



## **AIN/IN Trigger Usage in a Multi-Provider Environment**

### **8. POSITION PAPERS**

The following position papers have been submitted on behalf of the individual companies to advance the resolution of this issue. These documents are submissions to Issue #0006 by individual companies and do not represent the consensus of the NIIF. Position papers are not subject to upgrading or changing by the forum in any manner unless authorized by the company representative or designee.

#### **8.1 SBC Communications, Inc.**

##### **ISSUE #006: AIN/IN TRIGGER USAGE IN A MULTI-PROVIDER ENVIRONMENT**

The completed matrix that follows is provided in response to a formal request of the NIIF-NIAC as to SBC Communications, Inc., perspective on the attached matrix as it pertains to the four routing proposals identified by the committee. The matrix provided by SBC Communications, Inc., may be subject to change in the evolving telecommunications environment due to software and/or hardware developments and/or deployments. Additionally, enhancements to the current network may result in other routing proposals and architectures being developed that may meet and perform the functions identified.

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		Proposal:			
		1	2	3	4
No.	Criterion	TT/SP	10 dig GTT	Rtg SCP	TT8
1.	Conforms w/ Existing Standards	To support more than a limited number of service providers, existing standards would have to be changed. (See Items 8 and 15.)	Could potentially require changing standards if translation types are assigned on a per service basis. (See Items 8 and 15.)	Consistent with existing standards.	Uses TT8, which is an approved ANSI standard; however, a new translation type is needed if small-small networks are supported as service providers.
2.	No Adverse Impact on Ntwk Reliability or Performance	Cannot be assessed without considering current and projected traffic loads.	Cannot be assessed without considering current and projected traffic loads.	Cannot be assessed without considering current and projected traffic loads.	Cannot be assessed without considering current and projected traffic loads.
3.	No Adverse Impact on Ntwk Mgmt Controls	Assuming interconnecting network complies with SS7 protocol, link level controls may not be impacted. ACG controls are not fully supported.	Assuming interconnecting network complies with SS7 protocol, link level controls may not be impacted. ACG controls are not fully supported.	Assuming interconnecting network complies with SS7 protocol, link level controls may not be impacted. ACG controls are not fully supported; Mediation Point could provide a mechanism for managing ACG shortcomings.	Assuming interconnecting network complies with SS7 protocol, link level controls may not be impacted. ACG controls are not fully supported; MSSF could potentially provide a mechanism for managing ACG shortcomings.
4.	Implementable Using Existing Ntwk Elements	Limited number of translation types available.	Not universally supported at this time.	Would require new or upgraded network element. If using TT8, may require switch upgrades to support provisionable GTA..	Would require new network element (MSSF) and switch upgrades to support provisionable GTA..
5.	Mediation Not Precluded	Does not preclude network provider from implementing mediation capabilities.	Does not preclude network provider from implementing mediation capabilities.	Incorporates mediation point (i.e., routing SCP).	Incorporates mediation point (i.e., MSSF).

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AIN/IN Trigger Usage in a Multi-Provider Environment

		Proposal:			
		1	2	3	4
No.	Criterion	TT/SP	10 dig GTT	Rtg SCP	TT8
6.	No/Minimal Change to OSSs	Cannot be assessed until billing and provisioning arrangements have been defined.	Cannot be assessed until billing and provisioning arrangements have been defined.	Cannot be assessed until billing and provisioning arrangements have been defined; would require provisioning interface and potential interfaces to other OSSs, including billing.	Cannot be assessed until billing and provisioning arrangements have been defined; MSSF would require provisioning interface and potential interfaces to other OSSs, including billing.
7.	Time to Network Deployment (enter "A", "B" or "C") A. Now = < 1 year B. Short Term = 1 to 3 years C. Long Term = > 3 years	Cannot be assessed until other criteria (e.g., Item 6) resolved.	Cannot be assessed until other criteria (e.g., Item 6) resolved.	Cannot be assessed until other criteria (e.g., Item 6) resolved.	Cannot be assessed until other criteria (e.g., Item 6) resolved.
8.	Conserves Translation Types	No; would require changes to existing standards to support more than a limited number of service providers. (See Items 1 and 15)	May potentially deplete translation types if proposal assumes a separate translation type per AIN service.	From a Network Provider's viewpoint, proposal conserves translation types.	Proposal conserves translation types.
9.	No Adverse Impact on Number Portability	Unknown; in-depth analysis and possible testing needed to fully evaluate interactions and impacts.	Unknown; in-depth analysis and possible testing needed to fully evaluate interactions and impacts.	Unknown; in-depth analysis and possible testing needed to fully evaluate interactions and impacts.	Unknown; in-depth analysis and possible testing needed to fully evaluate interactions and impacts.
10.	Evolvable	Proposal does not preclude transition to future routing schemes.	Proposal does not preclude transition to future routing schemes.	Proposal does not preclude transition to future routing schemes.	Proposal does not preclude transition to future routing schemes.
11.	Architecturally Compatible	Potential impacts to Operations processes.	10 digit global title translation within STPs not universally supported; potential impacts to Operations processes.	Introduces a new network element/functionality.	Introduces a new network element/functionality; impacts existing provisioning of global title addresses (GTA).
12.	Scaleable	No; only a limited number of service providers/networks can be supported without changing existing SS7 standards.	STP operations are complicated, resulting in increased costs and potential errors.	Most easily scaled to accommodate large number of service providers/networks.	SSP (and potentially SCP) operations complicated, resulting in increased costs and potential errors.

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		Proposal: <u>1</u> <u>2</u> <u>3</u> <u>4</u>			
No.	Criterion	TT/SP	10 dig GTT	Rtg SCP	TT8
13.	No Adverse Feature Interactions	Cannot be assessed without extensive testing.	Cannot be assessed without extensive testing.	Adverse feature interactions could potentially be addressed by mediation point; cannot be fully assessed without extensive testing.	Adverse feature interactions could potentially be addressed by MSSF; cannot be fully assessed without extensive testing.
14.	Technically Feasible	While proposal, in theory, is technically feasible, field tests with significant traffic volumes and service providers are needed to validate.	While proposal, in theory, is technically feasible, field tests with significant traffic volumes and service providers are needed to validate.	While proposal, in theory, is technically feasible, field tests with significant traffic volumes and service providers are needed to validate.	While proposal, in theory, is technically feasible, field tests with significant traffic volumes and service providers are needed to validate.
15.	Supports Multiple Svc Provider Env'mt Enter "N" or "Y-A", "Y-A,B", etc.) A. Multiple AIN Providers., single line, diff. triggers B. Mult. AIN Prov., single line, same trigger C. Mult. AIN Prov., one/mult. lines, same trigger	Could only support "A" if several translation types are assigned to each service provider, which would further consume translation types. For "B" and "C", cannot evaluate TCAP parameters or invoke some type of service logic to determine routing destination.	Cannot distinguish trigger type without consuming translation types. For "B" and "C", cannot evaluate TCAP parameters or invoke some type of service logic to determine routing destination.	Provides a point (i.e, routing SCP) at which TCAP parameters can be examined and/or logic invoked to determine routing destination.	Depending on capabilities of MSSF, could provide a point at which TCAP parameters can be examined and/or logic invoked to determine routing destination.
16.	Supports Svc Deploymt on Multiple SCPs	Assuming network provider performs final GTT, could potentially require a translation type for each SCP deployed by a service provider, which would further consume translation types.	Assuming network provider performs final GTT, would allow a service provider to segment subscribers into different SCPs but does not support dynamic assignment (e.g., for load balancing purposes).	Mediation point could potentially support both dynamic load balancing and segmentation (of subscribers).	Depending on capabilities of MSSF, could potentially support both dynamic load balancing and segmentation (of subscribers).
17.	SCP/SSP Interconnection Not Precluded	Assuming compliance with appropriate standards at both elements, does not preclude SCP/SSP interconnection.	Assuming compliance with appropriate standards at both elements, does not preclude SCP/SSP interconnection.	SCP/SSP interconnection would be via mediation point.	SCP/SSP interconnection would be via MSSF.

