

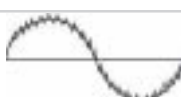
Power Problems and their Consequences

Origins for Power Problems

Utility companies cannot guarantee the supply of the clean source of power that sensitive electronic equipment require. 3 major origins can be listed:

- ▶ **Mother Nature:** Thunderstorms, strong winds, hurricanes, earthquakes, snow, ice, flood can all affect power lines. No place in the country is safe from any climatic hazard.
- ▶ **Human errors:** Remember the San Francisco power outage (1 million people in the dark for 7 hours in December 1998)? The reason was a "simple human error", as workers adjusting several 115-kilovolt lines turned power on without proper grounding.
- ▶ **Office environment:** departmental copiers, neon lights, elevators generate disturbances that can affect the proper operation of any information system.

Types of Power Problems

▶ Blackouts Total loss of utility power for more than 1 cycle		Thunderstorms, overloads, accidents, ice on power lines	System crashes, lost data, corrupted data
▶ Brownouts Sustained under-voltage conditions		Overloads, excessive power demand (AC or heating turned on)	System crashes, overheating, damage, operating errors
▶ Surges Temporary over-voltage condition		Startup of large loads	Operating errors, system shutdown, component stress
▶ Spikes Short duration, sudden voltage jump		Lightning, static discharges	Operating errors, system shutdown, corrupted data
▶ Overvoltage Continuous voltage above nominal		Wiring faults, faulty regulation systems	Overheating, component stress, damage, operating errors
▶ Harmonics Frequency oscillations up to 100% amplitude		Incorrect electrical settings, faulty control systems	Power supply malfunction, data loss
▶ Noise Electromagnetic interference (EMI)		Electric motors	Operating errors, data loss

Financial Consequences

According to an independent survey from The Standish Group, one minute of application downtime can cost thousands of dollars in lost revenues.

Based on these costs, the ROI for power protection can be as fast as a few seconds of downtime, or simply the first power outage.

Call location	\$27,000
Number portability	\$14,000
Enterprise Resource Planning	\$13,000
Supply Chain Management	\$11,000
Electronic Commerce	\$10,000
Internet Banking	\$7,000
Universal Personal Services	\$6,000
Customer Service Center	\$3,700
Point of Sale/Electronic Fund Transfer	\$3,500
Messaging	\$1,000

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