Link Aggregation Trunking

Ariel Hendel

hendel@eng.sun.com

Sun Microsystems

## IEEE 802 - Tutorial Session

11-November-1997

Concept

- Capacity - Increase link capacity by parallel connection of several links between two end points.

- Transparency - No impact on protocols and interfaces beyond the trunk end points

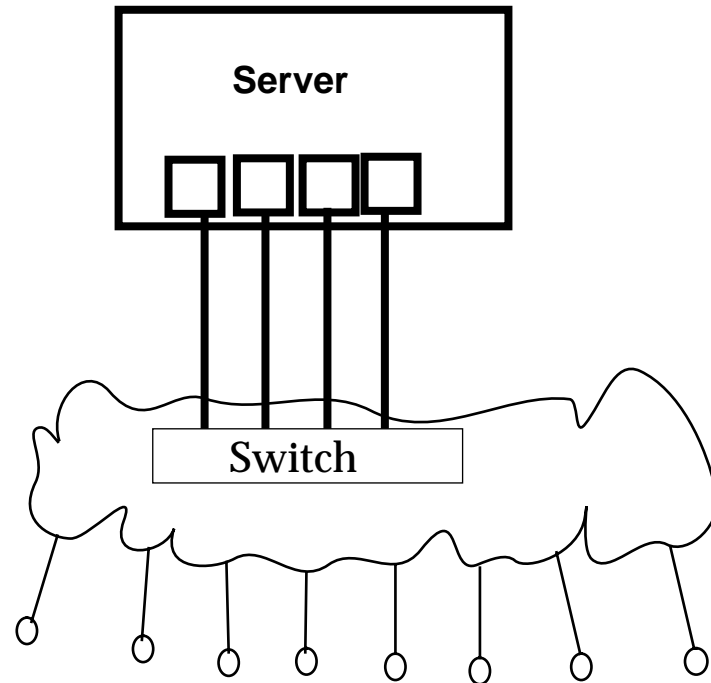(or a simpler formulation: Don't break anything).

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Benefits (example):

Server

Server

subnet 1   subnet 2   subnet 3   subnet n

Switch
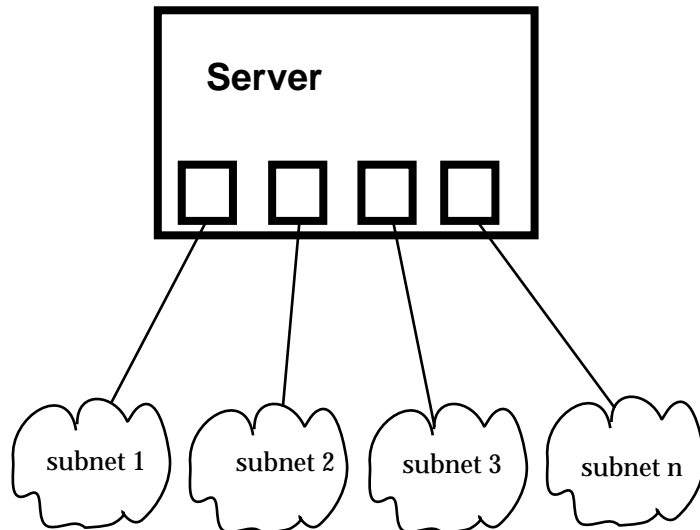
Multiple Server identities

Single server identity:

One IP address
One MAC address

11-November-1997

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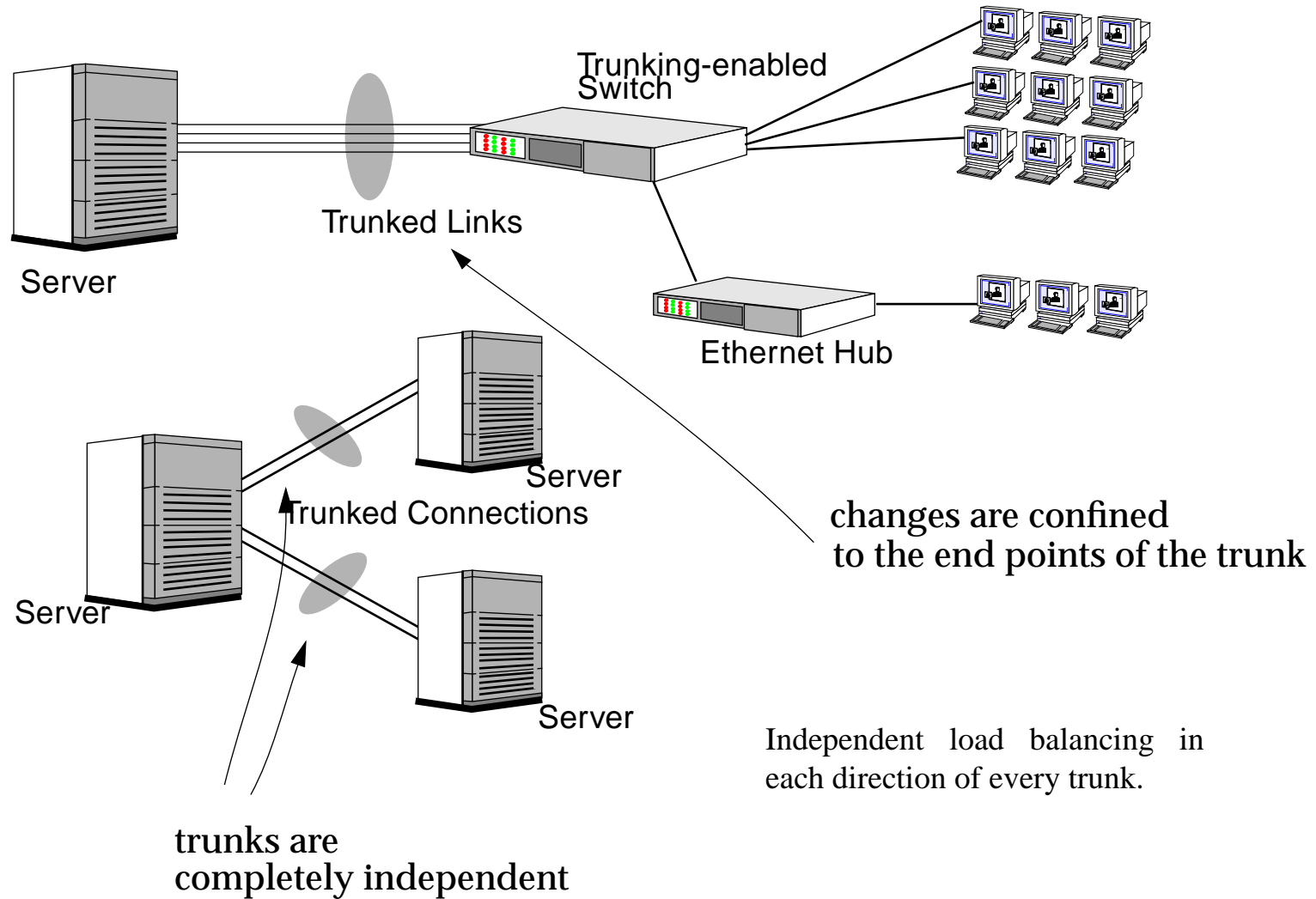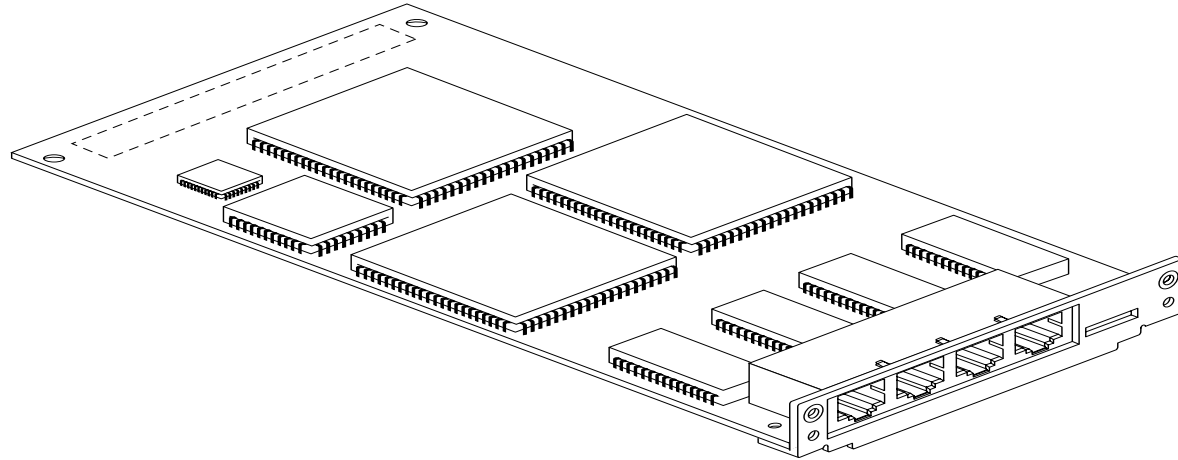microsystems

Benefits (cont.):

- Customer's benefits:

    - **Increase capacity between server and network without the side effects of subnets.**

    - **Increase capacity between individual switches (bridges) without having to resort to multiple VLANs with separate spanning trees.**

    - **Redundancy of host (server) links**

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Examples

Trunking-enabled Switch

Trunked Links

Server

Ethernet Hub

Server

Trunked Connections

Server

Server

changes are confined
to the end points of the trunk

Independent load balancing in
each direction of every trunk.

trunks are
completely independent

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Feasibility: Product Examples:

Server trunking based on Quad FastEthernet Adapter Card and Sun Trunking software.

(Interoperability verified against trunking switches from five different vendors).

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Load Balancing

The appeal of link aggregation trunks depends on the ability to load balance traffic across different links.

For example, trunking bridges would load balance while preserving the following external properties:

1. No frame misordering for a given priority level between a given MAC source and destination.

2. No frame duplication.

Additional endpoint and state information may be available at the server to support a more sophisticated downstream load balancing.

- Each end of the trunk may **independently** attempt to load balance across the segments using information from a given layer(s), while remaining transparent to protocols operating above these layers.

- Load balancing to be effective even when host has a single identity (same MAC address on every segment of a trunk).

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What should the standard cover?

Standardize the behavior required for interoperability, including configuration and deployment.

Load balancing algorithms don't need to be covered in the standard.

It seems appropriate to cover most of the other functions we mentioned.

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Summary of Proposal

Based on the technical background and customer benefit presented, we support the initiation of a standards project to produce specifications that enable interoperable deployment of link aggregation trunks.

We recommend such a standard define the behavior of trunks in all aspects that affect interoperability as well as ease of use and ease of deployment of trunking products.

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