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**AIN/IN Trigger Usage in a Multi-Provider Environment**

No.	Criterion	Proposal:			
		1 TT/SP	2 10 dig GTT	3 Rtg SCP	4 TT8
18.	No Adverse Impact on Wireless AIN	Cannot assess at this time without further information on the network arrangements envisioned; could potentially consume translation types.	Cannot assess at this time without further information on the network arrangements envisioned; could potentially consume translation types.	Cannot assess at this time without further information on the network arrangements envisioned.	Cannot assess at this time without further information on the network arrangements envisioned.
19.	Universally Applicable (ntwk architec/ntwk provider)	No; number of available translation types limited and requires interconnecting networks to be compliant with SS7/AIN standards.	Unknown; potential exists for consuming translation types and requires interconnecting networks to be compliant with SS7/AIN standards.	Enables interconnecting networks to use different signaling protocols.	Enables interconnecting networks to use different signaling protocols if interconnection is via MSSF.
20.	Utility for Service Providers	Unknown	Unknown	Unknown	Unknown
21.	Ability to Bill	Cannot be assessed until billing arrangements have been defined.	Cannot be assessed until billing arrangements have been defined.	Cannot be assessed until billing arrangements have been defined.	Cannot be assessed until billing arrangements have been defined.
22.	No Adverse Impact on Service Unbundling	Unknown at this time; testing required to determine impacts.	Unknown at this time; testing required to determine impacts.	Unknown at this time; testing required to determine impacts.	Unknown at this time; testing required to determine impacts.
23.	Competitively Neutral	No; number of available translation types limited.	No; number of available translation types limited (if proposal assumes separate translation type per service).	Assuming all AIN messages are routed through this element independent of provider, proposal provides competitive neutrality.	Assuming all AIN messages are routed through MSSF independent of provider, proposal provides competitive neutrality.
24.	Security/Privacy of Data Maintained	No mechanism for preventing unauthorized access to data and/or entities.	No mechanism for preventing unauthorized access to data and/or entities.	Mediation point could incorporate mechanism to identify and manage privacy and security of proprietary data.	MSSF could incorporate mechanism to identify and manage privacy and security of proprietary data.
25.	Fairness of Resource Usage	No mechanism for ensuring "equal" access to resources.	No mechanism for ensuring "equal" access to resources.	Could incorporate mechanism to facilitate "equal" access to resources.	MSSF could potentially incorporate mechanism to facilitate "equal" access to resources.
26.	Ntwk Monitor'g/Measurem't Capabilities Maintained	Necessary revisions to support monitoring/measuring would need to be assessed.	Necessary revisions to support monitoring/measuring would need to be assessed.	Necessary revisions to support monitoring/measuring would need to be assessed.	Necessary revisions to support monitoring/measuring would need to be assessed.

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27.	Triggers Identified	<i>Criteria needs clarification.</i>	<i>Criteria needs clarification.</i>	<i>Criteria needs clarification.</i>	<i>Criteria needs clarification.</i>
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AIN/IN Trigger Usage in a Multi-Provider Environment

		Proposal:			
		1	2	3	4
No.	NEW Criterion	TT/SP	10 dig GTT	Rtg SCP	TT8
28.	Transit Network ( <i>Intermediate signaling network is used for interconnecting SSP provider and SCP provider</i> )	No support for transit networks.	Proposal will work with transit networks; assumes MTP-routed from network provider's STP through transit network to service provider's SCP.	Proposal will work with transit networks; assumes MTP-routed from network provider's STP through transit network to service provider's SCP.	Proposal will work with transit networks (which can also perform 6 digit intermediate GTT) assuming TT8 implemented across networks.
29.	Network Policies ( <i>Network providers have implemented translation types and SSNs independently from one another</i> )	No mechanism for resolving translation type and SSN duplications.	No mechanism for resolving translation type and SSN duplications.	Mediation point could include mechanism for mapping between translation types and SSNs.	Industry level assignment (and implementation) needed for TT8 values.
30.	Service Provider ID ( <i>Specific identification of provider offering service versus owner of SCP at which service resides, who may or may not be the service provider.</i> )	No explicit service provider ID included.	No explicit service provider ID included.	No explicit service provider ID included.	No explicit service provider ID included.

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8.2 GTE

**MATRIX PROVIDED BY GTE**

Proposal:		1 (MCI)	2 (AGCS)	3 (Bell South)	4(GTE)
No.	Criterion	TT/Service Provider	10 digit GTT	Routing SCP	TT=8 and MSSF
1.	Conforms with Existing Standards	No, not a recommended use of TT Types. Would use up TTs quickly. To increase field size, would need an ITU-T Standards agreements. (See items 4, 8, 12, 14, 23 and 25)	Would require changes to AIN service requirements. Some AIN services do not specify the 10 digit DN for the GTT function (only 6 digits are available).	Meets Existing Standards using TT=8. Need a TT=8 equivalent for use with code point blocks (very small networks).	Meets Existing Standards using TT=8. Need a TT=8 equivalent for use with code point blocks (very small networks).
2.	No Adverse Impact on Network Reliability or Performance	Minimal if any .	Minimal if any. 10 digit GTT required.	Minimal if any. SS7 traffic routed thru a mediation point that could be in an STP or SCP.	Minimal if any. SS7 traffic routed thru a mediation point that could be in an STP or SCP.
3.	No Adverse Impact on Network Management Controls	ACG Control will not work correctly.	ACG Control will not work correctly.	ACG Control will not work correctly. The mediation device could manage the ACG problem.	ACG Control will not work correctly. The mediation device could manage the ACG problem.
4.	Implementable Using Existing Network Elements	Insufficient number of TTs to meet all networks needs. (See items 1, 8, 12,14, 23 and 25.)	10 digit GTT not supported in all nodes.	TT=8 and mediation device software is not available.	TT=8 and mediation device software is not available.
5.	Mediation Not Precluded	A mediation device is not part of the solution.	A mediation device is not part of the solution.	Mediation device is part of the solution.	Mediation device is part of the solution.
6.	No/Minimal Change to OSSs	Billing and provisioning impacts need to be determined.	Billing and provisioning impacts need to be determined.	Billing, provisioning and mediation device impacts need to be determined.	Billing, provisioning and mediation device impacts need to be determined.

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**AIN/IN 1 trigger Usage in a Multi-Provider Environment**

7.	Time to Network Deployment (enter "A", "B" or "C") A. Now = < 1 year B. Short Term = 1 to 3 years C. Long Term = > 3 years	A (Limit) - C (Full)	A to B - -	- B to C	- B to C
8.	Conserves Translation Types	No, who would decide which service providers get to use the TTs currently available? (See items 1, 4, 12, 14, 23 and 25)	Conserves TTs.	Conserves TTs.	Conserves TTs.
9.	No Adverse Impact on Number Portability	Indeterminable	Indeterminable.	Indeterminable.	Indeterminable.
10.	Evolvable	No, when moving to another solution would require expense to remove from the network.	Yes.	Yes.	Yes.
11.	Architecturally Compatible	No, not a recommended use of TT Types.	10 digit GTT not supported in all nodes.	TT=8 and mediation device software is not available.	TT=8 and mediation device software is not available.
12.	Scaleable	No, limited TTs available. (See items 1, 4, 8, 14, 23 and 25.)	Yes.	Yes.	Yes.
13.	No Adverse Feature Interactions	Indeterminable	Indeterminable.	Indeterminable but the mediation device could help resolve feature interactions.	Indeterminable but the mediation device could help resolve feature interactions.
14.	Technically Feasible	No, limited TTs available. (See items 1, 4, 8, 12, 23 and 25.)	Yes, but 10 digit GTT translation required for all AIN calls.	Yes.	Yes.

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**AIN/IN Trigger Usage in a Multi-Provider Environment**

15.	Supports Multiple Service Provider Environment. Enter "N" or "Y-A", "Y-A, B", etc.)  A. Multiple AIN Providers., single line, different triggers  B. Multiple AIN Providers, single line, same trigger  C. Multiple AIN Providers, one/ multiple lines, same trigger	Yes  No  No	Yes  No  No	The mediation point could be used to provide the resolution of any routing problems for environment A, B, or C.	The mediation point could be used to provide the resolution of any routing problems for environment A, B, or C .
16.	Supports Service Deployment on Multiple SCPs	Yes	Yes	Yes	Yes
17.	SCP/SSP Interconnection Not Precluded	Yes	Yes	Interconnection would be via the mediation device.	Interconnection would be via the mediation device.
18.	No Adverse Impact on Wireless AIN	Indeterminable.	Indeterminable.	Indeterminable.	Indeterminable.
19.	Universally Applicable (network architecture/network provider)	No, limited TTs available.	Yes	Yes	Yes
20.	Utility for Service Providers	Indeterminable.	Indeterminable.	Indeterminable.	Indeterminable.
21.	Ability to Bill	Software changes could be required in the switch and downstream billing systems.	Software changes could be required in the switch and downstream billing systems.	Software changes could be required in the switch and downstream billing systems.	Software changes could be required in the switch and downstream billing systems.
22.	No Adverse Impact on Service Unbundling	None seen at this time.	None seen at this time.	None seen at this time.	None seen at this time.
23.	Competitively Neutral	No. See items 1, 4, 8, 12, 14, and 25.	Yes, but 10 digit GTT translation required for all AIN calls.	Yes, LEC will need to route their own customers through the mediation device.	Yes, LEC will need to route their own customers through the mediation device.

