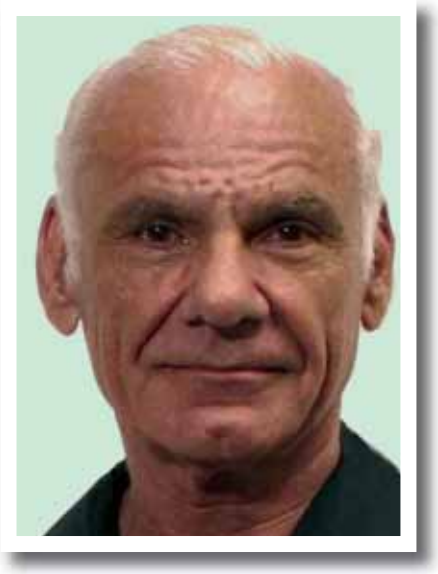
Realising Broadband Potential

ANAGRAN

InterComms talks to Anagran's Dr Larry Roberts



Dr. Lawrence G. Roberts

Dr. Roberts is currently Founder & CEO of Anagran Inc. Anagran is currently manufacturing flow-based traffic management network equipment, the first major improvement in packet network technology in the 40 years since Dr. Roberts designed and managed the first packet network, the ARPANET (now the Internet). At that time, in 1967, Dr. Roberts became the Chief Scientist of ARPA taking on the task of designing, funding, and managing a radically new communications network concept (packet switching) to interconnect computers worldwide. The first four nodes of the ARPANET were installed in 1969 and by 1973 when Dr. Roberts left ARPA to become CEO of Telenet (now part of Sprint), the concept of packet switching had been well proven to the world. Dr. Roberts has BS, MS, and Ph.D. Degrees from MIT and has received numerous awards for his work, including the L.M. Ericsson prize for research in data communications, in 1998 the ACM SIGCOMM Award, in 2000 the IEEE Internet Award, in 2001 the National Academy of Engineering Draper Award, in 2002 the Principe de Asturias Award, and in 2005 the NEC Computer and Communication Award.

Q: Where do you view service and customer growth for the Service providers, and what do you view as the next new product area ?

A: ISPs must deliver the Internet traffic in ever increasing volume, speed, and quality. This is their main and most important service. They may offer other video or voice options but at least in developed countries there will be more and more Net Neutrality issues forcing them to provide equal service for any other Internet services. Thus, they cannot expect to win customers with their own services when others will certainly underprice them. Going direct is always cheaper for the content people. Thus the new product is to improve their basic Internet service. Our equipment allows these improvements with lower cost and better capability than any other equipment.

Q: As a pioneer what do you think have been the major successes and failures of the internet so far, by the Service providers?

A: Their success has been to offer broadband Internet service. Their failures have been in attempting to combine with content providers (AOL) and to not improve the Internet service sufficiently. Unequal, unfair usage like P2P has plagued them in recent years. Another failure is the slowness of improvements in peak and average capacity to the home.

Q: High Content and Video are becoming the go to service area for the Service providers, what are the major problems in terms of bandwidth time and security?

A: HDTV is a problem to deliver over the full Internet, even with 100 Mbps to the home. The problem is not local, but a basic problem with TCP throughput over distance. Distance causes delay and delay causes TCP to slow down. This restricts HDTV to 1000 miles or less, dependent on congestion delays. This can be fixed with improved equipment and streaming TCP which we have pioneered. The bandwidth is available.

Security has become a major problem, so far not fully recognized, but clearly bad enough to cause billions of dollars of damage. Soon the average user will become scared to do virtually anything. Thus, security in the network is a new critical priority. It cannot be fixed by patches to the end systems - we are falling behind the crooks there. But to do CyberCrime

requires communication and the network must add many security features to fight it where we can win. We need authentication (part of our DARPA program), DOS control, BOT detection/control, and SPAM sender detection /control.

Q: Many companies, due to the current economic climate, are adapting their legacy networks to carry these high bandwidth services, how can Anagran help avoid the pitfalls in this?

A: The requirement for high bandwidth delivery requires improved streaming TCP (our TIA 1039 protocol and ITU Q.Flowstatesig protocol), much improved congestion control (we lead here), and lower cost equipment to do all this (here also flow management beats packet management).

