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What is SD-WAN?

▶ Definition of SD-WAN
  ▶ Stands for Software Defined Wide Area Network

▶ Characteristics of SD-WAN
  ▶ Application-aware over-the-top WAN connectivity service
  ▶ Uses policies to direct application flows
  ▶ Operates over multiple underlay networks

"

"I had originally purchased leased fiber to interconnect the Livewire networks of the locations, but that proved expensive and overkill for my specific needs. I was contemplating a network of codecs to move around the audio and implementing an appliance-based SD WAN, using cheaper internet connections. When I took my idea to Jacob at Tieline, he instantly said SD WANs were not a problem at all, and proceeded to introduce me to the then new Gateway product that would do exactly what I wanted to do with my codecs in a single platform."

–Jamie Till, Director of Engineering for Sarkes Tarzian Radio, IN.

"

"For the most part, SD-WANs tend to just work out of the box with a Tieline system. There are expectations to things just not working out of the box, but those issues tend to be related to things like your Routing Table not being configured properly, or the SD-WAN interface itself. At the end of the day, Tieline simply views an SD-WAN as a traditional IP network with a Routing Table that we can refer to for network routing."

–Jacob Daniluck Vice President of Sales, Americas

Tieline
The Codec Company

Cloud Migration & SaaS Usage

▶ Traditional WANs were designed for data centers, not the cloud.

▶ As companies moved apps to SaaS (like Office 365, Salesforce) and IaaS (like AWS, Azure), they needed better direct-to-cloud connectivity.

▶ SD-WAN allows secure, optimized cloud access from any branch without backhauling traffic through the data center.
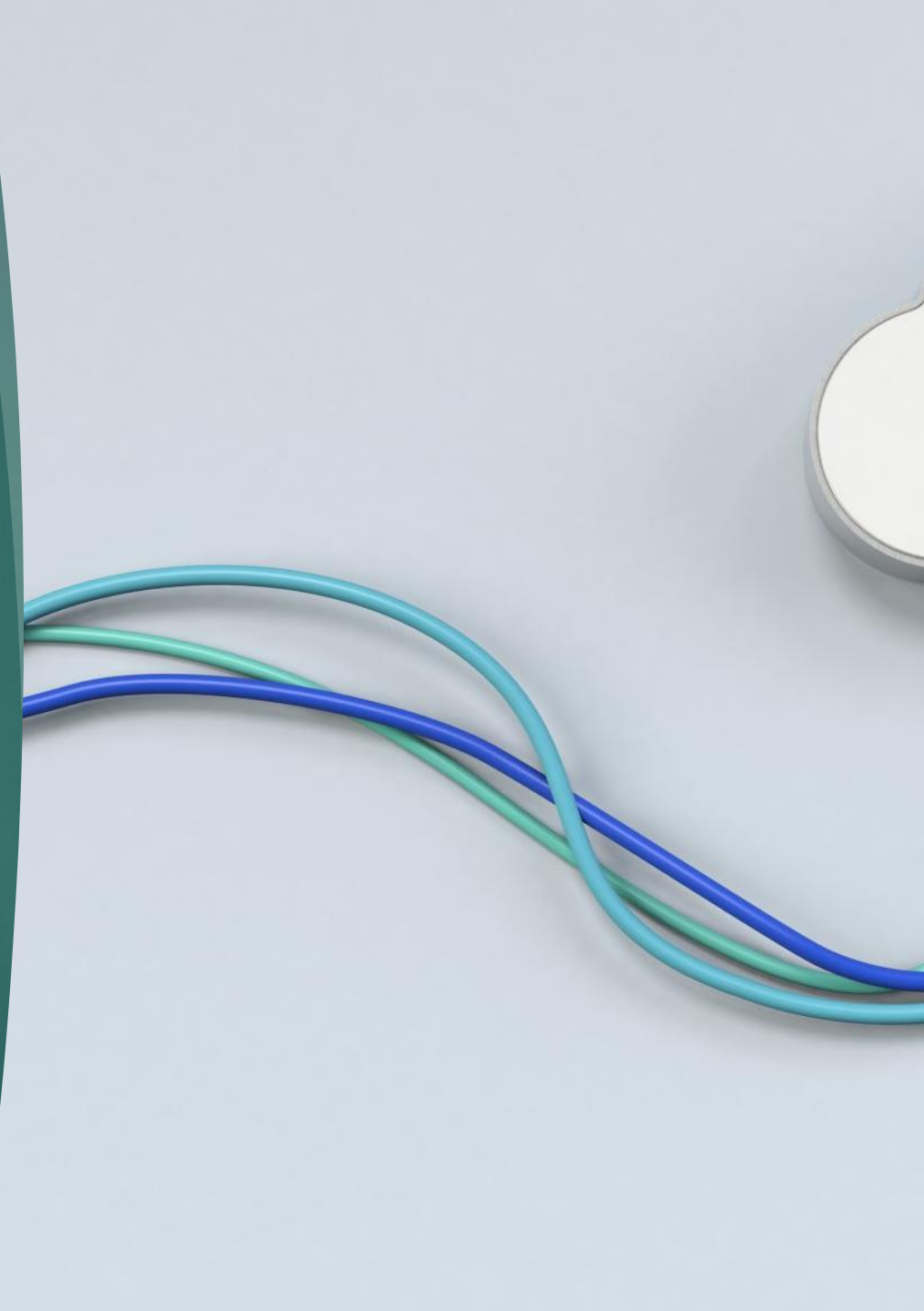
Cost Efficiency