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**AIN/IN Trigger Usage in a Multi-Provider Environment**

24.	Security/Privacy of Data Maintained	No	No	Mediation device will maintain data security/privacy.	Mediation device will maintain data security/privacy.
25.	Fairness of Resource Usage	No. See items 1, 4, 8, 12, 14, and 23.	Yes, but 10 digit GTT translation required for all AIN calls.	Mediation device will maintain fairness of resource usage.	Mediation device will maintain fairness of resource usage.
26.	Network Monitoring/Measurement Capabilities Maintained	Yes, but additional capabilities will be required.			
27.	Triggers Identified	Yes, buy will be determined by which triggers are deployed in the switch.	Yes, buy will be determined by which triggers are deployed in the switch.	Yes, buy will be determined by which triggers are deployed in the switch.	Yes, buy will be determined by which triggers are deployed in the switch.

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**Summary**

- 1) Translation Type (TT) per Service Provider: This proposal is not technically feasible. There are only a limited number of translation type available in the SS7 network. Providing one translation type per Service Provider is an inappropriate use of this limited resource that TIS1.3 has carefully conserved. To extend this field, which is standardized internationally, would be a major effort in standards, switch development and network deployment. Another concern is who will decide which service providers are allocated one of the existing number of TTs (first come, first served, ballot etc.).
- 2) This proposal does not provide a mediation function that is essential when using Bellcore AIN requirements, that were developed considering only one service provider. Mediation would limit the potential for abuse, both inadvertently or purposely, of service provider's customer data (i.e., overriding the customers PIC or the dialed 10XXXXXX to cause "Per-Call" slamming, changing the calling party's privacy indicator, altering data that is used to bill causing the call to be mis-billed or not billed, "errant service logic" that alters a customer's service, etc.). The addition of mediation to this proposal will not resolve the limited number of TT available that is the main concern of proposal 1).
- 3) Also of concern is the lack of a migration path from proposal 1) to the other proposals 2), 3) or 4). If proposal 1) is implemented in the network as a "get started" method, prior to the implementation of one of the other 3 proposals, the removal of proposal 1) will not be easy and could be expensive.
- 4) NOTE: One of the reasons that duplicate TTs were assigned for 14 Digit Calling Card application (TT = 2 or 253) and Call Management application (TT = 6 or 251) is that prior to standardization of TTs by Committee TIS1.3, these applications were already implemented in networks and the cost to the interexchange carriers to change their TTs to the new TT value standardized for national use was exorbitant.
- 5) All AIN Calls are routed using a 10 Digit Global Title Translation (GTT): This proposal requires changes to some Bellcore and TIS1 AIN service specifications to allow the full 10 digits of the directory number to be made available for the GTT. 10 digit GTT is both a real time and memory Hog, however, with the fast moving pace of technology this may not be a problem. As in 1) above, this proposal does not provide a mediation function that is essential when using Bellcore AIN requirements, that were developed considering only one service provider. However, mediation could be added to this proposal.
- 6) and 4) Routing Service Control Point (SCP) or Mediation Point and TT=8: Proposals 3 and 4 are essentially the same. They are both based on the TT=8 and the 10 digit GTT capability of a routing SCP or mediation point. The TT=8 concept needs to be expanded and a new TT specified for very small networks using SS7 code point blocks. Software to support the mediation point requirements identified by the Information Industry Liaison Committee (IILC) needs to be developed. Two major requirements identified by the IILC were (a) to ensure that the Mediation Point will not be a network failure or choke point and (b) to screen sufficiently into the SS7 messages to ensure that the message contents do not adversely impact either the customers or the service providers served by the Mediation Point.
- 7) A Mediation Point will resolve problems associated with proposals 1) and 2) such as ACG Control, billing and provisioning, maintaining the security and privacy of customer data, fairness of resource usage, and scalability. The Mediation Point will NOT resolve the limited number of TT available that is the main concern of proposal 1).

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8.3 Cincinnati Bell

CINCINNATI BELL'S MATRIX  
NIIF ISSUE #0006

	MCI	ACGS 10-digit GTT	BellSouth SCP Solution	GTE Solution
1.00	Yes	Yes	Yes	Yes
2.00	O.K..	O.K..	O.K.	O.K.
3.00	O.K..	O.K..	O.K..	O.K..
4.00	O.K..	O.K..	Requires a mediation point	Requires a mediation point
5.00	O.K..	O.K..	O.K..	O.K..
6.00	Billing Issues	Billing Issues	Billing Issues	Billing Issues
7.00	A If a network runs out of TTs - what then? To add more TTs to the SS7 code would require network wide element and test gear software upgrades.	B -	B - An AIN SCP package needs to be developed	B - Mediation package needs to be developed
8.00	NO Has anybody looked at Translation Type Mapping?		Yes	Yes
9.00	No significant time delay	Could impact the usage requirements of the platform	Additional time delay is not significant	Additional time delay is not significant
10.00	Yes	Yes	Yes	Yes

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**AIN/IN Trigger Usage in a Multi-Provider Environment**

11.0 0	Yes	Yes	Yes	Yes
12.0 0	Yes	Yes	Yes	Yes
13.0 0	Testing required to ensure duplicate TTs are not assigned in both networks.	Testing Required	Testing Required	Testing Required
14.0 0	Yes	Yes	Yes	Yes
15.0 0	Y-A Y-B Y-C	Y-A Y-B Y-C	Y-A Depends upon mediation point software Y-B Y-C	Y-A Depends upon mediation point software Y-B Y-C
16.0 0	O.K.	O.K..	O.K..	O.K..
17.0 0	O.K.	O.K..	O.K..	O.K..
18.0 0	Do the cellular providers have lots of unused TTs in their networks?	Ask CTIA	Ask CTIA	Ask CTIA
19.0 0	Testing Required	Testing Required	Testing Required	Testing Required
20.0 0	O.K.	O.K..	O.K..	O.K..
21.0 0	An individual company billing solution will be required	An individual company billing solution will be required	An individual company billing solution will be required	An individual company billing solution will be required
22.0 0	The impact these proposed services will have on unbundling is not known at this time.	The impact these proposed services will have on unbundling is not known at this time.	The impact these proposed services will have on unbundling is not known at this time.	The impact these proposed services will have on unbundling is not known at this time.

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23.0 0	There may be slight delays in SS7 message routing	There may be slight delays in SS7 message routing	There may be slight delays in SS7 message routing	There may be slight delays in SS7 message routing
24.0 0	O.K.	O.K.	O.K.	O.K.
25.0 0	O.K.	O.K.	O.K.	O.K.
26.0 0	O.K.	O.K.	O.K.	O.K.
27.0 0	Yes/Business Issue as to what triggers/TTs are available in a specific Network/SSP	Yes/Business Issue as to what triggers are available in a specific Network/SSP	Yes/Business Issue as to what triggers are available in a specific Network/SSP	Yes/Business Issue as to what triggers are available in a specific Network/SSP

YES - indicates the answer to a question requiring a YES or NO response!

OK- means I agree with the thought or suggestion and a YES or NO was not required!

