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THE INTERCONNECTION COMPANY



Telx Internet Exchange (TIE) Participant Portal



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TIE Locations

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Telx operates 4 IX sites in the US

- Atlanta, Georgia (South East)
- Dallas, TX (South)
- New York, NY (North East)
- Phoenix, Arizona (South West)

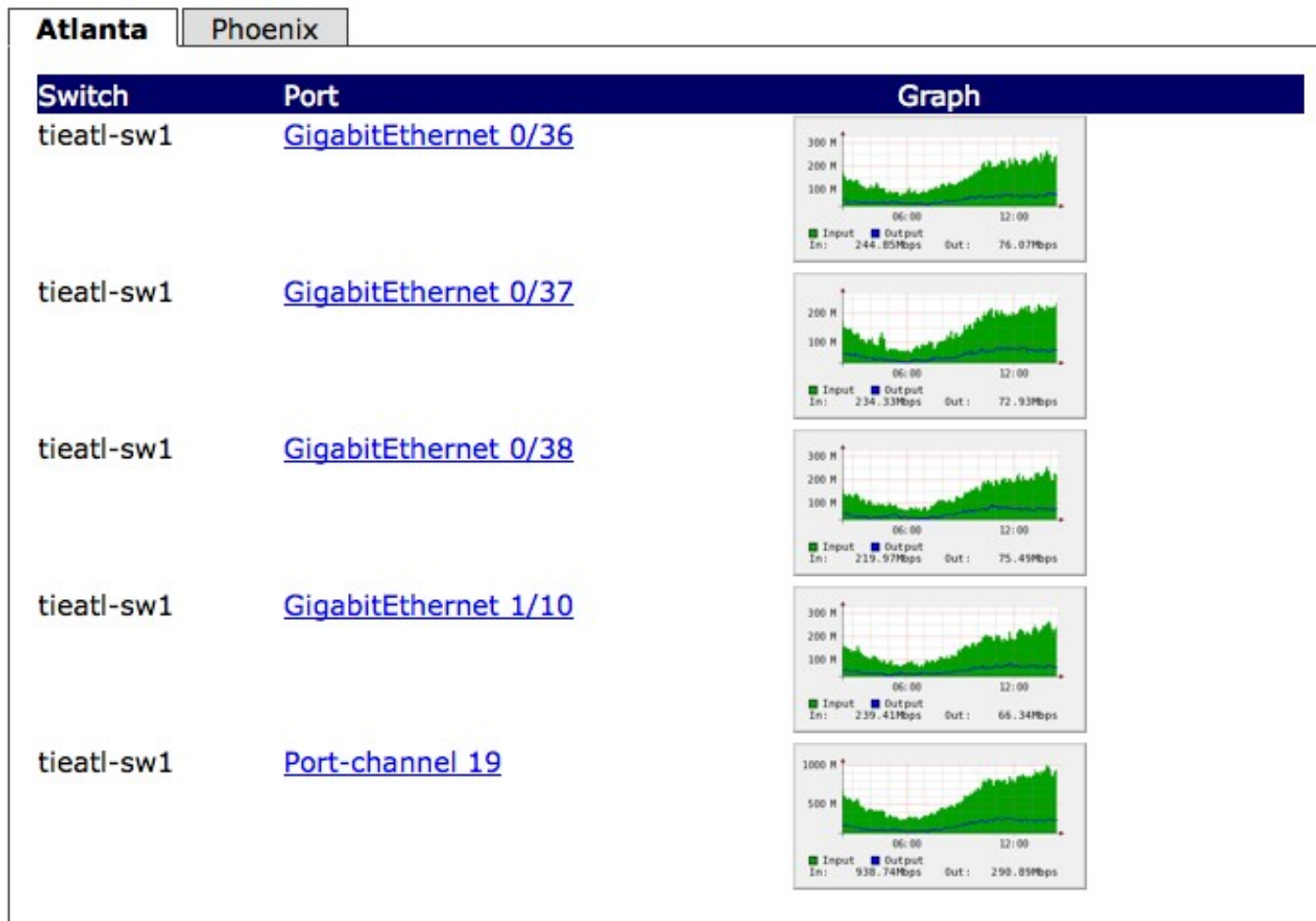
TIE Portal Needs

in order to create a list of desired functionality for a customer portal.
participants giving at least one specific request.

