Interim Report of the Future Peering Service Framework Committee

On December 11-12, 2013, the Future Peering Service Framework Committee gathered for a face-to-face meeting in Ann Arbor, Michigan. Under the leadership of co-chairs Pat Christian (University of Wisconsin) and Cas D’Angelo (Georgia Tech), the committee spent two full days developing principles for the next evolution of Peering Service for Internet2 members. Since September, when the group was charged with creating a Future Peering Service Framework by the Network Architecture, Operations and Policy Program Advisory Group (NAOPpag), this group has met nine times and has discussed peering topics including:

* Scan of the Peering Environment
* Review of the Financials of TR-CPS
* Review of the Current Operations of TR-CPS
* Review of Current TR-CPS Architecture including Peering Location Details and Interconnect Utilization
* Planned and Conducted a Survey of Peering Practices by Regionals

The face-to-face meeting was the culmination of the fact-gathering efforts and the commencement of writing a report to be provided to the NAOPpag. While there is much work to be done in crafting the report, the committee wanted to share with the community a summary of the key areas where progress was made. This summary does not provide insight into the details of how the enhanced peering service will operate, but rather articulates the principles that the committee agreed would be vital to ensuring that the next evolution of a peering service continues to meet the needs of our community.

The key areas of progress include:

* Virtualization of the network—not separate infrastructure
* NET + should be offered as part of the peering service
* Create a new Headroom Policy—as a positive incentive to address the 20G “cap”
* Begin offering dedicated TR-CPS ports
* Provide at least 24 months assurance of TR-CPS availability before planned changes
* Increase transparency and governance
* Address dedicated staffing
* Expand collaborations to include international peering

***Virtualization of the network - not separate infrastructure***

The committee discussed the feasibility of changing from the current practice of using physically separate networks for TR-CPS and the Internet2 R&E networks to one that would utilize virtualized routing functions. For the current service, the community had preferred having a clearly separate infrastructure. The committee discussion converged on an agreement that most of the community’s concerns about changing to a virtualized infrastructure could be addressed by adhering to reliability and cost effectiveness principles. Further, the committee agreed that by using proven (not bleeding edge) technologies, such as those widely used in the commercial peering space (e.g., VRFs with MPLS), Internet2 could offer a reliable service on a shared, virtualized infrastructure. Additionally, the committee agreed that making the decision to virtualize on a single hardware base led to the conclusion that a single operational organization is needed to manage the network. The group indicated that these considerations may also allow the service to be delivered in the most cost effective manner.

***NET + should be offered as part of the peering service***The committee agreed that the community wants clarity as to how NET+, TR-CPS and R&E routing will be handled and made progress in articulating a strategy that would allow maximum flexibility for all connectors. The group further agreed that, with the utilization of a common virtualized routing infrastructure, Internet2 could “rebrand” the services and state that there are multiple virtual networks (e.g., TR-CPS, R&E and potentially a very high-performance network for >10G end users) while also allowing each connector to choose how they wish to connect. The committee also agreed that it is critical to ensure that the proper “knobs” are in place and functional to provide all connectors with the ability to determine how they accept or advertise routes. (This is available today and the importance of ensuring that this capability remains was emphasized.) Next steps would include:

* Broader conversation with the community about the realignment and potential “rebranding” to move this forward
* In-depth conversation with the routing working group about implementing the principles suggested by the committee

***Create a new Headroom policy -- as a positive incentive to address the 20G “cap”***

The committee discussed community concerns about the current 20G cap on TR-CPS for each 100G link to Internet2. It was noted that the 20G cap was intended to provide an incentive for connectors to maintain sufficient headroom on their 100G connection for research flows (as well as help manage the capacity of the TR-CPS infrastructure). The committee thought it wise to plan in the future to deal with headroom issues directly. After discussion about the need to regularly keep the entire advanced networking ecosystem in sync around utilization, headroom, cost and equity of Internet2 services, the committee recommended that rather than set a cap on the amount of TR-CPS traffic that can be carried on a link, a new headroom policy that would ensure there was enough capacity to meet the “bursting” needs for purely research traffic be established both for the Internet2 backbone and for connections to connectors. The committee discussed using a starting point of ensuring there is at least 50G of capacity available for research traffic.[[1]](#footnote-1) The group discussed options of requiring 50G of capacity be available on a single 100G circuit (not 50G spread across two circuits) and that each connector must establish routing such that research traffic can access that headroom. This model also considered that a connector with two 100G ports, might need to allocate 50G of headroom on only one of their connections. The discussion recognized that such a model could work as long as the community continues to monitor equity, cost and aggregation among connectors.