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8.4 BellSouth

BellSouth Contribution to NIIF Issue #0006

Straw Evaluation/Screening Matrix

No.	Criterion	Proposal:			
		1 TT/SP	2 10 dig GIT	3 Rtg SCP	4 TT8
1.	Conforms with Existing Standards	Y	Y	Y	Y
2.	No Adverse Impact on Ntwk Reliability or Performance	Y	Y	N	N
3.	No Adverse Impact on Ntwk Management Controls	Y	Y	N	N
4.	Implementable Using Existing Ntwk Elements	Y	N	N	N
5.	Mediation Not Precluded	Y	Y	Y	Y
6.	No/Minimal Change to OSSs	Y	N	N	N
7.	Time to Network Deployment (enter "A", "B", or "C") A. Now = < 1 year B. Short Term = 1 to 3 years C. Long Term = > 3 years	A	B	C	C
8.	Conserves Translation Types	N	Y	Y	Y
9.	No Adverse Impact on Number Portability	Y	Y	Y	Y
10.	Evolvable	Y	Y	Y	Y
11.	Architecturally Compatible	Y	Y	N	N
12.	Scaleable	N	Y	Y	Y
13.	No Adverse Feature Interactions	Y	Y	Y	Y
14.	Technically Feasible	Y	Y	Y	Y
15.	Supports Multiple Service Provider Environment (enter "N", "Y-A", "Y-A,B", etc) A. Multiple AIN Providers, single line, different triggers B. Multiple AIN Providers, single line, same trigger C. Multiple AIN Providers, one/mult lines, same trigger	Y-A N-B,C	Y-A N-B,C	Y-A N-B,C	Y-A N-B,C
16.	Supports Service Deployment on Multiple SCPs	Y	Y	Y	Y
17.	SCP/SSP Interconnection Not Precluded	Y	Y	Y	Y
18.	No Adverse Impact on Wireless AIN	Y	Y	Y	Y

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**AIN/IN Trigger Usage in a Multi-Provider Environment**

19.	Universally Applicable (ntwk architecture/ntwk provider)	Y	Y	Y	Y
20.	Utility for Service Providers	Y	Y	Y	Y
21.	Ability to Bill	Y	Y	Y	Y
22.	No Adverse Impact on Service Unbundling	Y	Y	Y	Y
23.	Competitively Neutral	Y	Y	Y	Y
24.	Security/Privacy of Data Maintained	Y	Y	Y	Y
25.	Fairness of Resource Usage	N	N	N	N
26.	Ntwk Monitoring/Measurement Capabilities Maintained	Y	Y	Y	Y
27.	Triggers Identified	N	N	N	N

**BellSouth Contribution to NIIF Issue #0006 Straw Evaluation/Screening Matrix**

2. Proposals #3 and #4 - more traffic, additional failure point, call delay
3. Proposals #3 and #4 - call gapping would have to be done at mediation point; cannot call gap at STP
4. Proposals #2, #3, and #4 - do not currently have; cost issue
5. Proposals #1 and #2 - can be mediated at STP
6. Proposals #2, #3, and #4 - OSS provisioning required with mediation
11. Proposals #3 and #4 - new mediation point; different traffic patterns
12. Proposal #1 - translation type exhaust
15. "same trigger" poses a problem in terms of which service takes precedence  
Proposals #3 and #4 could be "yes" depending on feature interaction functionality
18. need more information
25. depends on congestion point - could be problem if congestion is at mediation point
27. proposals do not talk about specific triggers

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8.5 MCI  
MCI Contribution to NIIF Issue #0006

No.	Criterion	Proposal:			
		1 TT/SP	2 10 dig GTT	3 Rtg SCP	4 TT8
1.	Conforms w/ Existing Standards	5	5	5	5
2.	No Adverse Impact on Ntwk Reliability or Performance	5	5	2	2
3.	No Adverse Impact on Ntwk Mgmt Controls	5	3	3	3
4.	Implementable Using Existing Ntwk Elements	5	5	3	4
5.	Mediation Not Precluded	5	5	5	5
6.	No/Minimal Change to OSSs	5	5	3	3
7.	Time to Network Deployment (enter "A", "B" or "C") A. Now = < 1 year B. Short Term = 1 to 3 years C. Long Term = > 3 years	A	B	C	C
8.	Conserves Translation Types	3	5	5	5
9.	No Adverse Impact on Number Portability	5	5	5	5
10.	Evolvable	5	5	5	5
11.	Architecturally Compatible	5	5	3	4
12.	Scaleable	4	5	5	5
13.	No Adverse Feature Interactions	5	5	5	5
14.	Technically Feasible	5	5	5	5
15.	Supports Multiple Svc Provider Env'mt Enter "N" or "Y-A", "Y-A,B", etc.) A. Multiple AIN Providers., single line, diff. triggers B. Mult. AIN Prov., single line, same trigger C. Mult. AIN Prov., one/mult. Lines, same trigger	Y-A	Y-A	Y-A	Y-A

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**AIN/IN Trigger Usage in a Multi-Provider Environment**

16.	Supports Svc Deploymt on Multiple SCPs	5	5	3	3
17.	SCP/SSP Interconnection Not Precluded	5	5	5	5
18.	No Adverse Impact on Wireless AIN	5	5	4	4
19.	Universally Applicable (ntwk architec/ntwk provider)	5	4	4	4
20.	Utility for Service Providers	5	5	4	4
21.	Ability to Bill	5	4	4	4
22.	No Adverse Impact on Service Unbundling	5	5	4	4
23.	Competitively Neutral	5	5	3	4
24.	Security/Privacy of Data Maintained	5	5	4	4
25.	Fairness of Resource Usage	5	5	3	3
26.	Ntwk Monitor'g/Measurem't Capabilities Maintained	5	5	5	5
27.	Triggers Identified	5	5	5	5

**Scale used: 1 – 5 points for each Criterion. Where: 5 indicated Strong Agreement**

**1 indicates Disagreement**

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## Introduction

A completed "Straw Evaluation/Screening Matrix" is attached to this contribution. A numeric value was used in the evaluation in the range of 1 to 5, where 5 indicates strong agreement with the question asked in the relevant criteria. The rationale for each selected evaluation levels is shown in Section 2.

## 2.0 Rationale

1. Use of SS7 routing by TT is part of the normal SS7 standard process. TT per SP is only an assignment Procedure by TIS1 and hence requires no changes to the protocol.
2. Proposal 1 does not increase network traffic beyond existing SS7 routing. The addition of a Mediation Device in Proposal 3 and possibly in 4 will increase congestion thresholds and increase post dial delay, thus affecting performance. Only a finite number of queries can be processed by the Mediation Point, and this number is determined by the capacity of the 32 link set connecting the MP to its associated STP pair. Assuming a query length of 120 octets, the capacity of the MP's combined link set is 747 queries per second at 40% load (commonly accepted engineering practice). This figure is, in the MP application, halved to 373, since each query and each query's associated response shares the combined link set's bandwidth. Many MPs will need to be deployed to handle all the ILEC and ASP traffic.  
In addition, Mediation Points introduce another point of failure without adding value to AIN/IN products and services.
3. No Network Management impact for Proposals 1 and 2. Other proposals having Mediation devices are likely to experience Network Management impact, such as ACG, etc. 10-digit ACG could be a problem for the switch.
4. No new Network Elements needed for Proposal 1. Proposals 3 and 4 require a new Element - The Mediation network element.
5. Proposal 1 does not propose Mediation, but mediation is not precluded.
6. No change to OSS is anticipated with Proposal 1. Billing interfaces is expected to be more complex when Mediation nodes exist in the network. There are no known OSS interfaces to MPs and this poses a problem for the deployment of services with such a node in the network. Also, service creation and service order capabilities are needed to create/administer/update with customer specific information in the MP.
7. Self Explanatory
8. The Translation Type field can be expanded when and if the 256 Service Providers (SPs) request and Are granted TT. Proposals 3 and 4 require the assignment of TTs by each SP for AIN services, using the 62 network-specific TTs available to Service Providers. This has a potential for exhaust.
9. All Proposals have synergy with LNP 10 digit Translation. Proposals 3 and 4 did not say whether they would route LNP queries through the MP.
10. Proposal 1 is evolvable to other routing schemes if/when there is an exhaust in the TTs. See comment under 12.
11. Proposals with Mediation network elements may not be architecturally compatible with current practices.
12. The number of bits allocated to the SS7 Translation Type can be expanded to accommodate multiple of the present 256 TTs available. The present 8 bits assigned to this field was made in the 1980's before unbundling and AIN were issues.
13. Proposals with Mediation may have adverse Feature Interactions. The issue of FIM needs to be studied.
14. All proposals are technically feasible. Some proposals are easier and more economical to implement.