Most were possible and could be implemented without great cost. A few will take considerable resources to build.
ease of implementation, and total cost to implement. For the initial phase we chose to implement the following features...

- ◆ In 2009 Telx began surveying our TIE participants
- ◆ We received responses from 80% of the
- ◆ We had a few “impossible to implement” requests.
- ◆ We ordered the requests by number of requests,
 - Static MAC address controls
 - Port state control (up/down/bounce)
 - Peering matrix/manager
 - Participant bulk e-mail
 - Looking Glass
 - Usage and participant statistics
 - Alert and Outage History
 - Live Chat Room
 - Outage Notifications

Participants can see all ports they have in any TIE location.



When a participant logs into the portal, they are presented with an Alert notifications and any the recent history of participant outages.

TIE Alerts

From Apr 29, 2010 to Jun 01, 2010

TIE Atlanta: Akamai will preform an upgrade in May to go from a single 10GigE to 4x10GigE (40Gbps). They expect traffic to dramatically increase in June. Please review your port utilization and contact tie@telx.com if you need to upgrade your capacity.

Previous Week of TIE Customer Outages (exceeding 2 minutes)

From Mon Apr 26 11:17:24 2010 EDT to Mon Apr 26 11:19:42 2010 EDT (2 Minutes 18 Seconds)

Port Down: Digital Service Consultants AS10355 tieatl-sw1 GigabitEthernet 1/4

From Mon Apr 26 22:13:14 2010 EDT to Mon Apr 26 22:26:17 2010 EDT (13 Minutes 3 Seconds)

BGP Down: tieatl BroadbandONE (formerly WV Fiber) AS19151 198.32.132.12

From Mon Apr 26 22:15:28 2010 EDT to Mon Apr 26 22:29:10 2010 EDT (13 Minutes 42 Seconds)

BGP Down: tiephx BroadbandONE (formerly WV Fiber) AS19151 198.32.186.21

From Mon Apr 26 22:20:09 2010 EDT to Mon Apr 26 22:33:47 2010 EDT (13 Minutes 38 Seconds)

BGP Down: tienyc BroadbandONE (formerly WV Fiber) AS19151 206.126.115.18

Notifications

For whatever reason, some participants either don't monitor individual BGP sessions and/or IX ports, or don't trust their NOC to notify them. Every participant can sign up to receive e-mail notifications from us for any up/down events

| Switch | Port | Notification Options | | |
|------------|---|---|--|--|
| tienyc-sw2 | TenGigabitEthernet 0/28 | <input checked="" type="checkbox"/> Port Down | <input checked="" type="checkbox"/> BGP Down IPv4 <input checked="" type="checkbox"/> BGP Down IPv6 | Email: <input type="text" value="repstein@bboi.net"/> |
| tiephx-sw1 | TenGigabitEthernet 0/4 | <input checked="" type="checkbox"/> Port Down | <input checked="" type="checkbox"/> BGP Down IPv4 <input checked="" type="checkbox"/> BGP Down IPv6 | Email: <input type="text" value="repstein@bboi.net"/> |
| tieatl-sw1 | TenGigabitEthernet 4/0 | <input checked="" type="checkbox"/> Port Down | <input checked="" type="checkbox"/> BGP Down IPv4 <input checked="" type="checkbox"/> BGP Down IPv6 | Email: <input type="text" value="repstein@bboi.net"/> |

