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| AUTHOR | Chris Litten, REANNZ |
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Abstract

As members increase their capability to exploit KAREN's capabilities, situations are emerging where some specific and aggregate usage patterns are placing some network circuits at full capacity, e.g. Astronomy and YouTube. Additional planned activities, e.g. high performance computing, are likely to create additional stress.

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1. Introduction

1a. This policy addresses how REANNZ will manage network capacity if and when it becomes a scarce resource, and the role of the KAREN Member community in providing guidance and advice to REANNZ on such matters.

2. Principles

2a. The following principles guide the application of this policy. No priority should be inferred from the order they are presented.

- Good Citizenship; users and members should not, by their actions, degrade the performance of KAREN for others
- The Member community as a whole is best placed to ascribe relative value to different traffic types, sources and usages
- Any decisions resulting from this policy should ideally have broad based consensus from the Community

- Any REANNZ investment resulting from this policy should ideally have broad based consensus from the Member community.
- Any decisions resulting from this policy must be financially sustainable for REANNZ and the Member community
- Resource allocation approaches and decisions will inform KAREN’s architecture
- The Community will be provided with the information it needs to enact this policy where such information is readily available.

3. Approach

3a. This section outlines the principle methods of network capacity resource allocation and comments on their appropriateness for KAREN. Table 1. below table shows the order of preference.

Table 1.

| Preference | Approach | Comments |
|------------|------------------------------|---|
| 1. | Over supply capacity | Preferred if economically achievable Pros: simple to enact, low ongoing operational impacts, equitable Cons: cost is circuit dependent, forces traffic coexistence |
| 2. | Time management (scheduling) | Pros: quick, member/user self-managed Cons: not always possible, requires altruistic member/user behavior, coordination overhead |
| 3. | Static allocation (circuits) | Pros: reasonably quick (VLANs), reasonably cheap Cons: inefficient, may not address overall capacity issues, sizing open to continual litigation, ongoing operational overhead |
| 4. | Dynamic allocation – Edge* | Only available to Members via the KAREN Distribution Layer Pros: automated once established, delays access circuit investment upgrades for Members, increases member control Cons: REANNZ and Member expense to implement, ongoing operational management |
| 5. | Dynamic allocation - | This will not be supported in the core |

| | | |
|--|--|--|
| | Core (Prioritisation and forms of QoS) | Pros: automated once established Cons: variable user experience, expensive to operate, not beneficial where small number of users, hard to differentiate value of traffic types, open to continual litigation of parameters |
|--|--|--|

* Allows Members to tag some of their outbound traffic as lower priority. Provides a benefit of managing traffic through a constrained 1Gb/s access port delaying an upgrade to 10Gb/s.

4. Traffic categories

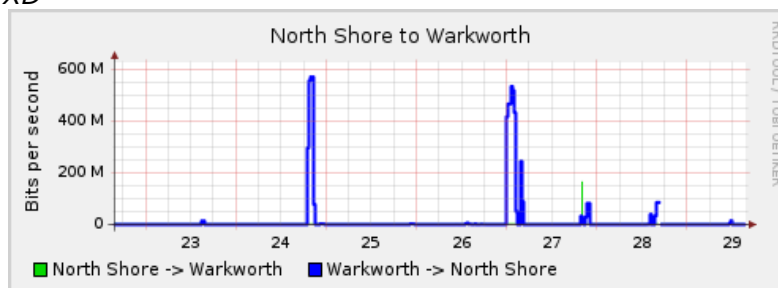
4a. There are three broad types of Community traffic supported over KAREN: experimental and development, high performance research and education, off-net. These are shown with examples in Table 2.

Table 2.

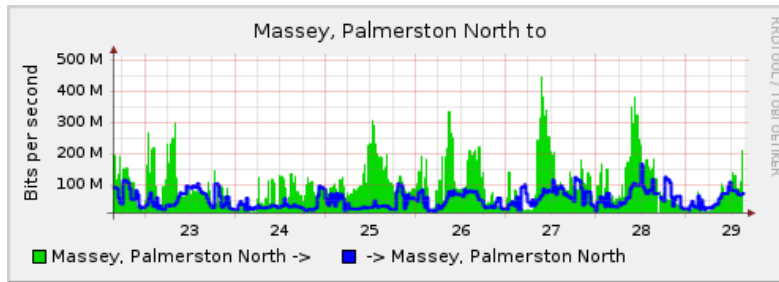
| Parameter | Experimental & Development (XD) | High performance research & education (HPRE) | Utility (including off-net) |
|-------------------------|---------------------------------|--|-----------------------------|
| Payload size | Very large | Variable (small to large) | Small |
| Number of sources/sinks | Very few Generally known | Moderate, widespread | Very large |
| Frequency | Infrequent Irregular | Variable peaks Predictable baseload | Regular Predictable |
| Duration | Minutes to hours | Variable | Daily cycle |

Visual examples:

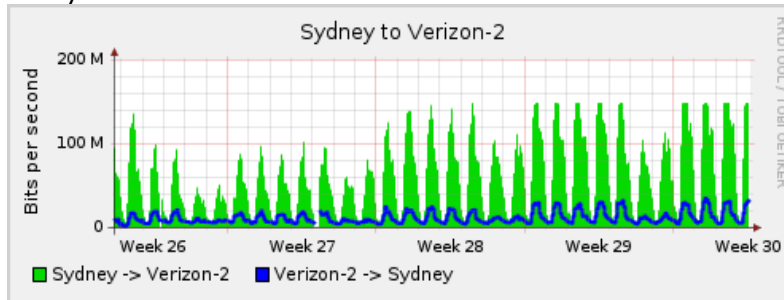
XD



HPRE



Utility



5. Thresholds

5a. These thresholds indicate what category an actual or intended traffic flow fits into and, therefore, when and how this policy should be applied.

5b. If a particular capacity is reached in any of the traffic types, one of the network resource allocation approaches, as above, must be implemented as shown in Table 3.

Table 3.

| Parameter | Experimental & Development (XD) | High performance research & education (HPRE) | Utility (including off-net) |
|---------------------------------|-------------------------------------|--|--|
| National network peak load | >30% per stream | >50% in total | >20% of 10Gb/s, or >40% of 1GB/s links |
| International network peak load | >50% per stream | >80% in total | >20% in total |
| Other | Potentially i.e. disruptive, non IP | - | - |

Note: percentages do not add to 100% for several reasons: time variances (averaging), upgrade thresholds being lower than 100%.

6. Decision authority

6a. Authority to make decisions under this policy rests with the REANNZ Board (or their delegates).

6b. It is desirable that a Working Group be established to advise the KAREN Policy Advisory Council (KPAC), and finally REANNZ, on the content and enforcement of this policy. The working group should be drawn from, and representative of, the KAREN Member community.

6c. The Working Group, through the KPAC, may make recommendations to REANNZ on:

1. The content of this policy (including thresholds settings, traffic categories),
2. The frequency at which traffic assessments will be made,
3. Communication practices around recommendations and decisions,
4. Implementation of this policy.

Alterations to this policy will proceed via the KARENRFC process, as described in [1].

7. Summary

7a. This policy addresses how REANNZ will manage network capacity if and when it becomes a scarce resource, and the role of the KAREN Member community in providing guidance and advice to REANNZ on such matters.

7b. The policy describes traffic types and thresholds where a described mitigation approach is to be applied. It also outlines the member decision making authority, which will recommend to REANNZ the approach to take as required.

8. References:

1. 'KAREN Request For Comment', KARENRFC S-0001-00