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## **AIN/IN Trigger Usage in a Multi-Provider Environment**

15. Implementation of options B and C is too complex and require multiple database dips, as well as database management and provisioning.
16. The MP does not have operational interfaces defined for service delivery to other SCPs.
17. SCP/SSP interconnection not precluded
18. Proposal 1 is consistent with IS-41 protocol. Impact on 3<sup>rd</sup> Generation Mobile is not known. Proposals 3 and 4 having mediation elements in the architecture may have an adverse protocol impact on existing wireless IN protocols, thus T1P1/CTIA need to be consulted
19. Proposal 4 does not support SPs small to small network interfaces. Use of 10-digit GTT is not universally available at this time.
20. Proposal 3 may pose a hindrance to small SPs that have no SS7 infrastructure. The NP must provision the SP's TTs in its STP/SCP
21. Ability to bill in all proposals. Inter-Network charges need to be studied. Also, the OBF should resolve billing questions.
22. Proposals 1 and 2 do not affect the service or application layer of the SS7 protocol, they do not negatively impact service unbundling. On the other hand, neither Proposals 3 or 4 have defined the operational processes of their MP implementations, so it is impossible to tell what effect MPs would have on service unbundling.
23. The inclusion of Mediation devices may advantage the network that requires mediation elements in its network. Mediation or similar screening mechanisms must be competitively neutral.
24. Mediation devices in one network may compromise proprietary data pertaining to another network. Proposals 3 and 4 allow access to privacy (seeing data) and also security (modifying data)  
Third party mediation may need to be employed to safeguard customer data.
25. MPs monopolize the resources of the network. The functionality of the MP is not specified nor understood at this time from the BellSouth or the GTE descriptions. Can other Network Providers share in the operation of the MP?
26. Present SS7 network monitoring mechanisms could be used in proposals 1 and 2. For proposals 3 and 4 it is not clear what the impact on monitoring/measurement capabilities. MCI would expect open interface access to MP monitoring and management systems, as provided in the Telecommunications Act of 1996.
27. All triggers identified within the scope of NIIF Issue 0006 should be applicable to these routing proposals. A list of AIN/IN Triggers have already been identified by the IILC Issue 049 task group.

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8.6 Ameritech

Straw Evaluation/Screening Matrix

NIIF - NIA #006

SOURCE: AMERITECH

No.	Criterion	Proposal:			
		1 TT/SP	2 10 dig GTT	3 Rtg SCP	4 TT8
1.	Conforms w/ Existing Standards	Y(1)	Y(1)	Y(1)	Y(1)
2.	No Adverse Impact on Ntwk Reliability or Performance	Y	Y	N(26)	N(37)
3.	No Adverse Impact on Ntwk Mgmt Controls	Y	N(14)	N(27)	N(37)
4.	Implementable Using Existing Ntwk Elements	N(2)	N(15)	N(28)	N(38)
5.	Mediation Not Precluded	Y	Y	Y	Y
6.	No/Minimal Change to OSSs	N	N(16)	N(29)	N
7.	Time to Network Deployment (enter "A", "B" or "C") A. Now = < 1 year B. Short Term = 1 to 3 years C. Long Term = > 3 years	B(3)	B to C	B to C	B to C
8.	Conserves Translation Types	N	?(17)	Y	Y
9.	No Adverse Impact on Number Portability	Y	N	Y	Y
10.	Evolvable	N	Y(18)	Y(18)	Y
11.	Architecturally Compatible	Y	Y	N(30)	Y
12.	Scaleable	N(4)	?(19)	Y	Y
13.	No Adverse Feature Interactions	N(5)	Y	?(31)	Y
14.	Technically Feasible	Y	Y	Y	Y

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**AIN/IN Trigger Usage in a Multi-Provider Environment**

15.	Supports Multiple Svc Provider Env'mt Enter "N" or "Y-A", "Y-A,B", etc.) A. Multiple AIN Providers., single line, diff. triggers B. Mult. AIN Prov., single line, same trigger C. Mult. AIN Prov., one/mult. lines, same trigger	A-Y(6) B-N C-N	A-N(20) B-N C-N	A-N(32) B-N(32) C-N(32)	A-Y B-N C-N
16.	Supports Svc Deploymt on Multiple SCPs	Y	Y	Y	Y
17.	SCP/SSP Interconnection Not Precluded	Y(7)	Y(7)	Y	Y(7)
18.	No Adverse Impact on Wireless AIN	?	?	?	?
19.	Universally Applicable (ntwk architec/ntwk provider)	N(8)	Y(21)	Y	Y
20.	Utility for Service Providers	N(9)	N(22)	N(33)	N
21.	Ability to Bill	Y(10)	Y(10)	Y(10)	Y(10)
22.	No Adverse Impact on Service Unbundling	Y(11)	N(23)	Y(11)	Y(11)
23.	Competitively Neutral	N(12)	Y	?(34)	Y
24.	Security/Privacy of Data Maintained	N(13)	Y(24)	Y(24)	N(13)
25.	Fairness of Resource Usage	N	N(25)	N(35)	Y(39)
26.	Ntwk Monitor'g/Measurem't Capabilities Maintained	Y	Y	N(36)	N
27.	Triggers Identified	N	N	N	N(40)

- (1) Can do within existing protocol fields but may require non-traditional populating of protocol fields
- (2) The SSPs of certain switch type used in Ameritech region would need to be modified to accommodate more Translations Types.
- (3) Certain switch type used in Ameritech region would need to be modified so can have more than one provider per trigger type
- (4) If Translations Types exhausted not expandable without major network change
- (5) Certain switch type used in Ameritech region is limited to one provider per trigger type (e.g., only one provider can use the 3,6,10 trigger in the office, all services for end users that require use of the 3,6,10 trigger would have to be provided by the same provider)
- (6) Currently certain switch type used in Ameritech region must have same provider for each trigger type on all lines in the office
- (7) Interconnection through an STP
- (8) Translations Types are not handled the same way in all networks (assigned differently)
- (9) Administration of Translations Types could be problematic
- (10) Except for Unbundled Local Switching (ULS) customers
- (11) Assumes Network Element unbundling per the 1996 Telecommunications Act
- (12) Limited by switch type, then to 256 total

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- (13) Dial tone provider knows who is providing AIN services to end user
- (14) Would have to go from 6 digit Automatic Call Gapping (ACG) to 10 digit. A switch can handle 256 ACG instructions so it can perform ACG on a NPA-NXX basis but ACG on a 10 digit basis would exhaust the switch's capabilities.
- (15) Would need a new table with different information, mapping the end user's phone number to an AIN provider
- (16) LNP provisioning-like Operational Support System would have to be built
- (17) If the end user has one total AIN provider-Yes, if the end user has multiple AIN providers-No
- (18) Evolvable to TT8 but could take time
- (19) Depends on how it is implemented. Multiple total AIN providers-Yes, Multiple providers for an end user-No
- (20) Enables multiple providers but not for the same end user
- (21) All providers would need to use the same Translation Type for AIN
- (22) Cost, ability to audit tables in the STP
- (23) ULS, unbundled access to AIN services affected.
- (24) Dial tone provider knows end user has AIN service but does not know who is providing the AIN service or what the AIN service is
- (25) If conserve Translations Types and only one total AIN provider permitted, others are precluded from providing AIN services
  
- (26) Could have a mismatch problem with re-query. Every query goes through the STP twice.
- (27) Contribution states that traffic management issues (e.g., capacity management, link congestion, link outage, guaranteed transaction rates) need to be resolved.
- (28) Need re-query function and switch mediation
- (29) Added mediation element (routing SCP)
- (30) Changes relationship of SSP and SCP by inserting routing SCP between them.
- (31) Depends on the routing SCP
- (32) Contribution assumes Global Title Address=Directory Number. Each line can only have one service provider
- (33) Additional routing SCP costs
- (34) Routing SCP is under the control of the dial tone provider
- (35) Only one service provider per line
- (36) Monitoring and Measurement capabilities assume direct connection of SSP to SCP, not through routing SCP (architecture change)
  
- (37) Since uses only one Translation Type for all AIN providers, if there is a Translation Type problem, all providers are affected
- (38) Provisioning trigger with provider information development required
- (39) Multiple providers allowed
- (40) Since not using Directory Number, monitoring and measurement systems must be modified

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8.7 Bell Atlantic

ISSUE #006:

AIN/IN TRIGGER USAGE IN A  
MULTI-PROVIDER ENVIRONMENT

The completed matrix that follows is provided in response to a formal request of the NIIF-NIAC for Bell Atlantic's perspective on the attached matrix -- as it pertains to the four routing proposals identified by the committee. The matrix provided by Bell Atlantic may be subject to change in the evolving telecommunications environment due to software and/or hardware developments and/or deployments. Additionally, enhancements to the current network may result in other routing proposals and architectures being developed that may meet and perform the functions identified.

The following matrix, provided by Bell Atlantic, may be subject to change in the evolving telecommunications environment due to software and/or hardware developments and/or deployments. Additionally, enhancements to the current network may result in other routing proposals and architectures being developed that may meet and perform the functions identified.