In the short term, until the next evolution of the Peering Service is implemented, the committee also discussed implementing a practice in 2014 in which Internet2 will monitor and measure the amount of capacity utilized by the regionals on each 100G link.[[2]](#footnote-2) This would allow Internet2 to develop a policy that supports continued TR-CPS usage growth and ensures adequate capacity is reserved for research use.  An annual process of allowing growth for the next year while also reviewing its impact and adjusting business models if needed might be considered.

***Continue offering dedicated TR-CPS ports***

The committee discussed continuing to support the ability of members to obtain a direct TR-CPS port on a peering router. The model discussed would use the existing flat rate fee for the port, which would not include the cost of transport from the connector to the port location. This would allow members to utilize existing infrastructure they may have to reach the peering exchange site, or choose to procure the appropriate transport service from Internet2 to gain access to the peering exchange site. The group discussed having such a port priced at the same fee as a port that includes Layer 3 access today ($200,000/yr) and monitoring over the next 18 months to determine if such a fee could sustainably fund the cost of TR-CPS growth among members. Further, the committee indicated that there are only a few regional partners who could place a large load on direct TR-CPS ports in the short term, therefore using the established 100G port fee is reasonable for the next 18 months.

***Provide at least 24 months assurance of TR-CPS availability before planned changes***

The committee discussed the fact that many regionals need certainty in how the Peering Service will operate to make decisions on their other commodity Internet contracts or long term capital expenditures. The committee agreed to the principle that Internet2 will provide at least 24 months notice prior to implementing any changes that would degrade or significantly impact the business or operational models of the Peering Service.[[3]](#footnote-3)

***Increase Transparency and Governance***

The committee agreed that operations can be handled by a single entity, separate from the governance but connected to governance. The committee further indicated that it is critical that governance be open and transparent as well as having community oversight. The committee recommended engaging the community in defining policy and governance and that a Peering Advisory Group be formed at the request and under the auspices of the NAOPpag. Agility and credibility are important aspects of any governance process and, therefore a “light-weight” advisory process was suggested allowing the Peering Coordinator (see next section) to provide a “heads up” on upcoming events or concerns to the Peering Advisory Group. The Peering Advisory Group would also review performance metrics and provide input to Internet2 in setting strategic direction.

***Address Dedicated Staffing***

The committee outlined the responsibilities and qualities necessary for the role of Peering Coordinator to support this effort. It was agreed that a dedicated Lead Peering Coordinator would be needed. The Lead Peering Coordinator would be responsible for capacity planning, coordination with Internet2, and community coordination & evangelization and, due to the importance of this role, the Lead Peering Coordinator needs to be dedicated to Internet2 for peering. The group also indicated that it will be important for the Peering Coordinator to be able to maintain credibility within the larger national/international peering community.

The committee further recommended that a small team be built to include one or two additional junior peering coordinators. Team members could come from the community and would provide input on matters at a tactical level. This team will be subordinate to the Peering Advisory Group. It was also felt that a very small group of peering coordinators throughout the community should be created (with rotating seats) to provide guidance to the Peering Coordinator.

***Expand Collaborations to include International peering***

The committee agreed that extending the peering infrastructure internationally would bring more peers to the enhanced peering service and would allow additional collaboration with international partners. Internet2, CENIC and Nordunet have already begun conversations about a North American/European collaboration and this conversation will be expanded and pursued. (Jorgen Qvist of Nordunet is an active member of the committee and was present in the Ann Arbor meetings.) The belief is that the global R&E community may find benefit through continued collaboration and unified presentation of a future service offering.

1. In this case, research traffic refers to what has been considered by the community to be traffic that is in support of discipline research, and is usually generated from the campus. While we understand that some of this traffic may now come from commercial cloud sites (e.g., Amazon AWS), such traffic would likely be considered NET+ or the “e” part of R&E Layer3 traffic, not what we have considered traditional research traffic. [↑](#footnote-ref-1)
2. It is the intention of Internet2 to be as flexible as possible regarding the 20G cap for TR/CPS traffic. No regional will be penalized or charged additional fees if they exceed the 20G cap from time to time; as long as such bursts are not detrimental to the overall service. In fact, such bursts would be beneficial to Internet2 in determining growth in demand. [↑](#footnote-ref-2)
3. Of course, there may be times when extenuating circumstances might prevent Internet2 from adhering to this principle – but in such cases the community will be informed and engaged in discussion on the best way for the Peering Service to proceed. [↑](#footnote-ref-3)