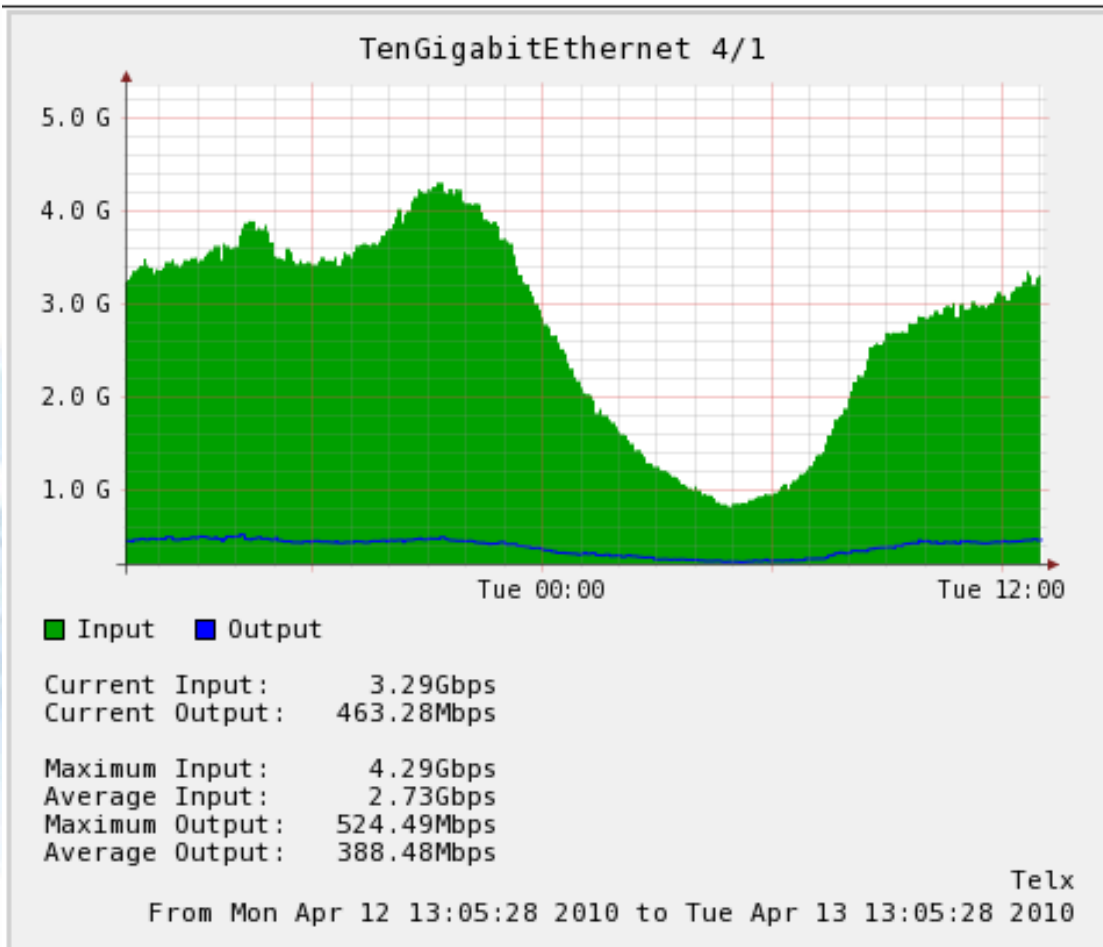
Interface Control

- Ability to see real-time port statistics pulled directly from the switch port.
- Ability to shutdown, bring up or bounce their port(s).
- All TIE fabrics maintain a static MAC address table per participant.

