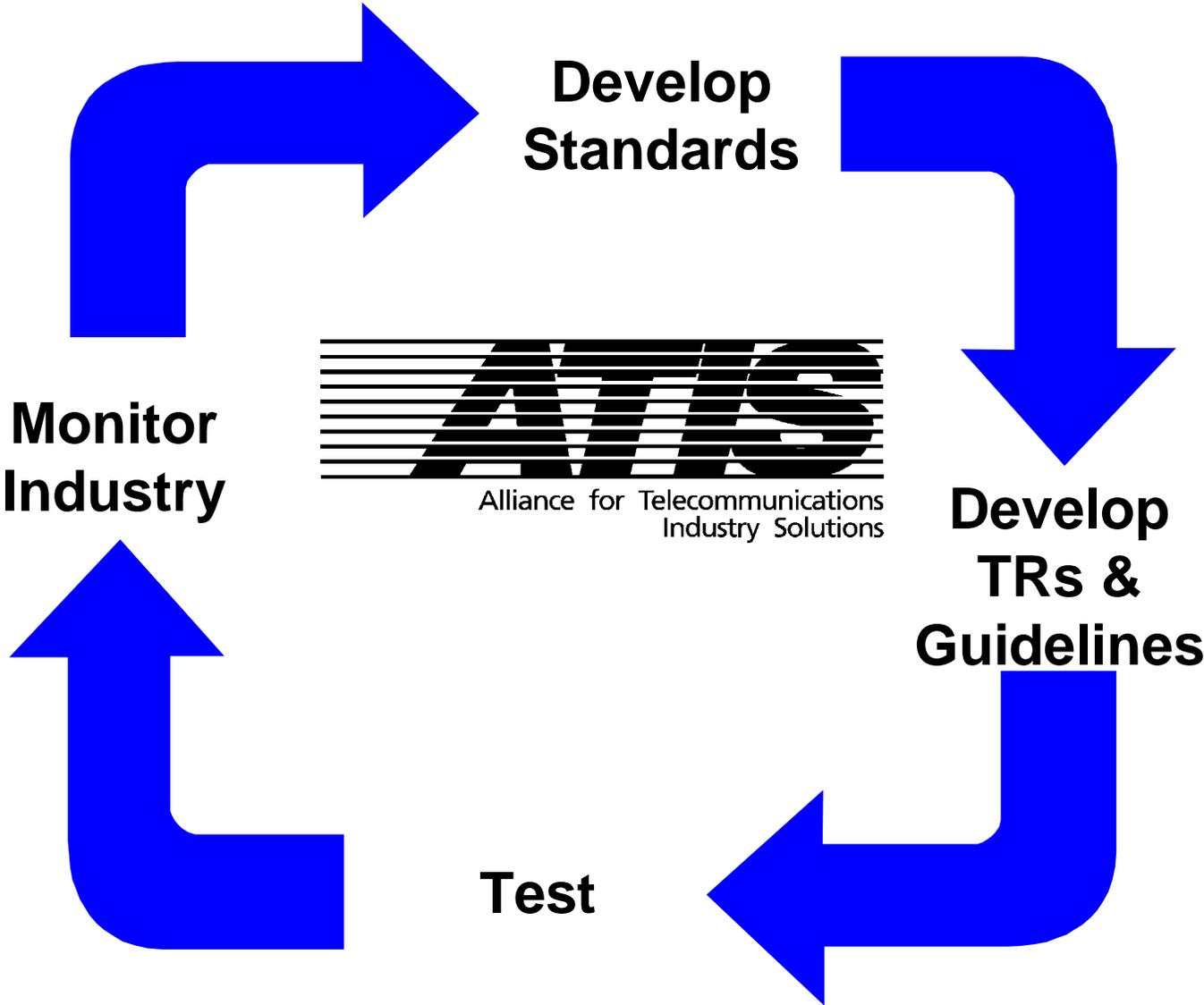


ATIS Scope



- ◆ Sponsor 12 Forums/Committees
 - e.g., Network Interconnection and Standards, Toll Fraud Prevention, Numbering, Ordering and Billing Access, SONET Interoperability Forum
 - FCC frequently refers issues to ATIS
- ◆ 2000+ participants; 300 companies
- ◆ Membership
 - North American (U.S., Mexico and Canada) and World Zone 1 Caribbean telecommunications service providers, resellers of those services, enhanced service providers, manufacturers, developers of telecommunications software, and providers of operations support

