Harnessing IP for Critical Communications Using Precedence (HICCUP)

Description of BOF:

Serious emergency events, whether created by nature (e.g., hurricanes, floods, earthquakes) or by man (e.g., terrorist attacks, combat situations or security events), place telecommunications networks under stress. When the network under stress cannot support all the demands users make on it, either because capacity is lost or because demand has spiked, some network operators have a need to provide preferential treatment based on precedence, defined as the user's indication of the importance of a message. Emergency preparedness requires that the networks deliver effective telecommunications capabilities at all times for those messages designated as higher precedence (i.e., critical communications), so that users can meet their objectives: for example, to enable immediate communications among first responders, to support ongoing operations in emergencies, or to enable continuity of critical business functions.

To deliver effective telecommunications capabilities when the network is under stress, technical solutions are needed to indicate precedence and deliver precedence-based preferential treatment. While emergency preparedness has a long history in telecommunications networks, the extensions to the Internet remain largely undeveloped. As more and more critical communications move to public and private IP networks, the various constituencies that design, manage and operate networks supporting critical communications need a focal point to: describe the requirements for critical communications in a way that is meaningful in the context of the Internet architecture; adapt circuit-switched based precedence treatment for critical communications to mechanisms that are appropriate in the Internet architecture; describe how mechanisms for precedence-based preferential treatment in IP networks can be used in an interoperable way; identify gaps in protocols to drive other WGs.

The HICCUP WG will address proactive measures to improve reliability of critical communications, in order to maintain adequate performance during periods of congestion. In reality, application performance can be affected by a variety of considerations beyond network congestion including server load, the network architecture, the use of caching or overlays, link sizes, routing stability, configurations, backward compatibility, etc. HICCUP does not propose to solve all these issues, but will start by detailing some procedures to indicate precedence of certain application sessions and descriptions of RFCs that could be used to architect a precedence-based model.

The deployment models should also be considered. For example, in certain scenarios the infrastructure might be managed by the governmental organization or enterprise requiring the precedence-based service. In others, the government entity or enterprise customer could require the service from their network service provider.

Taking all of these constraints into account, new efforts will focus on specific requirements and solutions, such as those pertaining to the

governmental/military sector. For example, under emergency circumstances, some countries require civil networks to distinguish sessions based on the user's indication of precedence. As Internet-based technology continues to expand into civil and government networks, requirements for precedence-based capabilities need to be developed. HICCUP will document these requirements as they pertain to IETF technologies of interest.

While voice was the driving application for IEPREP in the past, preferential treatment will need to be applied to all applications essential to critical telecommunications. Preferential treatment must address robustness of both voice and non-real-time applications that share the same infrastructure. The HICCUP WG should document the preferential treatment mechanisms that are appropriate for any essential telecommunications.

The working group will also take into consideration the environment in which these mechanisms will be deployed. For example, some networks will have security constraints, relying on IPsec to encrypt user traffic that traverses a common, cipher text core. In addition, unlike previous preemption based, circuit-switched mechanisms, the solutions that are proposed by this group will have to be implemented over both fixed and mobile IP-based infrastructures.

Given the potentially wide-scope of this effort, the group will begin by defining the requirements for expressing precedence information within traffic flows. It will also describe the deployment considerations that any solution must consider. Since much work has been completed as it relates to voice and video, the group will then define the expected behavior for inelastic traffic. Finally, it will reference the proposed solutions that have been defined in other WGs into an informational RFC to describe the full solution for inelastic traffic in one document.

Once the work defining the requirements and mechanisms needed to support precedence for inelastic traffic is complete, the working group will also define the requirements for elastic traffic which, to date, have been more elusive. Nevertheless, the initial focus will be on clearly defining the expected behavior for more critical elastic traffic compared with other elastic traffic. The desire is that higher precedence elastic traffic should succeed even at the expense of lower precedence traffic. The best way to support such a vision will be investigated as it may be application dependent. Once the requirements are well understood, the working group will then investigate protocols or other solutions that can support these requirements.

Goals and Milestones:

July 07 Submit an initial I-D of Requirements for Precedence Markings in IP Networks

Nov 07 Submit final I-D of Requirements for Precedence Markings in IP Networks

Nov 07 Submit an initial I-D of Expected Behaviors for Precedence-Based Treatment of Inelastic Traffic

Nov 07 Submit initial I-D on Deployment Considerations of Precedence-Based Mechanisms

Mar 08 Submit final I-D of Expected Behaviors to Support Precedence-Based Treatment of Inelastic Traffic

July 08 Submit final I-D on Deployment Considerations of Precedence-Based Mechanisms

July 08 Submit initial I-D on Expected Behaviors for Precedence-Based Treatment of Elastic Traffic

July 08 Submit initial I-D on Mechanisms to Support Precedence-Based Treatment of Inelastic Traffic

Nov 08 Submit final I-D on Mechanisms to Support Precedence-Based Treatment of Inelastic Traffic

Nov 08 Submit final I-D on Expected Behaviors for Precedence-Based Treatment of Elastic Traffic

Nov 08 Submit initial I-D on Mechanisms to Support Precedence-Based Treatment of Elastic Traffic

Mar 09 Submit final I-D on Mechanisms to Support Precedence-Based Treatment of Elastic Traffic