		Proposal 1	Proposal 2	Proposal 3	Proposal 4
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## AIN/IN Trigger Usage in a Multi-Provider Environment

6.	No/Minimal Change to OSSs	Cannot be assessed until billing and provisioning arrangements have been defined. Would require software and/or generic enhancements.	Cannot be assessed until billing and provisioning arrangements have been defined. Would require software and/or generic enhancements.	Cannot be assessed until billing and provisioning arrangements have been defined. Would require software and/or generic enhancements.	Cannot be assessed until billing and provisioning arrangements have been defined. Would require software and/or generic enhancements.
7.	Time to Network Deployment (enter "A", "B" or "C") A. Now = < 1 year B. Short Term = 1 to 3 years C. Long Term = > 3 years	Cannot be assessed at this time. Ordering, Provisioning and billing systems will need consideration as well.	Cannot be assessed at this time.	Cannot be assessed at this time.	Cannot be assessed at this time.
8.	Conserves Translation Types	No. Exceeds existing domestic and international standards.	No, if multiple service providers per subscriber line.	Conserves translation types.	Conserves translation types. Requires no additions or changes to existing standards.
9.	No Adverse Impact on Number Portability	Input not clearly understood. Additional research, analysis, and testing required.	Input not clearly understood. Additional research, analysis, and testing required.	Input not clearly understood. Additional research, analysis, and testing required.	Input not clearly understood. Additional research, analysis, and testing required.
10.	Evolvable	Proposal does not preclude transition to future routing schemes.	Proposal does not preclude transition to future routing schemes, but transition would involve removing large quantities of Global Title entries.	Proposal does not preclude transition to future routing schemes.	Proposal does not preclude transition to future routing schemes.
11.	Architecturally Compatible	Potential impacts to OSSs.	Potential impacts to OSSs.	Adds new network functionality and enhances security.	Adds new network functionality and greatly enhances security.
12.	Scaleable	No; only a limited number of service providers/networks can be supported without changing existing SS7 standards.	Yes	Yes	Yes

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Proposal: 1 2 3 4

No.	Criterion	TT/SP	10 digit GTT	Routing SCP	Translation Type 8
13.	No Adverse Feature Interactions	Unknown	Unknown	Mediation functionality enhances potential feature interaction resolution.	Mediation functionality enhances potential feature interaction resolution.
14.	Technically Feasible	Yes, with enhancements to domestic and international standards and network elements.	Yes. May require STP replacements where 10Digit GTT can not be supported or where sufficient capacity to support the required quantity of 10 digit GTT entries).	Yes. Requires enhancements to existing network elements or deployment of new network elements.	Yes. Requires enhancements to existing network elements or deployment of new network elements
15.	Supports Multiple Svc Provider Env'mt Enter "N" or "Y-A", "Y-A,B", etc.) A. Multiple AIN Providers., single line, diff. triggers B. Mult. AIN Prov., single line, same trigger C. Mult. AIN Prov., one/mult. lines, same trigger	A - No, all triggers not supportable B - No, all triggers not supportable C - No, all triggers not supportable	A - No, all triggers not supportable B - No, all triggers not supportable C - No, all triggers not supportable	A - Yes, dependent upon trigger and service interaction manager B - Yes, dependent upon trigger and service interaction manager C - Yes, dependent upon trigger and service interaction manager	A - Yes, dependent upon trigger and service interaction manager B - No C - No
16.	Supports Svc Deploymt on Multiple SCPs	Yes	Yes	Yes	Yes
17.	SCP/SSP Interconnection Not Precluded	Assuming compliance with appropriate standards at both elements, does not preclude SCP/SSP interconnection.	Assuming compliance with appropriate standards at both elements, does not preclude SCP/SSP interconnection.	Arrangement provides virtual SCP/SSP interconnection. Mediation functionality enhances security by enabling isolation of each ASP and its subscribers from all other ASPs and their subscribers.	Arrangement provides virtual SCP/SSP interconnection. Mediation functionality enhances security by enabling isolation of each ASP and its subscribers from all other ASPs and their subscribers.

AIN/IN Trigger Usage in a Multi-Provider Environment

Proposal: 1 2 3 4

No.	Criterion	TT/SP	10 digit GTT	Routing SCP	Translation Type 8
18.	No Adverse Impact on Wireless AIN	Cannot assess at this time without further information on the network arrangements envisioned.	Cannot assess at this time without further information on the network arrangements envisioned.	Cannot assess at this time without further information on the network arrangements envisioned.	Cannot assess at this time without further information on the network arrangements envisioned.
19.	Universally Applicable (ntwk architec/ntwk provider)	No. Network providers assign TTs differently. May result in conflicts among network provider assignments.	Yes	Yes	Yes
20.	Utility for Service Providers	Unknown	Unknown	Unknown	Unknown
21.	Ability to Bill	Cannot be assessed until billing arrangements have been defined.	Cannot be assessed until billing arrangements have been defined.	Cannot be assessed until billing arrangements have been defined.	Cannot be assessed until billing arrangements have been defined.
22.	No Adverse Impact on Service Unbundling	Must be tested in relationship to services to be assessed.	Must be tested in relationship to services to be assessed.	Must be tested in relationship to services to be assessed.	Must be tested in relationship to services to be assessed.
23.	Competitively Neutral	No; number of available translation types limited.	No; number of available translation types limited (if proposal assumes separate translation type per service).	Yes, assuming all AIN messages are routed through this function.	Yes, assuming all AIN messages are routed through this function.
24.	Security/Privacy of Data Maintained	No assurity of data security or privacy.	No assurity of data security or privacy.	Yes. Security and privacy functions could be incorporated in mediation functionality.	Yes. Security and privacy functions could be incorporated in mediation functionality.
25.	Fairness of Resource Usage	No mechanism to manage or ensure "equity" or resource utilization.	No mechanism to manage or ensure "equity" or resource utilization.	Yes, resource allocation, authorization could be included in mediation functionality.	Yes, resource allocation, authorization could be included in mediation functionality
26.	Ntwk Monitor'g/Measurem't Capabilities Maintained	Network element modification necessary for monitoring and measurement.	Network element modification necessary for monitoring and measurement.	Network element modification necessary for monitoring and measurement.	Network element modification necessary for monitoring and measurement.

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**AIN/IN Trigger Usage in a Multi-Provider Environment**

27.	Triggers Identified	Not always. Relates to routing of SS7messages -- may impact vertical services and other SS7 traffic.	Not always. Relates to routing of SS7messages -- may impact vertical services and other SS7 traffic.	Not always. Relates to routing of SS7messages -- may impact vertical services and other SS7 traffic.	Not always. Relates to routing of SS7messages -- may impact vertical services and other SS7 traffic.
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**Issue 6 Document - 55**

3/23/98

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### 9. OPERATIONAL AND TECHNICAL ISSUES

Many Operational Support Systems (OSSs) currently deployed are based on basic telephone services. The deployment of AIN/IN is dramatically changing the way LECs do business, and will impact legacy OSSs that cannot fully support AIN/IN. Processes for ordering, provisioning, maintaining and billing of services may need to be re-engineered. Some legacy OSSs cannot be modified to operate in this new AIN/IN environment.

Changes in the telephone industry will require additional and different types of information to be available from OSSs. Formerly, the LEC was the facility provider and provided the service to the end user. Presently, multiple facility providers and multiple service providers can be combined to deliver service to the end user. In this multiple service provider context customer records will be more complicated and trouble reporting more convoluted.

The AIN/IN issues identified to date are:

#### A. PHYSICAL REQUESTS

- Assignment and Inventory

Accuracy of Operational Supports System (OSS) data

- Trouble Report Administration

Present industry guidelines regarding how trouble reports are handled among multiple service providers are limited. Existing industry guidelines for handling trouble reports may need to be revised to accommodate an expanded multi-provider environment. In addition, new industry guidelines may need to be developed to address other areas of trouble management in an expanded multi-provider environment.

- Maintenance and Testing

Existing industry guidelines for the responsibilities associated with maintenance, isolation, sectionalization, repair and testing may need to be revised. In addition, new industry guidelines may need to be developed to address these areas in an expanded multi-provider environment.

- Capacity Planning

Existing LEC forecasting methods may need to be revised in a multi-provider environment. Increased sharing of demand/forecast information may be required between service providers.

- Provisioning

In order to effect an AIN/IN service, provisioning of customer or service information may be necessary in network nodes and operational support systems belonging to multiple service providers. New industry guidelines may be required to address the coordination of AIN/IN service provisioning in a multi-provider environment.

- Service Ordering

Service order coordination will be more complex in a multi-provider environment. For example, service orders will need to be distributed among multiple providers for processing. OSS elements and interfaces, and intercompany procedures may also need to be developed. New service order

codes may also be required for unbundled network service components.

- Network Reliability & Survivability

Concerns arise from collocation of equipment without New Equipment Building Standard, Underwriters Labs, etc. compliance.