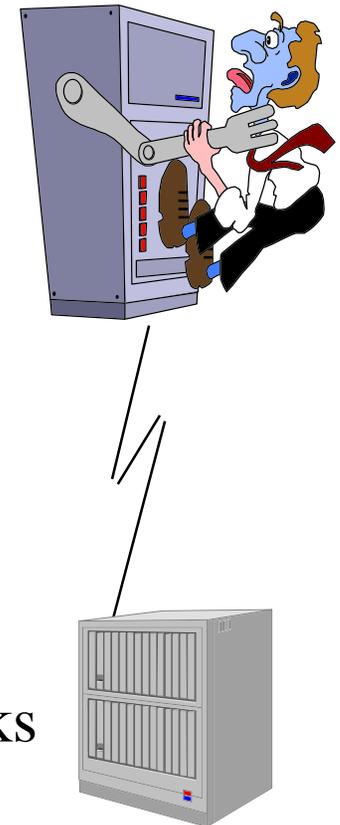
Role of Forums and Committees



Service Provider Interoperability Testing



- ◆ Internetwork Interoperability Test Coordination (IITC) Committee
 - Recommended by the Federal Communication Commission's (FCC's) Network Reliability & Interoperability Council (NRIC)
 - Endorsed by the FCC
 - Expand testing done in the NTC beyond SS7
 - Develop an Industry Funding Mechanism
- ◆ Network Testing Committee:
 - Conducts off-line testing of interconnected networks



IITC Participants

Alcatel/DSC

Ameritech

AT&T

Bell Atlantic

Bellcore

BellSouth

CTIA

D & E Commun.

Ericsson

GTE

Lucent

MCI/Worldcom

Nortel

North Pittsburgh Tel.Co.

Siemens Network Tech.

