# Platform Stacking

Application Note
October 2006

# INTRODUCTION

Stacking connects two or more physical switch chips inside a switching platform and connects two or more switching platforms to build a larger system that behaves and is managed as a single system image. Some typical stacking configurations include stacked 1RU “pizza-box” platforms and larger chassis systems.
Through the Broadcom System Developers’ Kit, ZebOS using the HIP is able to take advantage of how the hardware attaches information to each packet traversing a stack link to allow switching and routing functions to be extended across multiple chips and platforms seamlessly: L2 packet forwarding, including VLAN membership, QoS/CoS management, ACL, link aggregation, and flow control (to mention a few) are all maintained across platforms.
A stacked or chassis system will automatically discover any existing system interconnections and configure the stack topology management for optimal packet forwarding performance. The system will also detect system change events and accept the changes through system reconfiguration while maintaining uninterrupted switching and routing.
The advantage to be gained from using stacking is the ability to increase the physical scalability of a system, while retaining a single system image. Ports can be added to increase system density, while retaining the single management interface to the whole system.

# STACKING CONFIGURATION EXAMPLES

Broadcom switching systems support several stacking configurations using the StrataXGS chipsets. Broadcom StrataXGS switching systems can be connected via one (1) or 10 Gbps ports, configured for the proprietary Broadcom HiGIG mode. Their HiGIG protocol defines a header (the HiGIG header) that is used by StrataXGS devices to properly forward packets across switching chips (or the entire switching platform) and communicate other information required to extend the StrataXGS features across the entire stacked or chassis system.
For Broadcom switching platforms using only 566x/569x switching chips and no switching fabric chip such as 5671, the stacking configuration is limited to *simplex* or cascade ring as shown below. This is because each 566x/569x switching chip supports only one full-duplex HiGIG port. In simplex stacking, packets can only traverse in one direction to reach the platform on which the destination port resides.

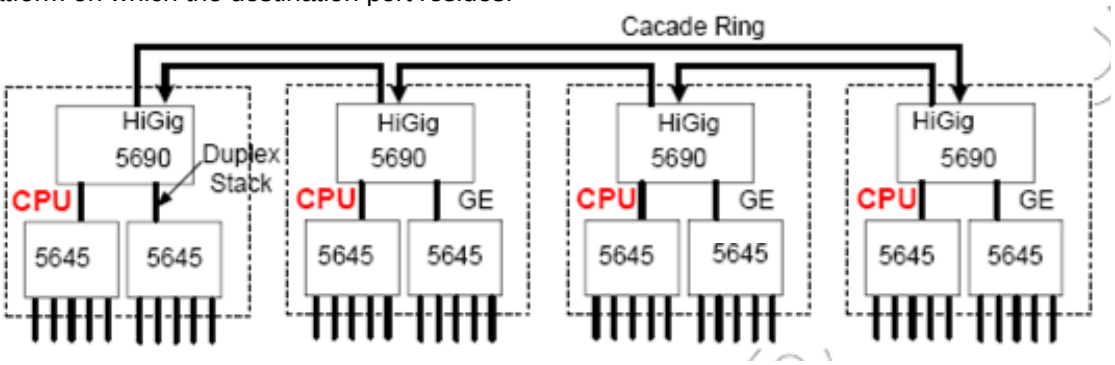


Figure 1 Simplex stacking configuration

For larger Broadcom switching platforms using both 566x/569x switching chips and switching fabric chip such as 5671, a more efficient duplex stacking configuration shown below can be used to take advantage of the ability to support multiple HiGIG ports on a switch fabric chip. In *duplex* stacking, packets can traverse the HiGIG link(s) in either direction to reach the platform on which the destination port resides, depending on which direction is the shorter path. For broadcast traffic, loops can be detected and avoided.

