

Minor Project- Report

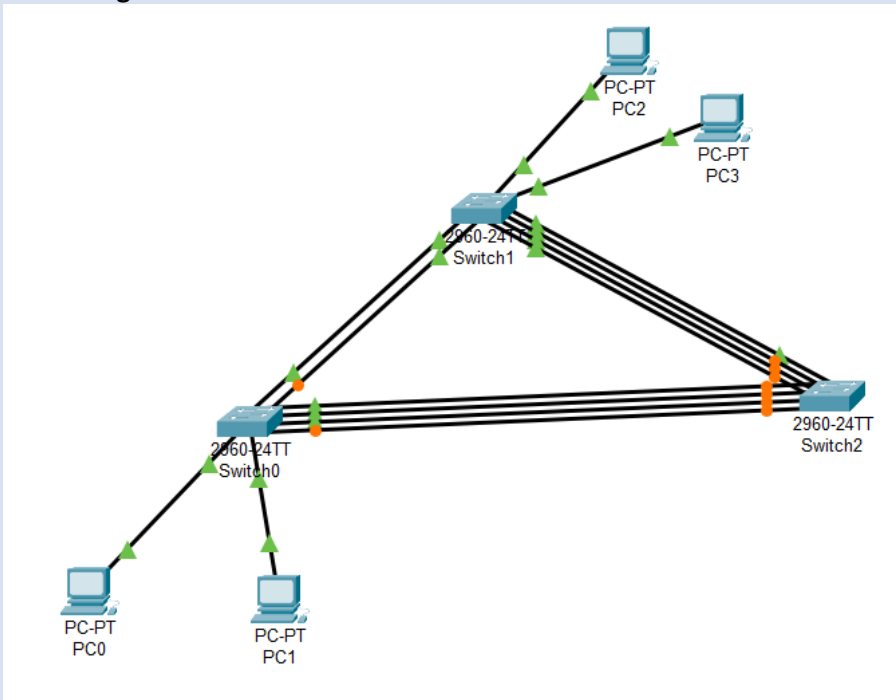
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Course Faculty: Prof. Ramya K Course Name: Computer Networks Laboratory
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TITLE OF THE PROJECT	Simulating Link Aggregation using EtherChannel, PAgP and LACP			
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INDIVIDUAL CONTRIBUTION	Port Aggregation Protocol (PAgP) configuration	EtherChannel (Manual) Configuration	Error Correction and Testing	Link Aggregation Control Protocol (LACP) Configuration
GUIDE	Prof. Ramya K			
PROJECT ABSTRACT:	<p>Problem Statement: Simulate link aggregation using various link aggregation protocols.</p> <p>In computer networking, link aggregation is the combining (aggregating) of multiple network connections in parallel by any of several methods, in order to increase throughput beyond what a single connection could sustain, to provide redundancy in case one of the links should fail, or both.</p>			
INTRODUCTION	<p>A link aggregation group (LAG) is the combined collection of physical ports. Other umbrella terms used to describe the concept include trunking, bundling, bonding, channelling or teaming. Link aggregation increases the bandwidth and resilience of Ethernet connections. Using EtherChannel, LACP and PAgP we will show how link aggregation works.</p> <p>EtherChannel is a technology that was originally developed by Cisco as a LAN switch-to-switch technique of grouping several Fast or Gigabit Ethernet ports into one logical channel and redundancy without being blocked by the Spanning Tree Protocol. EtherChannel configuration has one mode known as the On mode.</p>			

	<ul style="list-style-type: none"> • On mode forces the connection to bring all links up without using a protocol to negotiate connections. This mode can only connect to another device that is also set to on. When using this mode, the switch does not negotiate the link using either PAGP or LACP. <p>LACP Link Aggregation Control Protocol (LACP) is part of an IEEE specification (802.3ad) that allows several physical ports to be bundled together to form a single logical channel. LACP allows a switch to negotiate an automatic bundle by sending LACP packets to the peer. LACP has 2 modes Active and Passive.</p> <ul style="list-style-type: none"> • Active mode sets the interface to actively attempt to negotiate connections with other LACP devices. • Passive mode sets the interface to respond to LACP data if it receives negotiation requests from other systems. <p>PAGP Port Aggregation Protocol (PAGP) provides the same negotiation benefits as LACP. PAGP is a Cisco proprietary protocol, and it will work only on Cisco devices. PAGP packets are exchanged between switches over EtherChannel-capable ports. PAGP also has 2 modes Auto and Desirable.</p> <ul style="list-style-type: none"> • Auto mode sets the interface to respond to PAGP negotiation packets, but the interface will not start negotiations on its own. • Desirable mode sets the interface to actively attempt to negotiate a PAGP connection. <p>Link Aggregation has many benefits: Increased Bandwidth: Use EtherChannel and combine two or four links into one logical link. It will double or quadruple your bandwidth. For example, four 100Mb Fast Ethernet connections bonded into one could provide you up to 800Mb/second, full duplex. Provides Redundancy: Since there are many Ethernet links combined into one logical channel, it automatically allows more available links in case one or more links go down. Load Balance Traffic: EtherChannel balances the traffic load across the links, thereby increasing efficiency on your networks.</p>
DESIGN	<p>To design the project, we used the following steps:</p> <ol style="list-style-type: none"> 1. Take 3 switches and 6 PCs 2. Connect PC0 and PC1 to Switch S1 and similarly connect PC2 and PC3 to Switch S2 and PC4 and PC5 to S3. 3. Configure VLANs such that PC0, PC2, PC4 belong to VLAN 10 and PC1, PC3, PC5 belong to VLAN 20. 4. Connect the cables for S1 and S2 by connect the correct respective ports (g0/1 of S1 to g0/1 of S2 and so on). 5. After this configure LACP by setting Active mode on S1 and Passive mode on S2. 6. Connect the cables for S2 and S3 by connect the correct respective ports (f0/21 of S2 to f0/21 of S3 and so on).

	<ol style="list-style-type: none"> After this configure PAgP by setting Auto mode on S2 and Desirable mode on S3. Connect the cables for S1 and S3 by connect the correct respective ports (f0/17 of S2 to f0/17 of S3 and so on). After this configure EtherChannel by setting On mode for both S1 and S3.
PLATFORM USED (H/W & S/W TOOLS TO BE USED)	Cisco Packet Tracer
PROJECT SOURCE CODE LINK (GITHUB/ GOOGLE DRIVE)	https://github.com/KPB1331/Link-Aggregation-In-CPT
CONCLUSION /FUTURE ENHANCEMENT	<p>In conclusion we have implemented various link aggregation protocols such as LACP, PAgP and EtherChannel(manual) successfully in Cisco Packet Tracer.</p> <p>To further improve the project, we can use the concepts we learnt here and apply it to a real world example where it might be used.</p>
UI SCREENSHOTS	<p>Pre-Configuration</p> 

Post-Configuration