Southwestern Bell

Sprint

Stentor

Tekelec

USTA

US WEST

NTC Participants



Alcatel/DSC

AirTouch Cellular

Ameritech

AT&T

Bell Atlantic

Bellcore

BellSouth

Cincinnati Bell

GTE

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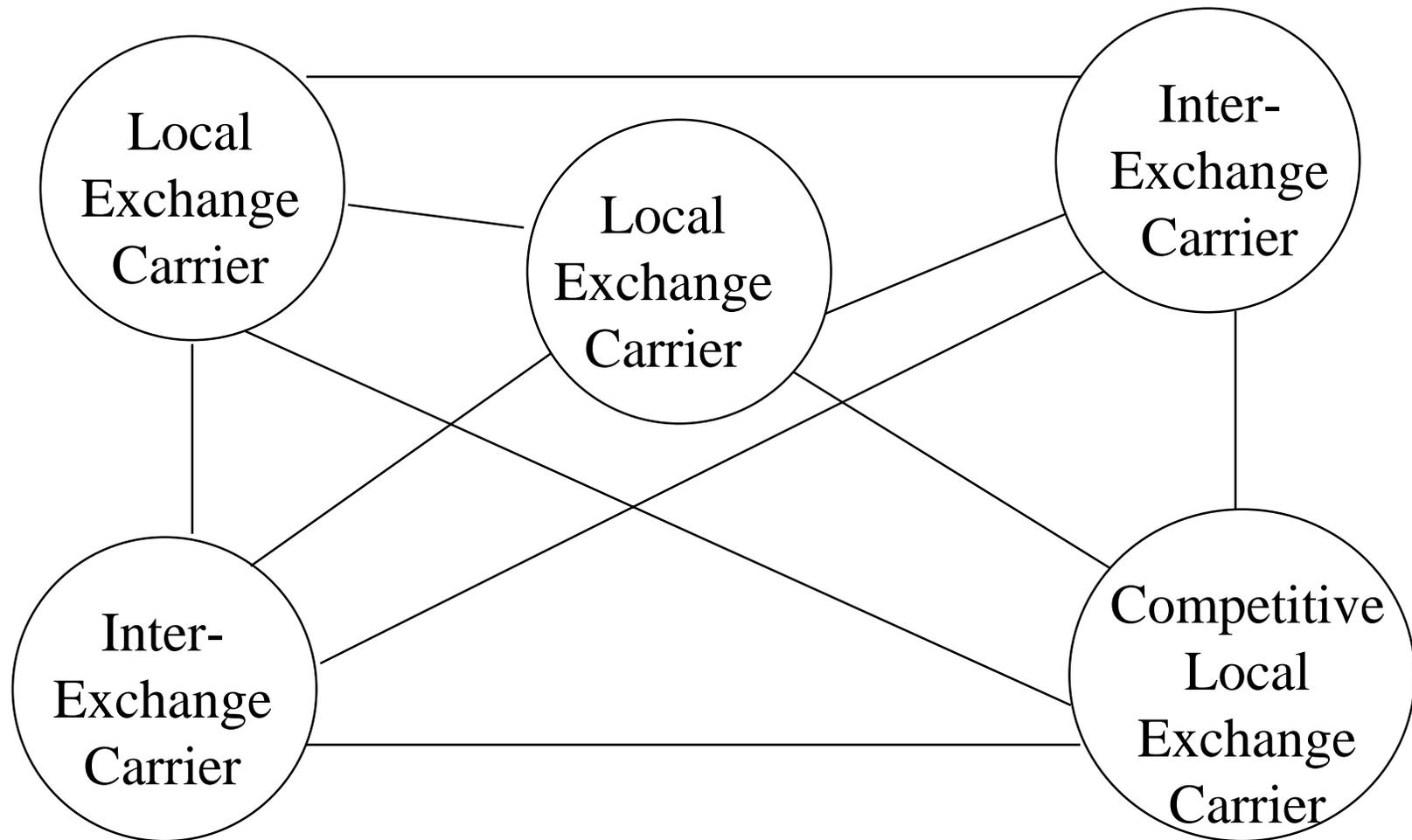
USTA

US WEST

Scope of Testing

- ◆ Internetwork interoperability
 - Service provider to service provider
- ◆ Historically, the Signaling System 7 network
- ◆ Emulate service provider networks in an off-line environment
- ◆ Stress test the network to induce failures
 - Analyze the failure, recommend solutions, retest
- ◆ Analyze all test results
- ◆ Create a Final Report for the industry
- ◆ Review industry best practices, update as necessary

Scope of Testing (cont'd.)



Stages of Telephony Network Testing



**Applications &
Private Network Testing**

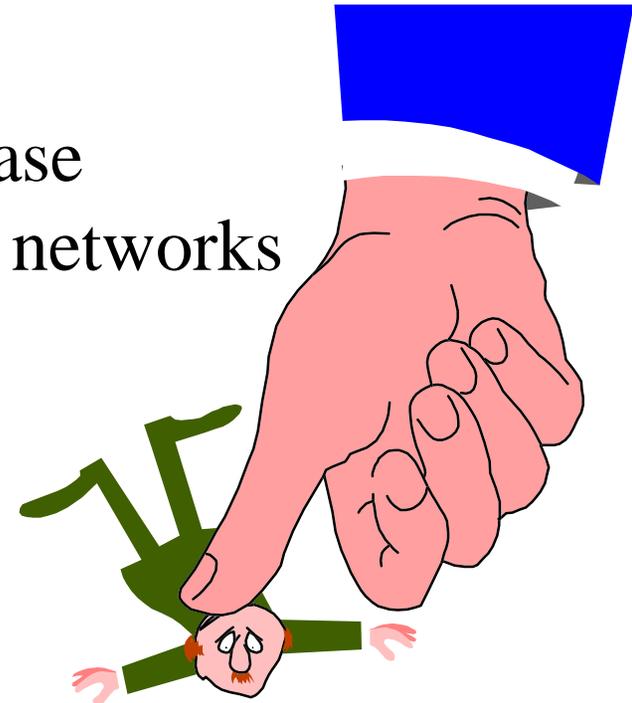
**Internetwork Y2K
Interoperability Testing**

