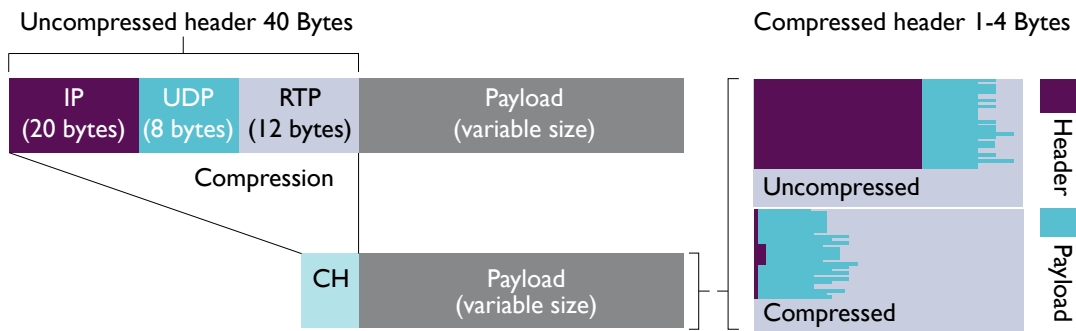


Specialist protocols for link optimisation

IP protocols have evolved from the fixed network world, where bandwidth is abundant and errors and delays are not significant factors. However, Roke Manor Research's customers are often working with bandwidth-constrained, high latency and error-prone links. In these cases, specialist solutions are needed to provide the required level of performance to support applications. Introducing Roke's specialist protocols for link optimisation...



Datasheet



Header compression

By working with Roke, organisations benefit from an extensive knowledge of header compression techniques. We work closely with our customers to develop and deploy header compression solutions which meet their specific needs.

Header compression provides a more efficient and cost-effective way to provide IP multimedia services over bandwidth restricted and/or error prone links. This allows operators to increase revenue by servicing additional customers with the same equipment, or offering better performance to existing customers (premium service).

Compared with traditional circuit switched networks, the use of IP introduces overhead in the form of packet headers. Without header compression, this can severely degrade the performance of multimedia services, especially voice, which requires frequent sending of packets with a payload that is significantly smaller than the applied header. Compression can reduce a typical header from 40 bytes to as little as 1 byte allowing a significant increase in call capacity.

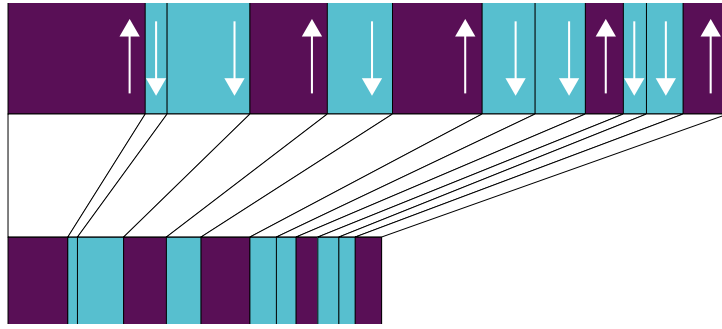
Roke has helped to standardise the solution in the Internet Engineering Task Force (IETF), which provides the required compression but maintains robustness against packet loss. The resulting Robust Header Compression (ROHC) solution has been adopted as the standard for use in 3G networks.

Roke has also developed a lighter-weight header compression solution, which offers comparable performance for applications outside of 3G, for instance in the military domain.

Signalling compression

Roke played a leading role in defining the SigComp standard within the IETF and developed a SigComp module as part of the Siemens IP Multimedia Subsystem (IMS) product. This has since been proven to be interoperable with other manufacturers' implementations and is both resilient and efficient in terms of memory and processing resources.

As the trend towards wireless networks like 3G increases, the challenge is to provide an equivalent user experience to that enjoyed on traditional fixed networks. Roke has been at the forefront of developing and standardising SigComp to meet this challenge. SigComp is a flexible and efficient solution designed to enhance the connection speeds of mobile applications, thereby ensuring competitive wireless network capabilities.



Most applications for multimedia communications use SIP (session initiation protocol) for signalling due to its simplicity and flexibility. These SIP messages are text-based and are often hundreds of bytes in size, as they were designed for fixed networks with bandwidth rich links. However when using wireless networks, e.g. 2.5G and 3G, the combination of large SIP messages and the constraints of the air-interface means that signalling delays, and therefore call setup times, can be very long. For interactive IMS services, like Push-To-Talk, these delays would be unacceptable.

SigComp provides a solution to this problem by providing robust, loss-less compression of the large application messages. It exploits the redundancy inherent in SIP to compress the messages down to a few tens of bytes, which considerably increases transmission speeds.

TCP enhancer

Roke's TCP enhancer maximises the usable data rate on error-prone, high-latency links. Without it, sometimes the achievable data rate for TCP-based traffic is a small fraction of the link capacity.

TCP is a widely used protocol for IP based applications. However, like many other IP protocols, it has been developed for the fixed network world. One of the basic assumptions made is that packet loss is most likely to be due to network congestion, so the protocol backs off the data rate as packets are dropped. The full data rate is subsequently restored in steps, based on acknowledgement of successful packet deliveries.

However, for wireless networks, packet loss is most likely due to bit errors on the link and standard TCP backs off the data rate unnecessarily. For high latency links, e.g. satellite links, the round-trip time is large and it can take a significant time for TCP to restore maximum data rate; often the next packet loss will occur before this happens. The TCP enhancer transparently replaces the TCP protocol with an enhanced protocol over the link in question, thus removing this particular problem.

For further information on Roke's skills and capabilities in the areas of header compression/signalling and TCP enhancement, please contact us.

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