➤ Customers are only allowed one MAC address per port. Sending more than one MAC address to the same port will result in the port being shut down automatically.

| Interface Control for tieatl-sw1 tengigabitethernet4/1 | |
|--|---|
| Admin Up Admin Down Bounce | |
| Interface Statistics | |
| Interface Status: TenGigabitEthernet 4/1 is up, line protocol is up | |
| Input Statistics: | 576481127873 packets, 176557953504237 bytes 256724287106 64-byte pkts, 155360396728 over 64-byte pkts, 42081410780 over 127-byte pkts 19387086861 over 255-byte pkts, 22124153223 over 511-byte pkts, 80803784917 over 1023-byte pkts 0 Multicasts, 68588 Broadcasts 0 runts, 8258 giants, 0 throttles 0 CRC, 0 overrun, 8258 discarded |
| Output Statistics: | 1240983295224 packets, 1191803261069271 bytes, 0 underruns 183339418491 64-byte pkts, 152596081290 over 64-byte pkts, 72112745865 over 127-byte pkts 43936263520 over 255-byte pkts, 40708736692 over 511-byte pkts, 748290049368 over 1023-byte pkts 20002647 Multicasts, 24512880 Broadcasts, 1240938779697 Unicasts 0 throttles, 0 discarded, 0 collisions |
| Rate info: | Input 466.00 Mbits/sec, 184774 packets/sec, 4.95% of line-rate Output 3351.00 Mbits/sec, 441751 packets/sec, 34.21% of line-rate |
| Last State Change: 6w2d10h | |
| Known Mac Address | |
| 00:16:4d:96:06:9b (Known via Static mapping) Delete | |

Per Interface Statistics



Last 24 Hours

Last 30 Days

Last 365 Days

Peering Manager



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- We Extract participant details from our equipment, and cross reference it with public information stored in the PeeringDB. This allows participants to keep one authoritative record of the peering information.
- As of May 2010, 95% of our participants maintain a PeeringDB record. A customer can see all peers marked with common locations. You can send an e-mail to another participant, mark them as a current peer.

IPv4 IPv6 Save! Legend: Not a member of PeeringDB No contacts found No common location

| Network | Name | Send Message | Currently Peering In | | | Unqualified ? |
|---------|---------------------------------|------------------------------|-------------------------------------|-------------------------------------|--------------------------|-------------------------------------|
| | | | ATL | NYC | PHX | |
| 42 | Woodynet | | <input checked="" type="checkbox"/> | <input type="checkbox"/> | | <input type="checkbox"/> |
| 1784 | Global NAPS, GNAPS | Send Message | <input checked="" type="checkbox"/> | | | <input type="checkbox"/> |
| 1785 | Paetec Communications | Send Message | <input checked="" type="checkbox"/> | | | <input type="checkbox"/> |
| 2711 | Spirit Telecom | Send Message | <input checked="" type="checkbox"/> | | | <input type="checkbox"/> |
| 3043 | Internet Operating Services LLC | Send Message | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3479 | PeachNet | | <input checked="" type="checkbox"/> | | | <input type="checkbox"/> |
| 3491 | PCCW Global | Send Message | <input checked="" type="checkbox"/> | | | <input type="checkbox"/> |
| 3492 | InternetSouth | | <input type="checkbox"/> | | | <input checked="" type="checkbox"/> |
| 3512 | Emory University | Send Message | <input checked="" type="checkbox"/> | | | <input type="checkbox"/> |
| 3595 | Global Net Access, LLC | | <input checked="" type="checkbox"/> | | | <input type="checkbox"/> |
| 3737 | PenTeleData | Send Message | | <input type="checkbox"/> | | <input checked="" type="checkbox"/> |
| 3856 | Packet Clearing House | Send Message | <input checked="" type="checkbox"/> | <input type="checkbox"/> | | <input type="checkbox"/> |
| 4181 | TDS Telecom | Send Message | <input checked="" type="checkbox"/> | | | <input type="checkbox"/> |
| 4355 | EarthLink | Send Message | <input checked="" type="checkbox"/> | | | <input type="checkbox"/> |
| 4436 | nLayer Communications | Send Message | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | <input type="checkbox"/> |
| 4555 | MassBath Inc | Send Message | <input checked="" type="checkbox"/> | | | <input type="checkbox"/> |

“Hover” over any participant and see their peering information with details extracted near-real time from the router monitor.