Service Provider Y2K Testing

**Vendor Y2K Compliance Testing
(unit testing)**

Significance of Testing

- ◆ The IITC Committee's internetwork testing is the only program of its kind in the US
- ◆ The FCC encourages voluntary participation in the IITC to increase confidence in the our network of networks

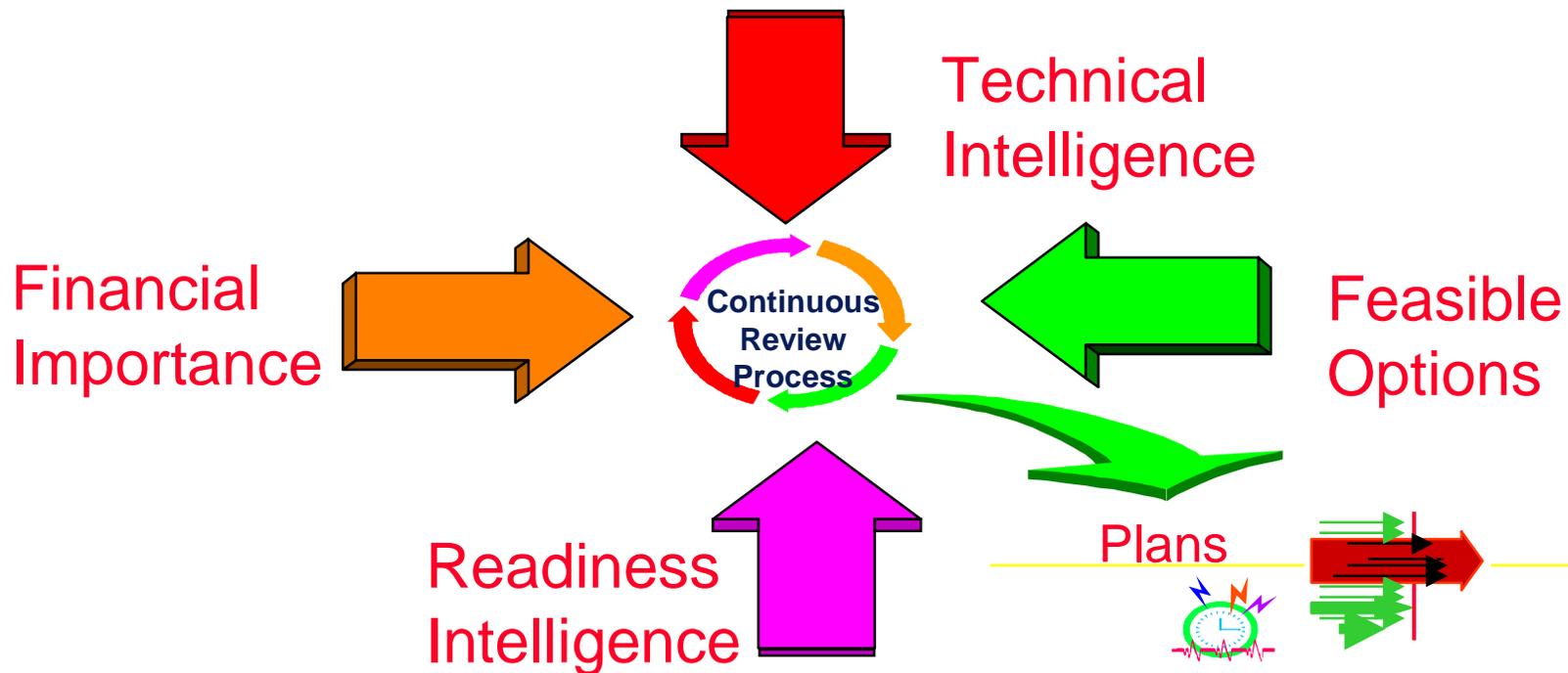


Significance of Testing (cont'd.)

