

# BANANA BOF Charter Review

IETF 99: Prague, Czech Republic

Margaret Cullen <mrcullen42@gmail.com>

Brian Trammell <ietf@trammell.ch>

# History

- ▶ Informational BOF held at IETF 97 in Seoul
  - ▶ Lots of interest, but problem not clearly formulated
- ▶ Subsequent mailing list discussion about problem being solved
  - ▶ Reached mailing list agreement on problem statement
- ▶ "Bar BOF" held at IETF 98 in Chicago
  - ▶ Active charter editing session, resulted in charter being discussed here
- ▶ Current charter text can be found here:
  - ▶ [https://docs.google.com/document/d/1byOJ\\_To6eL1ZBxKSYpTafQbngTBiNwxaK7ReIsl\\_d9Ek/edit?usp=sharing](https://docs.google.com/document/d/1byOJ_To6eL1ZBxKSYpTafQbngTBiNwxaK7ReIsl_d9Ek/edit?usp=sharing)

# Summary

The BANdwidth Aggregation for Network Access (BANANA) Working Group is chartered to develop solution(s) to support dynamic path selection on a per-packet basis in networks that have more than one point of attachment to the Internet.

Bandwidth Aggregation consists of splitting local traffic across multiple Internet links on a per-packet basis, including the ability to split a single flow across multiple links when necessary.

# Goals

It is the goal of this WG to produce a Bandwidth Aggregation solution that will provide the following benefits:

- ▶ **Higher Per-Flow Bandwidth:** Many Internet links available to homes and small offices (DSL, Cable, LTE, Satellite, etc.) have relatively low bandwidth. Users may wish to run applications (such as streaming video, or content up/downloads) that require (or could benefit from) more bandwidth for a single traffic flow than is available on any of the local links. A Bandwidth Aggregation solution could supply the needed bandwidth by splitting a single traffic flow across multiple Internet links.
- ▶ **Reduced Cost:** Traffic sharing on a per-packet basis allows the full bandwidth of the lowest-cost link to be used first, only using a higher-cost link when the lowest-cost link is full.
- ▶ **Increased Reliability:** When one Internet link goes down, ongoing application flows can be moved to another link, preventing service disruption.

# Solutions

Proposed BANANA solutions use different approaches (e.g. tunnels, proxies, etc.) to split and recombine traffic, but at an abstract level, they involve a local (hardware or software) component on the multi-access network, a remote component within the Internet, and mechanisms for those components to find each other, exchange signalling information, and direct traffic to each other. We refer to these functional components as the Local and Remote “BANANA Boxes”, and we refer to the method they use to direct traffic to each other as a “BANANA Encapsulation”.

The Bandwidth Aggregation solutions developed in this group will work whether the attached links are provided by a single Internet Service Provider or multiple Providers.

# Work Items

The BANANA WG will have the following work items:

- ▶ Determine how Local and Remote BANANA Boxes find each other.
- ▶ Specify a signalling protocol that can be used to send configuration and control information between BANANA boxes, including:
  - ▶ IP Prefixes of local links
  - ▶ Information about link properties & status
  - ▶ Information needed by the encapsulations
- ▶ Select (and extend, if necessary) an existing tunneling encapsulation for sending traffic between BANANA Boxes.
- ▶ Work with other IETF WGs defining BANANA encapsulations (if any) to ensure that the discovery mechanism and signalling protocol will meet their needs.

# Additional Details

BANANA Boxes will determine if a specific flow is eligible for Bandwidth Aggregation. If a flow is not eligible, it will not be split across multiple attached links.

For this initial charter, we will focus on how Local BANANA Boxes communicate with Remote BANANA Boxes. We will not address the topic of cooperation between multiple Local BANANA Boxes.

# ECN issue from mailing list

- ▶ Add explicit discussion of ECN?
  - ▶ General issue: Should we mention ECN in the charter? If so, what should we say about it?
  - ▶ Proposed change from Dave Dolson:
    - ▶ Add additional work item: “Specify measurements, protocols, and control algorithm for the scheduling of packets into each link based on packet loss and ECN experienced per link.”