- Multiple Service Provider Access to OSSs

Service providers need to have the appropriate level of access to another service provider's OSSs. For example, access to another service provider's OSSs might be restricted to subscribed functionalities and information related to "owned" services. As a result of this need, guidelines for procedures should be developed.

**B. LOGICAL REQUESTS (Interconnection):**

- Trigger usage in a multi-provider environment.

Examples of trigger usage concerns in a multi-provider environment include the number of providers per trigger per line, the number of services per trigger per line, the number of query destinations per trigger per line and the number of triggers per call, by class of service.

- Trigger provisioning and subscription in a multi-provider environment.

Each provider needs to know prior to provisioning if a trigger is being used and how use of the trigger will interact with other services.

- Lack of deployment uniformity of AIN/IN features across networks in a multi-provider environment.

Examples could be networks deploying different AIN Release levels or having different features available. Networks could implement different vendor versions of an AIN Release or implement the same vendor's AIN Release differently.

- Compatibility in interconnected networks.

Different AIN/IN networks may not be fully compatible or may not have interconnection agreements.

- Trouble conditions in a multi-provider environment.

Guidelines for coordinating trouble reports and trouble referrals need to be developed for a multi-provider environment.

- Network capacity engineering in a multi-provider environment.

Total multi-provider usage could affect the services of each individual AIN provider. Processing capacity, memory capacity and throughput need to be engineered. Load and cost need to be associated with an AIN provider. (tentative text)

- Subscriber service ordering and provisioning in a multi-provider environment.

Guidelines need to be developed for such things as entry of trigger-associated data into a SCP or external database(s), customer record maintenance and coordination, responsibilities and processes

## **AIN/IN Trigger Usage in a Multi-Provider Environment**

for dispute resolution.

- Billing capabilities, procedures and systems accommodating a multi-provider environment would need to be developed.
- Default situations in a multi-provider environment need to be identified.
- Multiple Service Provider Access to OSSs

Service providers need to have the appropriate level of access to another service provider's OSSs. For example, access to another service provider's OSSs might be restricted to subscribed functionalities and information related to "owned" services. As a result of this need, guidelines for procedures should be developed.

### **C.. LOGICAL REQUESTS (Standards):**

- Identification and development of non-real-time interoperability interface standards appropriate for a multi-provider environment.
- Identification and development of appropriate real-time interoperability interface standards for service platforms and databases in a multi-provider environment.
- Identification and development or modification of call-associated interoperability standards appropriate for a multi-provider environment.
- Identification and development or modification of non-call-associated message sets appropriate for a multi-provider environment.

### **D. LOGICAL REQUESTS (Mediation):**

- Identification and definition of real-time and non-real-time functions of mediation appropriate for a multi-provider environment.

There is no appropriate universal definition of the term "mediation" as it applies to interconnecting providers and networks, nor need there be. Mediation may be variously defined by numerous parties in terms of specific functions selected to be included or excluded from any given mediation platform or process. The NIAC recommended that network and service providers enter into one-to-one negotiations to determine the various functions of mediation, if any, needed for their specific interconnection/access arrangement(s) and to identify, of those functions, any that may require development

- Control and Management of mediation function(s) appropriate for a multi-provider environment.

The interconnection, mediation and interaction of a multitude of parties needs to be carefully scrutinized for technical and operational significance. Parties pursuing finite definition, design, development and deployment of mediation devices should recognize the different provider segments might have different output requirements. For instance, 1) the network provider needs the data to bill the interconnected provider for use of the network facilities and functions; 2) the interconnected provider needs the data to bill use of his added value to his customer (reseller or end users); 3) resellers and other service providers need the data necessary to bill end users; and 4) all of these users and end users need access to data to substantiate the use for which they are billed by their respective providers. These multiple layers of need may require multiple levels of partitioned functionality.

- Application of mediation across multiple networks and providers

Any function has the potential to compromise the performance of service(s) and network(s), the rights of providers and consumers, and/or the integrity of data. Based on the potential for harm, the NIAC developed a list of possible criteria for evaluating the need for and placement of mediation functions.

- Management of interactions among features in a multi-provider environment, including service precedence rules.

There are complex interactions between AIN services as well as between AIN and switch-based services. Serial triggering increases this complexity. In today's environment:

- some interactions are managed via service negotiation (i.e., do not allow both services/features on the same line),
- some interactions are managed via careful creation of the service,
- some interactions are addressed in the database, and
- some interactions are not yet clear; they are discovered and managed as needed.

In order to predict and manage interactions in a multi-provider environment, an overall view of a given user's services/features is needed. The interaction manager in the future unbundled environment needs to be determined. However, some industry participants contend that the dial tone provider is in the best position to identify potential problems and should assume the role of interaction manager.

AIN/IN allows a service provider or network provider to offer services to end users in a flexible manner where such services can be easily customized. These services are in addition to switch based features that are resident within the switch software release. Current implementations exist where a single AIN/IN service or feature is offered to a line or Directory Number (DN). Interactions that occur between AIN services and these switch based features need to be managed.

In an AIN/IN multi-service provider environment, it is expected that multiple AIN/IN services will be offered to a single line or DN. Such scenarios can involve a single service provider offering multiple services as well as multiple service providers offering a variety of services, some of which may be identical or very similar. Therefore, it is critical that the management of AIN to AIN service / feature interactions occur.

The management of feature interactions involves three phases; Identification, Impact Determination and Interaction Resolution. During the identification phase, the effect of using an AIN trigger and corresponding messages is identified. In the next phase, Impact Determination, a determination is made as to whether or not the impact of the feature interaction is desirable, undesirable or that the interaction has no impact on the quality of service. That is, a determination is made as to whether or not it causes a conflict within the network to occur or possibly creates a confusing situation from the user's perspective. In the final stage, Interaction Resolution, a resolution mechanism needs to be implemented to manage the undesirable interactions. This resolution mechanism may include service precedence rules.

### E. NETWORK MANAGEMENT:

- **ACG - Automatic Call Gapping**

Current three or six digit ACG controls are not designed for a multi-provider environment. These ACG controls may need to be enhanced, and/or new network management mechanisms may need to be developed. In addition, processes and/or capabilities are needed to ensure one provider cannot apply or remove network management controls that would impair another provider's services. New capabilities may also be needed to record the source and nature of

## **AIN/IN Trigger Usage in a Multi-Provider Environment**

each network management control message.

- **Controls**  
Existing signaling network management and control capabilities may need to be revised to ensure fairness and ensure prompt recovery when multiple service providers depend upon common signaling network elements during overloads or other network outages.

### **F. SECURITY:**

#### **Access to Database (Provider and Customer Proprietary Information)**

When a database or platform is shared by multiple providers, a mechanism is necessary to ensure that each of them is limited to its own data.

Access to the contents of the database (service data, service logic, customer data) will need to be addressed. Unauthorized modification of database contents can adversely affect the operation of services. Even if a party does not modify the contents of the database, access by unauthorized parties could compromise proprietary information.

- **Access to Triggers Residing in Network Switching Elements**

Areas to be addressed include ensuring that providers have access only to their customer's trigger information residing in a given switch.

- **Mediation**

The security of any mediation processes, procedures, and functions need to be addressed. Providers will want to be assured that unauthorized parties cannot access or modify processes that would interfere with the operation of their services. Network providers will also want to identify and authenticate potential users prior to their logging on to a mediation function to perform administrative tasks, as well as identify and authenticate systems that exchange SS7 messages across network boundaries.

### **G.. WIRELESS IMPACTS**

The impact of interconnection, including feature interactions and mediation standards with wireless providers needs to be addressed.

### **10. LIAISONS**

T1S1 Letter (T1S1/97-087) dated April 28, 1997: Routing of TCAP Messages

### **11. CAVEATS**

The NIIF identified the following caveats in regard to AIN/IN trigger usage in a multi-provider environment:

- ESPs', Vendors', and LECs' individual business plans, technologies, and the service offerings are dynamic.
- ESPs' implementations may use various AIN/IN architectures

- Vendors' AIN/IN software/hardware vary
- LECs' AIN/IN architectures, features, functions and software releases will vary in a manner supporting their individual company business plans
- ESPs', Vendors', and LECs' operational and technical issues and concerns vary. Additionally, the operational processes used to support AIN/IN (e.g., the customer and network provisioning processes used to provide a feature to a customer) also vary.
- The survey materials<sup>2</sup> from the IILC included in this document are dated (1995 and 1996).

## 12. FINDINGS

Unbundling AIN/IN Triggers is a complex subject. This document focuses only on the question of routing SS7 signaling messages for AIN/IN trigger usage in a multi-provider environment between switches (SSPs) owned by Service Provider A and databases (SCPs) owned by Service Provider B. The broader issues associated with unbundling AIN/IN triggers, as identified in Section 10, Operational and Technical Issues, will have to be undertaken in other studies.