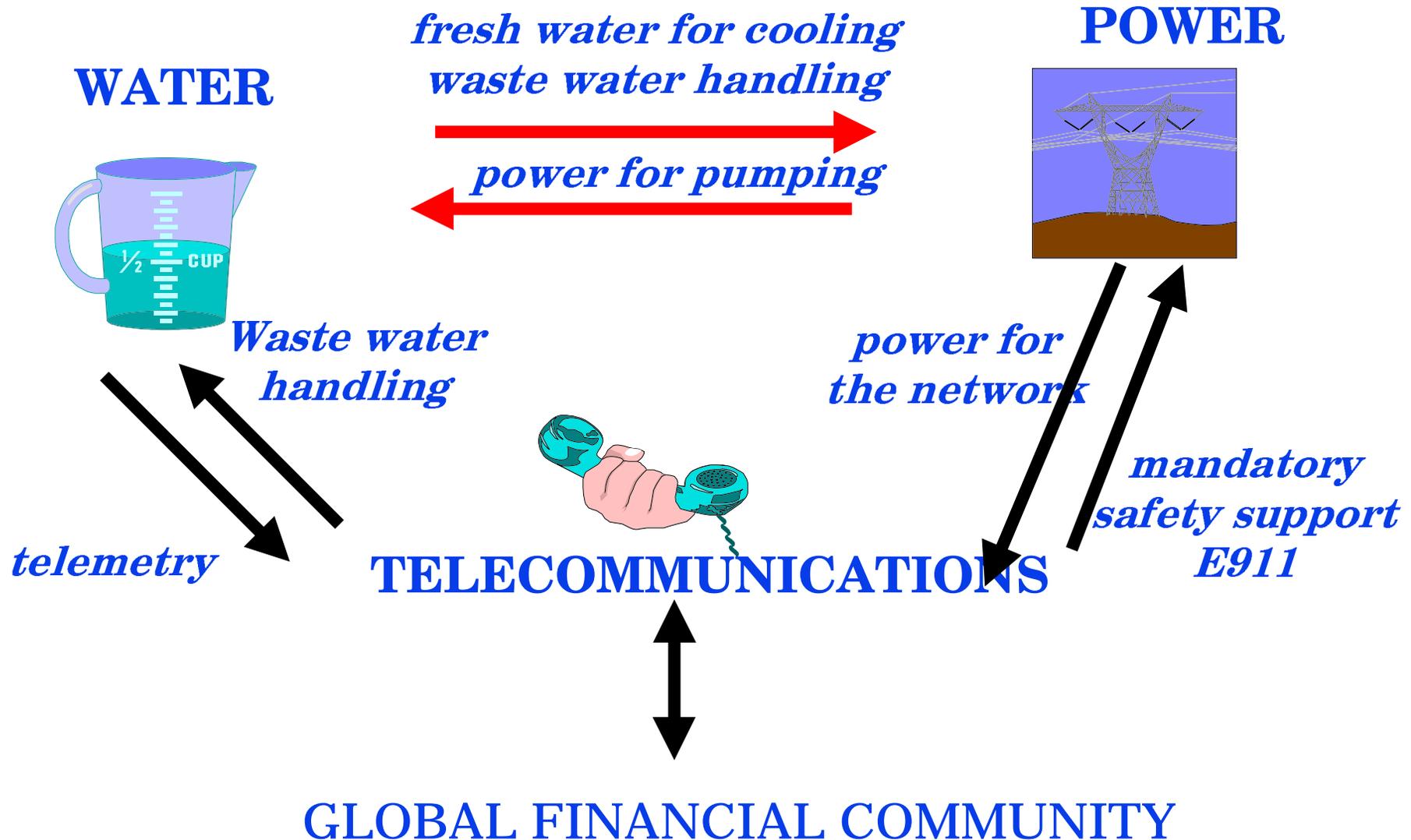
- ◆ The internetwork testing sponsored by ATIS is funded by industry contributions
- ◆ The cost per test campaign ranges from 500K\$ to 1M\$
 - does NOT include the costs to the test participants
 - » service provider test labs
 - » vendor equipment
- ◆ Costs to participate are much less of an issue than the costs NOT to participate
 - voluntary vs a government mandate

Risk Management

Risk Management Business Continuity Planning



Interdependencies



Significance of Testing (cont'd.)