| | | | |
|-------|------------------------------|--------------------------------|------------------------------|
| 12989 | Highwinds Network Group, Inc | | Send Message |
| 13680 | HGTN.net | Name: Highwinds | Send Message |
| 13768 | Peer1 Network | ASN: 12989 | Send Message |
| 14793 | API Digital | Peering Policy: Selective | Send Message |
| 15133 | EdgeCast Networks | Atlanta | Send Message |
| 15169 | Google Inc. | IPv4 Address: 198.32.132.39 | Send Message |
| 16586 | Clearwire | IPv4 Prefixes: 716 | Send Message |
| 19080 | Global Telecommunications | IPv6 Address: 2001:478:132::39 | Send Message |
| 19158 | US Carrier | IPv6 Prefixes: 44 | Send Message |
| 19181 | CWIE | Phoenix | Send Message |
| 19750 | Criteo Corp. | IPv4 Address: 198.32.186.10 | Send Message |
| 20081 | Net2Atlanta | IPv4 Prefixes: 716 | Send Message |
| 20040 | Akamai Technologies | IPv6 Address: 2001:478:186::10 | Send Message |
| | | IPv6 Prefixes: 44 | Send Message |

Peering Information



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Participants can verify the BGP announcements to our route monitor servers.

| My BGP | Atlanta | Dallas | New York | Phoenix | Errors |
|---------------|---------|---------------------|---------------------|---------|--------|
| IPv4 | | | | | |
| City | ASN | IP Address | Advertised Prefixes | | |
| Atlanta | 19151 | 198.32.132.12 | 2702 | | |
| New York | 19151 | 206.126.115.18 | 2702 | | |
| Phoenix | 19151 | 198.32.186.21 | 2702 | | |
| IPv6 | | | | | |
| City | ASN | IP Address | Advertised Prefixes | | |
| Atlanta | 19151 | 2001:478:132::12 | 21 | | |
| New York | 19151 | 2001:504:17:115::18 | 21 | | |
| Phoenix | 19151 | 2001:478:186::21 | 21 | | |

Peering Information



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See participants details and route announcements per

My BGP Atlanta Dallas New York Phoenix Errors

| Organization | ASN | IPv4 Address | IPv4 Prefixes | IPv6 Address | IPv6 Prefixes | Peering Policy |
|---|-------|---------------|---------------|------------------|---------------|----------------|
| Hurricane Electric | 6939 | 198.32.132.75 | 12637 | 2001:478:132::75 | 1473 | Open |
| OCCAID | 30071 | 198.32.132.40 | 0 | 2001:478:132::40 | 140 | Selective |
| Highwinds Network Group, Inc | 12989 | 198.32.132.39 | 714 | 2001:478:132::39 | 44 | Selective |
| Google Inc. | 15169 | 198.32.132.41 | 166 | 2001:478:132::41 | 30 | Selective |
| nLayer Communications | 4436 | 198.32.132.68 | 2468 | 2001:478:132::68 | 27 | Selective |
| BroadbandONE (formerly WV Fiber) | 19151 | 198.32.132.12 | 2701 | 2001:478:132::12 | 23 | Restrictive |
| Southern Crossroads (SoX) | 10490 | 198.32.132.11 | 103 | 2001:478:132::11 | 7 | Open |
| Internap | 22212 | 198.32.132.84 | 5123 | 2001:478:132::84 | 5 | Selective |
| Speakeasy | 23504 | 198.32.132.33 | 34 | 2001:478:132::33 | 1 | Selective |
| Education Networks of America, Inc. (ENA) | 11686 | 198.32.132.51 | 44 | 2001:478:132::51 | 1 | Selective |
| ISC | 33080 | 198.32.132.78 | 1 | 2001:478:132::78 | 1 | Unknown |
| DiracPath | 21030 | 198.32.132.85 | 5 | 2001:478:132::85 | 1 | Unknown |

Errors and Outages

See any know issues with participants. BGP and port state are reported. You can also see participants that have ordered service but have not yet connected.