Section 6, Routing Alternatives, describes four possible alternatives to provide the routing functionality required to make available AIN/IN triggers for multi-provider provision of services. Each of the alternatives proposes new network capabilities needed to provide the enhanced addressing procedures. These procedures will allow subscribers connected to service provider A to obtain AIN/IN supported services from network databases (SCPs) owned by service provider B.

Descriptions of the routing alternatives considered in this document are presented in Section 6. Each has merits and drawbacks. The four routing alternatives are:

- TT/SP: (Translation Type per Service Provider )
- 10 Digit GTT: (10 Digit Global Title Translation without mediation)
- RTG SCP: (Routing Service Control Point with mediation)
- TT8: (10 digit GTT, SCP-Assisted Call Processing Using TT=8)

All of these alternatives propose additional routing functionality in the SS7 signaling network. It is unclear how effectively these alternatives can be when used to meet the broader concerns involved with inter-network messaging.

The first routing alternative (TT/SP) utilizes existing capabilities to route traffic between networks by assigning a unique TT to each service provider. The current SS7 protocol has the capability of using only 255 TTs for national and international use. These 255 TTs are broken down into those assigned for internetwork applications, network specific applications, and spare as described in ANSI T1.112.3. The TT field would need to be expanded to make this a suitable routing alternative. The expansion would require agreements in T1S1.3 and ITU-T. In the case of unique national TT assignments for each service provider, agreements in T1S1 would be required.

The second routing alternative (10 Digit GTT) requires development effort in the STPs to accommodate the

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<sup>2</sup> These surveys took in excess of one year to perform as part of IILC Issue #049 and it is likely that another survey would take a similar length of time

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newly defined 10-digit GTT. Since there are many STPs in the various networks concerned, widespread availability and deployment of this additional functionality will entail considerable time. Additional planning and administration to define in more detail the use of this approach would be required before widespread availability and deployment could take place.

The third routing alternative (RTG SCP) proposes a mediation point in a new signaling network element, the Routing SCP, and uses the existing TT #8 to identify the other network involved in the call. However, there are no industry technical definitions for this new network element, and therefore, a significant planning interval for the definition of requirements would be needed. Further, the impacts (e.g., call set-up delays) of introducing the additional signaling network element into the SS7 network are yet to be determined.

The fourth routing alternative (TT8) is a variation of the RTG SCP routing alternative, in that the mediation function may be resident at any network element. However, there are no industry technical definitions for this mediation functionality, and therefore, a significant planning interval for the definition of requirements would be needed. Further, the impacts (e.g., call set-up delays) of introducing the mediation functionality into the SS7 network are yet to be determined.

The matrices in Section 8, Position Papers, reflect input from NIIF participants and represent a variety of viewpoints about the four alternatives. These viewpoints were based on the examination of the four routing alternatives using the twenty-seven criteria in Section 7, Evaluation Criteria.

Technically, each of the four routing alternatives discussed is capable, albeit with caveats, of supporting the availability of AIN/IN triggers for multi-provider provision of services. Each of the alternatives proposes new network capabilities needed to provide the enhanced addressing procedures. It is recognized that the design, operation, and implementation decisions of service providers' networks tend to differ. Therefore, it was not the NIIF's intent to evaluate the merits of one routing alternative over another or to recommend a single routing alternative. Given the inherent industry diversity and the lack of a clearly superior technical routing alternative, the NIIF cannot realistically undertake an evaluation leading to a single specific recommendation at this time.

### **13. RECOMMENDED NEXT STEPS**

The NIIF recommends that:

- Industry testing, to the extent possible, of the four routing alternatives should be performed.
- Companies desiring AIN/IN interconnection should begin a dialogue with appropriate network operators to evaluate the feasibility of implementing such interconnection.
- The industry should initiate and work to resolve the issues identified in Section 10, Operational and Technical Issues to the appropriate standards bodies and industry forums.

### **14. REFERENCES**

Work within the telecommunications industry on AIN/IN trigger usage in a multi-provider environment has been in-depth, and has occurred over a number of years. The reader should refer to the following documents for additional information:

- In the Matter of Intelligent Networks, FCC Docket 91-346 (Released December 6, 1991) and resolved by Order, FCC Docket 91-346 (Released December 4, 1998).
- IILC Issue 026: Long Term Unbundling and Network Evolution (Closed April 15, 1995)
- IILC Issue 049: AIN/IN Trigger Usage in a Multi-Provider Environment (Begun June, 1995 and transferred to

the NIIF as Issue 0006: AIN/IN Trigger Usage in a Multi-Provider Environment on January 1, 1997.)

- IILC Issue 052: Definition and Criteria for Placement of Logical Interconnection Mediation Functions (Begun June, 1995 and transferred to the NIIF as Issue 0009: Definition and Criteria for Placement of Logical Interconnection Mediation Functions on January 1, 1997)
- FCC Docket 96-98, First Report and Order, FCC 96-325, Section V.J.4(c) (Released August 8, 1996).
- "Framework for Testing AIN Trigger Usage and AIN Interconnection Arrangements in a Multi-Service Provider Environment" (Version 1.1, January 28, 1998, INF-201-001) issued by the IN Forum.
- ANSI Signaling System No. 7 (SS7) Signaling Connection Control Part (SCCP) Document T1.112.3-1996.

### 15. GLOSSARY

- **MTP/SCCP Screening:** The process utilized within the STP to examine the network layer information within an SS7 message incoming from an externally interconnected SS7 network. This process detects attempts of unauthorized access to the network element (e.g., an SCP) or to a particular application on a network element and verifies the message origination against the physical connections (e.g., Company A should not be the message originator for a message incoming over the interface with Company B). The network layer information can be the origination/destination point code in the Message Transfer Part (MTP) or the point code and subsystem number information in the Calling Party Address and Called Party Address parameters of the Signaling Connection Control Part (SCCP). No evaluation of the Transaction Capability Applications Part (TCAP) message content is performed during the Gateway Screening Process.
- **Mediation:** Mediation is the generic term used to describe safeguards intended to allow multiple third-party access to an existing AIN. Mediation includes a set of real time and procedural functions and interconnections testing that facilitate secure, cost-effective, and network-efficient third party access to an existing AIN. The key functions to be managed and controlled by mediation include: privacy, security, routing, billing, screening, feature interactions, operational procedures, reliability, provisioning, performance monitoring, error handling, customer care, and network management.
- **Network Element:** Facilities or equipment used in the provision of a telecommunications service.
- **Service Control Point (SCP):** A network-based computer and associated database used to provide advanced services in intelligent telecommunications networks. SCPs contain service logic and associated data for services such as advanced 800, calling card, virtual private networks and personal telephone numbers. Architecturally, SCPs are part of the SS7 network. They also are a fundamental part of the AIN. SSP switches use SS7 transport capabilities to access the SCPs services.
- **Service Logic** A program that runs in an AIN node (such as an SCP) which usually directs call processing in as SSP, so as to provide a customized service.
- **Service Management System (SMS):** A computer system that supports the Operation, Administration, Maintenance and Provisioning (OAM&P) needs of AIN. The SMS is connected to SCPs and other network elements.
- **Service Switching Point (SSP):** A switching system, including its remotes, that identifies calls associated with Intelligent Network services and initiates dialogues with the SCPs in which the logic for the service resides.
- **Signal Transfer Point (STP):** A special-purpose packet switch used for forwarding signaling messages in an SS7 network. Network switches and SCPs connect directly to STPs for message routing. STPs forward messages using the destination point code contained in the SS7 message's MTP level 3 routing label. STPs will process the SCCP protocol when necessary to perform global title translations.

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Carriers typically interconnect their SS7 networks via Gateway STPs. These Gateway STPs will contain screening functions for network security. For reliability purposes STPs are always deployed in mated pairs.

- **Trigger or Trigger Detection Point (TDP):** Within the Basic Call Model, a point in the Call Processing (originating or terminating) that separates one point in the call from the next. At the Trigger Detection Point, the SSP can notify an SCP of the occurrence of an event and in some cases allow the SCP to influence subsequent call processing. Examples of these subscribed triggers are Off-Hook Immediate, Off-Hook Delayed, and Terminating Attempt. These triggers are assigned and provisioned on individual end-user's lines. It should be noted that triggers may not only apply to a single line (e.g., line-based), but may also apply to all lines on a switch (e.g., office-based). Triggers are encountered when calls originate from or terminate to these provisioned lines.