- ◆ Network failures can effect the global economy
 - power industry, financial industry, health care
 - » just one US financial institution has 1.1T\$ in transactions daily!!
- ◆ Cooperative testing among industry participants costs less than having to enter into bilateral testing agreements on a per company basis

Approaches to Testing

- ◆ As a result of the IITC Committee and the continued rapid evolution of technology, our testing processes must be reassessed
- ◆ IITC Committee:
 - defines the scope of testing with input from the industry
 - » Local Number Portability, Y2K, Internet, etc.
 - solicits funding from the industry
 - obtains commitments for lab facilities
- ◆ Network Testing Committee
 - develops the test scripts, defines the specific testing methodology

Year 2000 Testing

Focus/Framework for Testing

Verification that there are no adverse affects on the interconnected networks upon entering the Millennium Year

Participants

Ameritech

AT&T

CTIA

GTE

Sprint

U S WEST

Awareness, Cooperation, Information Flow

Year 2000 Testing (Cont'd.)

Items to be Tested:

- ◆ Mass Calling Events on 12/31/99
- ◆ Potential congestion
- ◆ Call processing during and after date rollover
- ◆ Cross network services (LIDB, toll free)
- ◆ Rollover to Year 2000 in LNP environment
- ◆ Impact of time zones
- ◆ Varied network interconnections and network elements
- ◆ Key dates in an LNP environment (12/31/99, 2/29/00, and 12/31/00)

YEAR 2000 TESTS

ISUP Compatibility Test

LNP Porting of Numbers During Multiple A, B/D, C Link Failures

**MTP Restart/Modified Effects of Selected Levels of Network Elements
Initialization**

Call Completion under Persistent Congestion

SCP Overload in LNP-LRN Configuration

NIIF LNP Interconnection Tests

**MTP Circular Routing Detection/Prevention of MTP Circular Routing on
B/D Links Due to Routing Errors at Mated Pairs of STP**