Anagran FR-1000 Traffic Manager

Q: The FR-1000 uses your unique 'Fast Flow Technology' how does this work in principle and what are the key benefits?

A: The basic concept for conventional traffic is to rate control every flow to assure no congestion occurs and priority can be utilized to optimize response time. Conventional equipment uses queues to manage congestion – they in fact cause the congestion and seriously harm TCP throughput and response time. To rate control each flow required moving to save flow state information (memory is now cheap) and then watching the rate of each flow in real time, discarding only when necessary to control it smoothly, and thus to keep it at the ideal rate. To determine the ideal rate is a complex task of watching the utilization at the output and a feedback loop to control each flow contributing to that utilization. Done right this avoids any congestion, assures flows do not jump all over in rate, thereby greatly improving response time and eliminating queue delay. Thus delay, jitter, throughput, and response time are all improved by factors of 2–3. Together, this amounts to a major improvement. Also, by focusing on flows, many new features like priority service options, host equalization, and better reporting are easy and inexpensive to add. Further, since there are 1/14 the flows that there are packets, the cost, size, and power is much lower than packet based technology.

Q: Quality of Service for IP Networks is a difficult issue, with a patch it fix it mentality being used in a lot of cases how can you help increase these levels and really show the benefit in longer term planning?

A: QoS is claimed by everyone and with packet based equipment not much really can be done. An example is in VoIP over WiFi. Every vendor has claimed new improvements to improve the bad quality observed for VoIP over WiFi. None have proven to work in reality. However, our congestion free operation instantly fixes VoIP over WiFi to high quality. The same has been true for video conferencing. These services require low delay jitter and this can only be fixed with a flow based, non-queuing system. Other QoS issues like Web access time is hard to measure and has varied so much claims are hard to verify. But eliminating the rate variance of all the flows required to deliver a page, the page appears three times faster (the last flow to complete determines when the page can be seen). Rate variance from queues hurts web access a lot. There are many other QoS measures, but they are so hard to quantify that it is hardly worth discussing them. Everyone claims improvement but this is the first real improvement.

Q: Could you explain Anagran's 'Behavioural Traffic Control' how it came about and its benefits?

A: When you don't know what type of transaction a flow is from its first packet, the next best thing is to watch its rate, packet size, and byte count to classify it as voice, video, interactive or bulk transfer (among others). A flow that stays around 100 Kbps with an average packet size of about 300 bytes is usually voice. Within 16 packets it can be identified and then treated with the QoS you want for voice. Same for video but different parameters. Also specific voice and video vendors can be classified if that is desired. One major use is to separate interactive from bulk. If a flow lasts over 100K bytes it is bulk and can be slowed down in busy interactive periods and speeded up in slack periods. A simple assignment of a different priority for bulk does this (one behavioural command). The improvement in average utilization of this is at least 2:1 leading to better interactive response time and better bulk delivery times.

Q: We have been looking in general terms of use of your product range, how can these be adapted or utilized by Mobile or Satellite operators?

A: The mobile service area benefits just the same as WiFi for VoIP and response time. Also, the impact of heavy users as AT&T has found with iPhone users or ISPs have found with P2P users is eliminated by subscriber equalization. What happens here is that our system keeps a record of the total utilization of each subscriber (and his paid priority status if any) and if the system is approaching full utilization (usually true for mobile) adjusts the priority for each subscriber such that the active users receive equal capacity. This assures no rate caps or special fees are required, everyone gets what they paid for, a fraction of the pie.

Satellite operation requires the new streaming TCP capability we have pioneered (TIA 1039 or Q.Flowstatesig). These protocols allow us to stream flows over high delay with no loss of throughput and the ability to maintain high utilization of the satellite. Such TCP optimization solutions have always been deployed with satellites but this is far superior and allows the satellite to become far more valuable.

Q: What next for Anagran, how do you see the company growing and what achievements so far can you look back on?

A: We have proven the streaming TCP support with a DARPA program to perform 30–50 times better on satellites. We now are adding authentication security to this protocol for DARPA. When complete it will be invaluable for the military, government emergency services, banking, and all similar highly vulnerable services. We have been rapidly expanding commercial sales in Asia where ISPs truly want to deploy subscriber equalization and QoS improvements. We plan to expand soon into corporate WiFi and mobile ISP deployments and into the US and European ISPs.

For more information visit:
www.anagran.com