

# Spanning Tree Information

## What is STP (Spanning Tree Protocol)?

### Why Do Business Networks Need STP?

Modern networks often contain multiple switches connected together. This provides resilience, allowing the network to continue operating if a cable or switch fails.

However, connecting switches together incorrectly can create a **network loop**, which can bring an entire network down in seconds.

STP (Spanning Tree Protocol) is a safety mechanism designed to prevent this from happening.

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## Imagine a Road Network

Imagine travelling from London to Manchester.

There may be several different routes available:

- Motorway route
- A-road route
- Diversion route

Having multiple routes is useful if one road is closed.

Computer networks work in exactly the same way.

Multiple paths between switches provide resilience, but if all routes remain active simultaneously, traffic can end up travelling in circles forever.

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# What Happens Without STP?

Without STP:

1. Switch A sends data.
2. Switch B receives it and forwards it.
3. Switch C receives it and forwards it.
4. The data returns to Switch A.
5. The cycle repeats indefinitely.

This is known as a:

## Network Loop

The result can be:

- Extremely slow network performance
- Cameras disconnecting
- Phones dropping calls
- Wi-Fi becoming unreliable
- Complete network outages

In severe cases, the network can become unusable within seconds.

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## How STP Prevents This

STP continuously monitors the network and identifies all available paths between switches.

If it detects multiple routes to the same destination, it will:

- ✓ Keep the best path active
- ✓ Place redundant paths into standby mode
- ✓ Automatically reactivate backup paths if a failure occurs

Think of it as a traffic controller ensuring vehicles only use one route at a time while keeping alternatives available if needed.

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# Example

## Without STP

Switch A ↔ Switch B

↑ ↓

Switch D ↔ Switch C

Traffic can circulate endlessly around the square.

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## With STP

Switch A ↔ Switch B

↑ X

Switch D ↔ Switch C

STP blocks one connection (shown as X).

The loop is removed, but a backup route still exists.

If a cable fails, STP can automatically reopen the blocked connection to maintain service.

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# Why Is STP Important for CCTV and Smart Homes?

Modern properties often have:

- Multiple network switches
- Wi-Fi access points
- Security cameras
- Door access systems
- Smart home controllers
- Audio/video systems

These systems are increasingly connected using multiple network paths to improve reliability.

STP ensures that:

- ✓ Cameras remain online
- ✓ Access control continues operating
- ✓ Wi-Fi remains stable
- ✓ Smart home systems remain responsive
- ✓ Redundant links can be used safely

Without STP, a single incorrectly connected cable can affect the entire property.

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## STP in UniFi Networks

UniFi systems use Rapid Spanning Tree Protocol (RSTP), which is a faster and more modern version of STP.

RSTP can:

- Detect loops quickly
- Recover from failures rapidly
- Automatically select the best route
- Protect the network from accidental cabling mistakes

This is one of the reasons professionally designed UniFi networks remain stable even when multiple switches and buildings are connected together.

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## In Simple Terms

**STP is a safety system for your network.**

It prevents data from travelling in circles, protects against cabling mistakes, and allows backup network routes to exist without causing outages.

Without STP, a single network loop can bring an entire property offline.

With STP, the network automatically keeps traffic flowing along the safest and most efficient route.

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Revision #1

Created 2026-06-03 07:46:18 UTC by Editor

Updated 2026-06-03 07:46:33 UTC by Editor