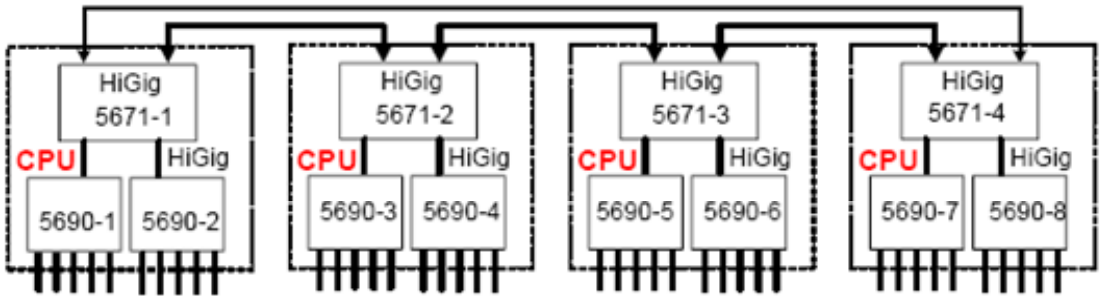

Figure 2 Duplex stacking configuration

For a Broadcom chassis based switching system, a start topology configuration where each Port Blade connects to the Back Plane via [one or more] HiGIG interfaces can be used as shown below.

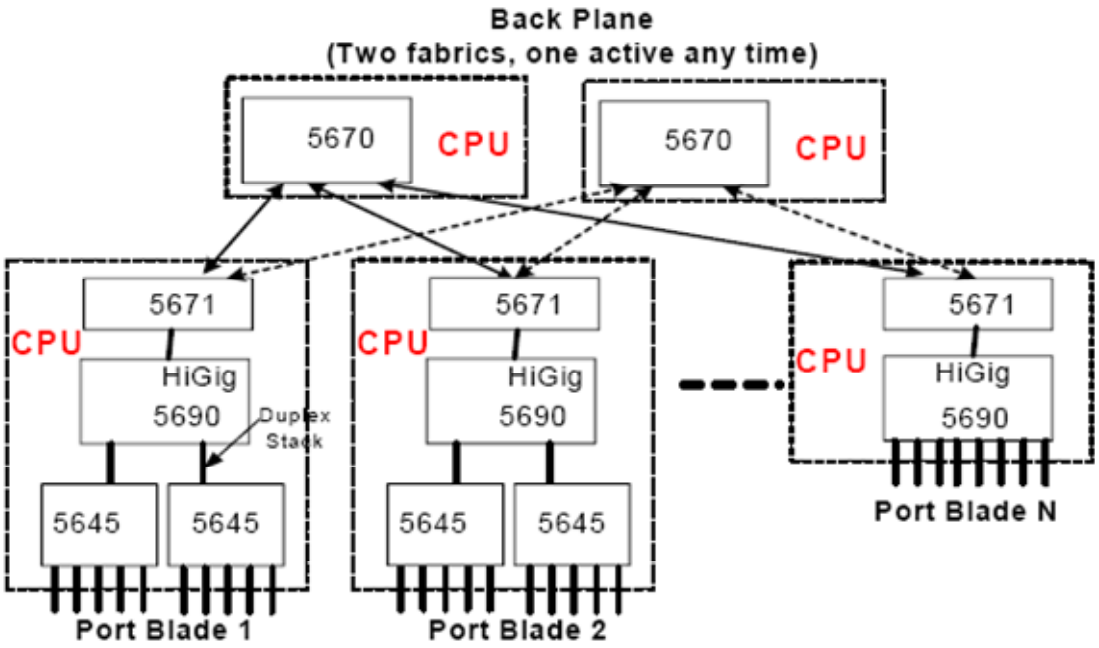

Figure 3 Example of Chassis configuration

The essential difference between stacked systems and chassis systems is the software control of the addition or removal of boards/platforms. Additional differences include:

1. Chassis systems often require more software for failover, redundancy and load balancing
2. Chassis configuration is easier since “slots” are predetermined
3. Stacked systems need to support “master movement”
4. Stacked systems may have less predictable interconnections


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