BGP Down

Atlanta (1)

| Organization | ASN | IPv4 Address | IPv4 State | IPv6 Address | IPv6 State |
|--------------|-------|---------------|------------|------------------|------------|
| OCCAID | 30071 | 198.32.132.40 | Down | 2001:478:132::40 | UP |

Pending Connections

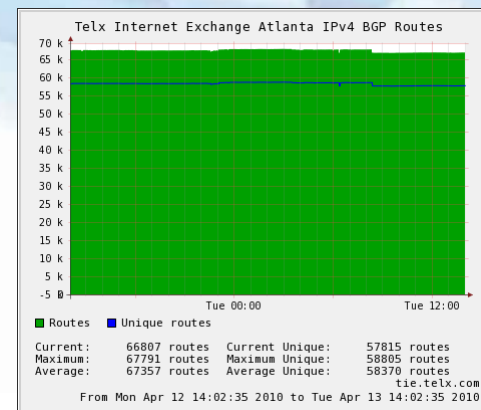
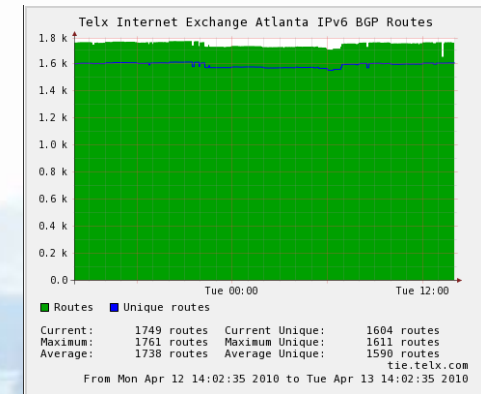
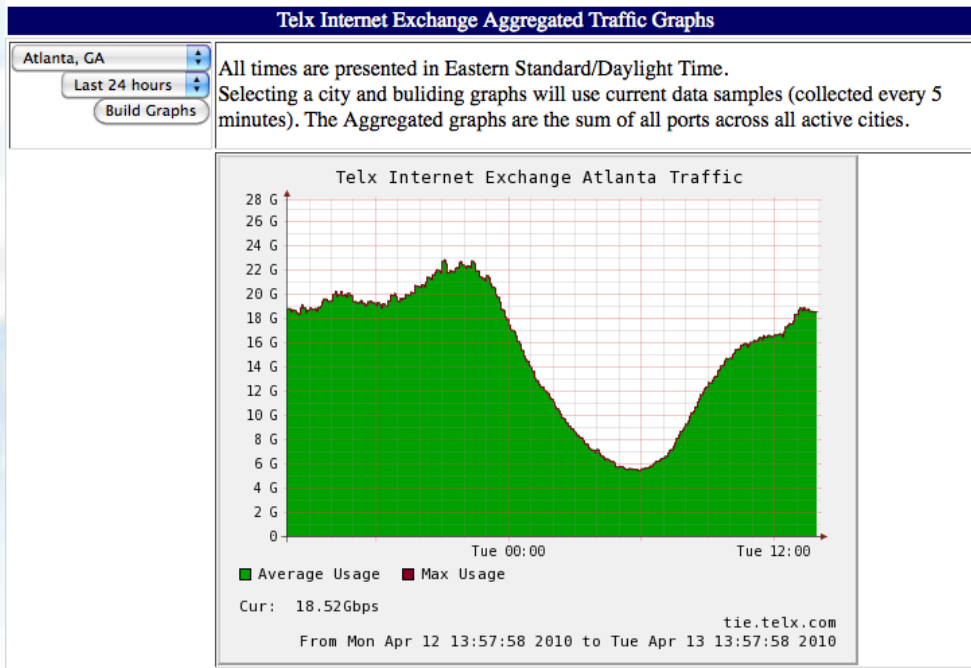
Atlanta (2)

| Organization | ASN | IPv4 Address | IPv4 State | IPv6 Address | IPv6 State |
|----------------------|-------|---------------|------------|------------------|------------|
| Bat Blue Corporation | 25885 | 198.32.132.92 | Pending | 2001:478:132::92 | Pending |
| Netriplex | 36167 | 198.32.132.91 | Pending | 2001:478:132::91 | Pending |

