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Section: IDB1	Title of Activity: LW3 Power Protection for Server 2019

In today's digital world, server uptime is critical. Power fluctuations and outages can cause data loss, hardware damage, and system downtime. Implementing a proper power protection plan is essential for safeguarding your Windows Server 2019 environment.

Research on the following:

1. What are the common power problems that can impact servers and its consequences on hardware, software and data? Fill out the table below.

Power Problem	Impact in terms of:		
	Hardware	Software	Data
Power Outages	Cause damage to hardware components	File System Corruption	Data loss
Power Surges	Causing components to fail.	System instability or system errors	Data loss and can corrupt stored data.
Voltage Spikes	Causes component failure or physical damage.	System instability or system errors	Data loss or corruption.
Electrical Noise	Causes errors, hardware malfunctions and reduce performance	System instability or system errors	Data loss or corruption.

2. Identify different types of power protection devices used for servers. What are their functionalities and their suitability on various server environments. Fill out the table below.

Power Protection Device	Function	Suitability		
		Cost	Power Capacity	Runtime
Uninterruptable Power Supplies(UPS)	For backup power in case of power outage, protecting equipment from damage.	Depends on the model and the environment whether it is small or large businesses	Can accommodate any server loads	Depends on battery capacity and loads
Surge Protector	Reduces excess voltage by diverting it to ground.	Low cost	None	None
Voltage regulator	Reduces fluctuations in the input voltage to	Medium to high cost.	None	None

	stabilize the output voltage.			
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3. What are the different UPS topologies and their advantages and disadvantages for server use.

UPS Topology	Advantage	Disadvantage
Standby or offline UPS	Cost-effective Simple management	Limited Protection
Line-interactive UPS	Enhanced protection Faster response time	Limited protection againsts power surges and spikes Limited suitability
Double-conversion online UPS	Provides more protection againsts anomalies	Expensive Higher energy consumption

4. Identify recommended practices for configuring and maintaining a UPS for optimal performance with Windows Server 2019.
- Recommended practices for configuring and maintaining a UPS for windows server 2019 are choosing the right or compatible UPS model for the server 2019. Install any software that is provided, enable UPS monitoring features, and regularly inspect the UPS for damages and connections. Make a schedule for testing and maintainance of the UPS and maintain a detailed records of UPS maintainance, or any incidents.
5. Research specific UPS models recommended for Windows Server 2019 environments.
- APC Smart-UPS SMT Series
 - Tripp Lite SmartOnline Series
 - CyberPower Online Series