YEAR 2000 Scenarios - GETS Script

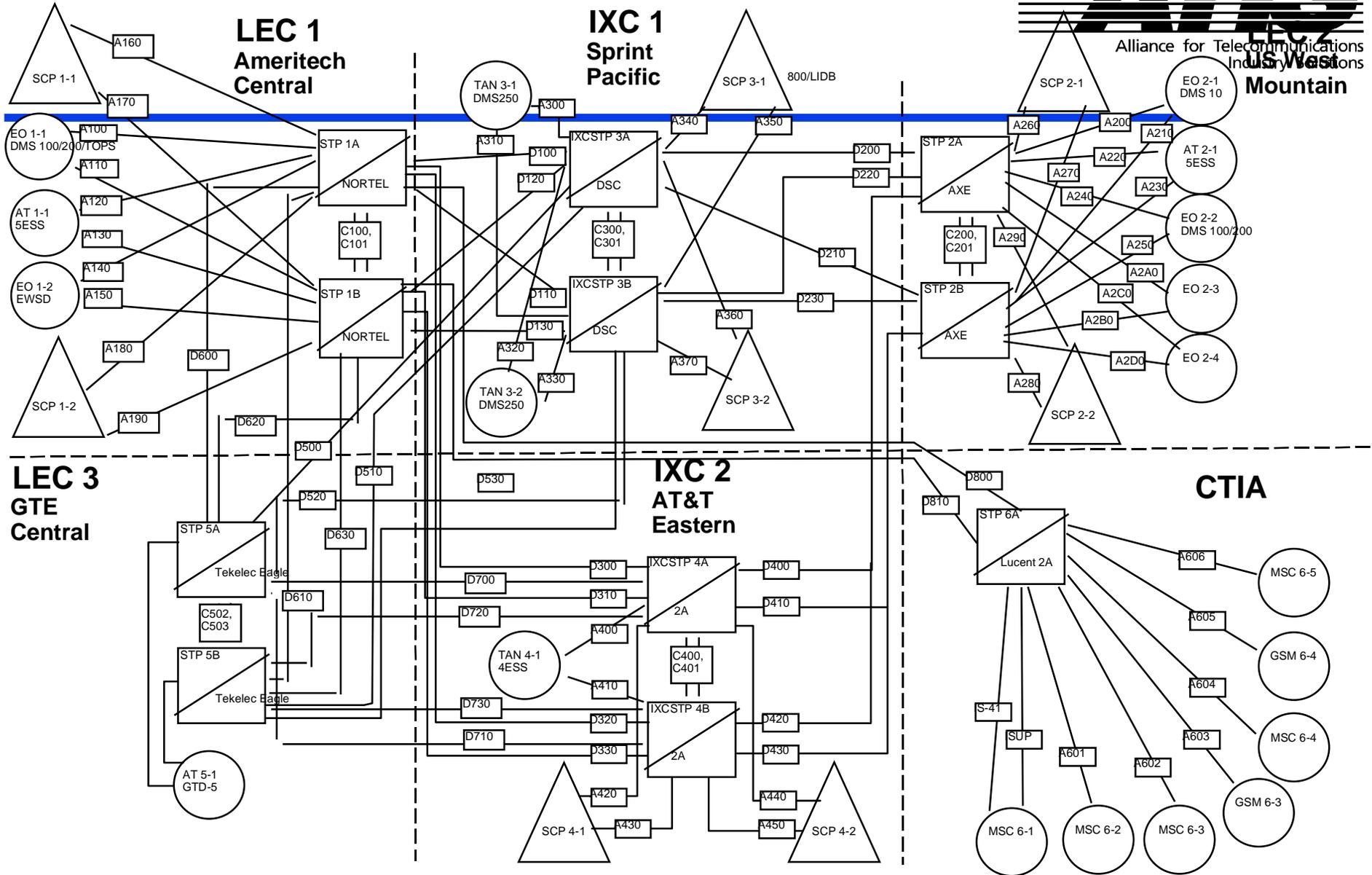
CTIA Wireles-to-Wireline

Year 2000 Testing

Timeline

- ◆ Pretest and set-up work to be completed in 4Q98
 - creation of test scripts
 - » many companies not participating in the test phase contribute to the test script development
 - procurement of T1 Facilities
 - preparing Network Elements and translations
 - ensuring interconnections are in place
- ◆ Test execution to run from 1/4/99 to 2/12/99
- ◆ Final Test Report to be available in 2Q99

Network Testing Committee Y2K Generic Signaling Configuration



LIDB/800

- non-LRN Capable

Potential Future Year 2000 Testing



Network Testing Committee is discussing:

- ▶ **A follow-on test phase to address any issues that may be identified**
 - ❖ **Interest has been raised by other participants that may want to be included in future testing**
- ▶ **International Gateway Testing**
 - ❖ **Discussions in place with a group investigating International Interoperability**
 - ❖ **4 objectives of testing has been defined**
 - * **technical resolution of issues**
 - * **customer care**
 - * **proving the telecommunications industry is meeting its responsibilities for the international Y2K concerns**

Technical Issues for Testing

- ◆ Importance of replicating the real world networks in an off-line environment
 - broad representation of all vendor components
 - » need to incorporate services or applications testing
- ◆ Test Criteria
 - Call completion under stress conditions
 - No outstanding anomalies at end of test phase
 - » work with vendor to fix
 - » retest

Other Testing Issues

- ◆ Taxonomy of internetwork telephone testing
 - evolving
 - rework the processes and the mindsets
 - » SS7, voice only--almost
 - » data (Frame Relay, ATM, SONET and applications)
 - this requires getting new players to the table
 - » Bay Networks, Cisco, 3Com etc.
 - also requires the resynching of participants' mindsets
 - » Bellheads vs Netheads

Other Testing Issues (cont'd.)

- ◆ Reduce cost
 - test processes and test execution
 - » share testing among the service providers
 - » not all service providers participate
- ◆ Working on liaisons with the ITU-T for international gateway and data testing
 - mix of equipment
 - mix of applications

Other Testing Issues (cont'd.)

- ❖ Share our testing processes and output widely
- ❖ Increase participation
 - CLECs, netheads
 - international players