Dallas (2)

| Organization | ASN | IPv4 Address | IPv4 State | IPv6 Address | IPv6 State |
|--------------|-------|----------------|------------|---------------------|------------|
| DirecPath | 31030 | 206.126.114.12 | Pending | 2001:504:17:114::12 | Pending |

Participants can view the aggregate usage of any TIE location. Participants can view total usage, aggregate IPv4 and IPv6 route announcements, and IPv4 and IPv6 unicast packet counts.



Participants have access to a looking glass. All participants are required to peer with the route monitor. Any participants can perform basic looking glass functions at anytime.

Telx Internet Exchange - Looking Glass

City:

- Query:
- arp
 - bgp
 - bgp longer-prefixes
 - bgp neighbor received-routes
 - bgp regexp
 - bgp summary
 - ping
 - traceroute

Protocol: IPv4
 IPv6

Address:


E-mail Options

- E-mail contacts are extracted from PeeringDB. Any technical contact is automatically included in peering requests from the peering portal or bulk e-mail message.
- The E-mail manger allows you exclude any contact from the participant portal.

| <u>Manage Contacts</u> | <u>Bulk Email</u> |
|--|---------------------------|
| Manage Contacts | |
| <input type="button" value="Save!"/> | |
| Hide Contact | Email |
| <input checked="" type="checkbox"/> | ed.coleman@oit.gatech.edu |
| <input type="checkbox"/> | operator@mail.gatech.edu |
| <input type="button" value="Save!"/> | |
| In this section you can check to hide contacts associated with your ASN from appearing in other participants portal functions. | |

E-mail Options

The e-mail manager allows you to send a bulk e-mail to any/all contacts on a specific IX.

| <u>Manage Contacts</u> | <u>Bulk Email</u> |
|---|---|
| Compose Bulk Email For ATL  | |
| <input type="button" value="Compose Email"/> | |
| 1784: Global NAPS, GNAPS | <input type="checkbox"/> Check/Uncheck All |
| Locations: ATL | <input checked="" type="checkbox"/> peering@gnaps.com |
| | <input type="checkbox"/> noc@gnaps.com |
| 1785: Paetec Communications | <input type="checkbox"/> Check/Uncheck All |
| Locations: ATL | <input checked="" type="checkbox"/> peering@paetec.com |
| | <input type="checkbox"/> no.nmc.cr@paetec.com |
| 2711: Spirit Telecom | <input checked="" type="checkbox"/> Check/Uncheck All |
| Locations: ATL | <input checked="" type="checkbox"/> wayne.bogan@spirittelecom.com |
| | <input checked="" type="checkbox"/> ncc@spirittelecom.com |
| 3491: PCCW Global | <input type="checkbox"/> Check/Uncheck All |
| Locations: ATL | <input checked="" type="checkbox"/> peering@pccwglobal.com |
| | <input type="checkbox"/> usnoc@pccwglobal.com |
| 3512: Emory University | <input checked="" type="checkbox"/> Check/Uncheck All |
| Locations: ATL | <input checked="" type="checkbox"/> toc@emory.edu |
| 3856: Packet Clearing House | <input type="checkbox"/> Check/Uncheck All |
| Locations: ATL, NYC | <input checked="" type="checkbox"/> peering@pch.net |
| | <input type="checkbox"/> noc@pch.net |

Next...

Since releasing the participant portal, 80% of participants have created an account and 30% actively (at least weekly) use the service. We have started evaluating future features including...

- Renesys' Market Intelligence® Reports
- Per AS sflow reporting / peering traffic analysis



Thank you

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