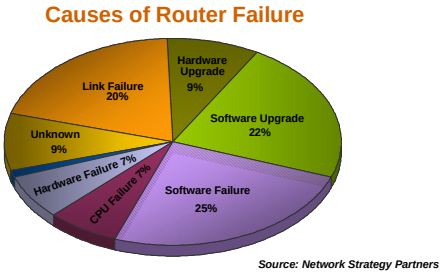
HYPERCHIP
CORE IP SYSTEMS

Technology Brief

The PBR-1280 Core IP System
HeliOS™ –Reliable IP Networking

Today's IP network architectures can provide for reliable IP services, but it comes at a significant cost – it requires the duplication of all routers in the network. Service providers have been forced to adopt network architectures built with duplicate elements because of the inherent limitations of current generation routers.



Router vendors claim "carrier class" reliability, with "carrier class" defined as redundant hardware elements and environmental standards compliance. Unfortunately, routing control plane failures account for 54% of router downtime, which until today cannot be managed without the duplication of equipment.

This "dual-router" redundancy approach can no longer be sustained for the following reasons:

- **Network Cost**: The road to profitability in IP networks traverses cost reduction. Solving this "dual-router" redundancy issue will provide a network that exhibits low capital and operation costs (less downtime).
- **Network Growth**: With IP traffic maintaining a steady growth stream, core router capacity continues to increase, thus making this dual router practice no longer a viable solution.
- **Network Convergence**: Service providers are looking to streamline their operations through the convergence of traditional services (ATM, Frame Relay, Voice) and IP services onto a common infrastructure. Here, reliability stands out as a key requirement.

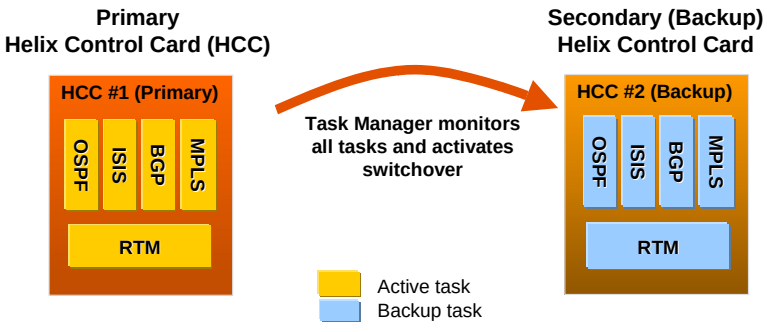
Hyperchip's HeliOS™ operating system, coupled with the PBR-1280 Helix™ distributed control processing architecture, breaks the mold with a unique approach to routing software that provides software resiliency, control plane scalability, and in-service upgrades.

HeliOS

HeliOS is separated into distinct, modular sub-components that leverage the distributed control processing architecture to span over multiple control cards and line cards providing superior resiliency, scalability, and in-service upgrades

Software Resiliency

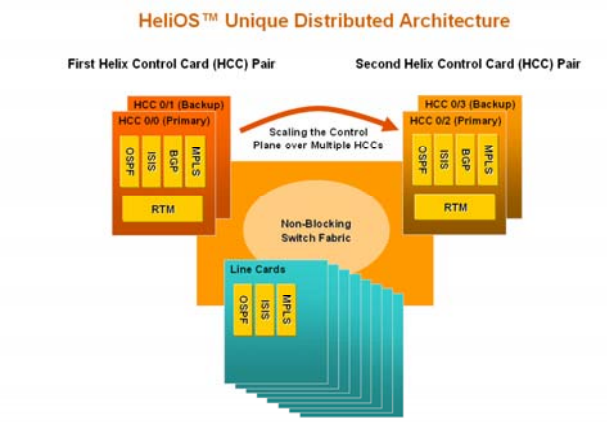
HeliOS achieves resiliency through fault isolation of the protocol subsystems and by monitoring the activities of each protocol subsystem. HeliOS transparently manages control card, kernel and individual task failures. Upon failure, the HeliOS task manager switchover mechanism activates backup tasks, eliminating effects on forwarding and neighbouring routers. . Because neighbour-related tasks operate on the line card, traffic forwarding and control plane adjacencies with other router peers are maintained during switchover process.



HYPERCHIP
CORE IP SYSTEMS

Software Scalability

The PBR-1280 incorporates a unique approach to processing. Unlike traditional routing equipment where route processor cards communicate with configured interface cards through dedicated Ethernet traces in the chassis backplane, the Helix Controller Cards (HCCs) communicate with each other and with the interface cards through dedicated control plane paths in the PBR-1280 scalable, multi-chassis switch fabric. The switch fabric allows any-point-to-any-point connection, regardless of physical chassis location, effectively creating a "control anywhere" system. In a small scale PBR-1280 core IP system (i.e. 1-4 chassis), all controller sub-systems can run on one HCC, with a second HCC configured with redundant subsystem instances. Typically, as chassis are added, no further processing cards are required. However, if additional processing is required for individual subsystems (for example BGP), the distributed software architecture of the PBR-1280 core IP system allows for these subsystems to scale independently by distributing the processing requirements across multiple HCCs.



HeliOS divides sub-component control processes even further on a protocol basis, taking advantage of processing power of the line cards as well. Adjacency intensive protocols such as ISIS and OSPF split processing between control and line cards. This division of protocol computation, and placing processing power where it is needed, enables scalability as the number of adjacencies increases.

In-Service Software Upgrades

In today's routing system software, if any protocol requires an upgrade the entire routing image must be upgraded, its operating system reloaded, and the entire router rebooted. This destabilizes the network, and such maintenance must be planned, consuming a large portion of planned operational activities.

The HeliOS operating system supports full, non-disruptive, in-service upgrades. Similar to the HeliOS switchover procedure in the event of sub-system or HCC failure, the HeliOS in-service upgrade procedure initializes a graceful switchover to a backup task, with this backup task containing a newly, pre-loaded version of software. Resiliencies during this process can be maintained by provisioning further control cards. This transparent switchover does not affect the network as all routing adjacencies and forwarding performance are maintained (i.e. no packet loss).

The PBR-1280
A New Era in IP Networking

Hyperchip's HeliOS architecture, coupled with the PBR-1280 unique hardware redundancy features, satisfies the requirements of next generation applications, which demand carrier-class resiliencies throughout the system, scalability to meet tomorrow's growth, and in-service lifetime operation.

Corporate Headquarters: 1800 Rene Levesque West, Montreal, Quebec, H3H 2H2, Tel: 514-906-2447, E-mail: sales@hyperchip.com