- ▶ **Legacy WANs relied heavily on expensive MPLS circuits and Private Lines**

- ▶ **SD-WAN enables use of lower-cost broadband and LTE links, either as a replacement or supplement to MPLS.**

- ▶ **This reduces bandwidth costs while maintaining performance.**

Performance Optimization

SD-WAN improves app performance with:

▶ Dynamic path selection

▶ Traffic shaping

▶ Forward error correction

▶ It prioritizes business-critical apps and reroutes around congestion or outages in real time.

Improved Security

▶ SD-WAN vendors began integrating next-gen firewalls, encryption, segmentation, and zero-trust access.

▶ This helped meet growing security needs, especially for distributed workforces and remote branches.

Gartner specifies four key capabilities as critical for SD-WAN:

Lightweight replacement for traditional WAN routers and support for multiple connection types

Dynamic Path Selection for load sharing and policy-based operation

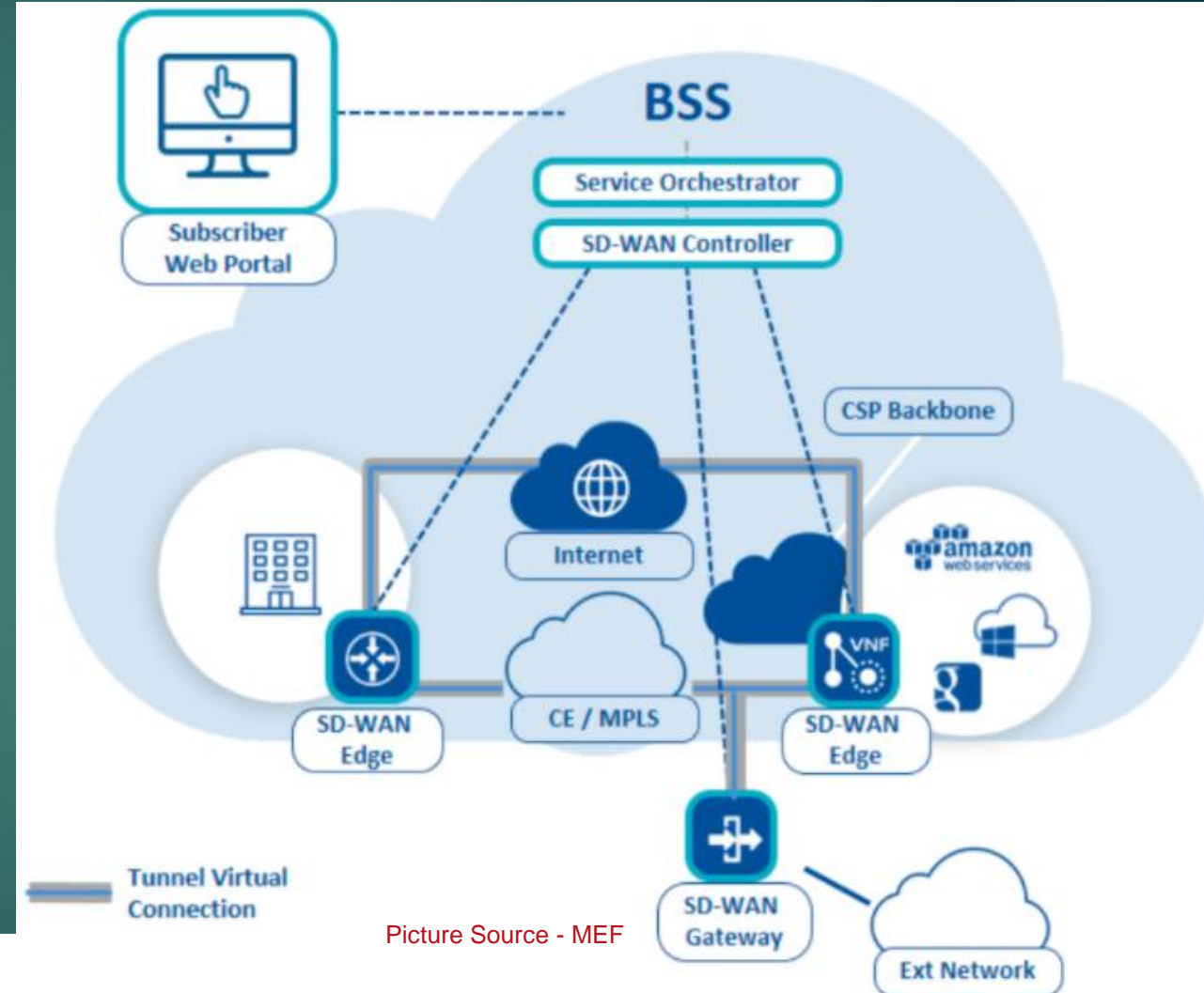A simple, intuitive WAN management and monitoring interface

Support for secure VPN's and integrated third-party network services

Understanding Basic SD-WAN Terminology

- **Orchestrator/Controller**

- **SD-WAN Edge**

- **Gateway**

- **Application flow**

- **Internet Breakout**

- **Virtual Tunnels**
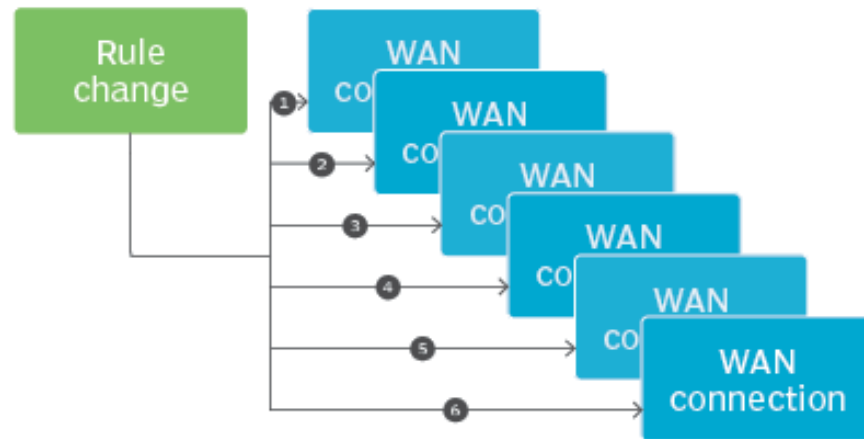
Picture Source - MEF

SD-WAN Controller

In a traditional WAN, each device is configured independently and manually. An SD-WAN controller consolidates and centralizes this configuration and provisioning data, enabling it to be orchestrated out to all WAN endpoints simultaneously.
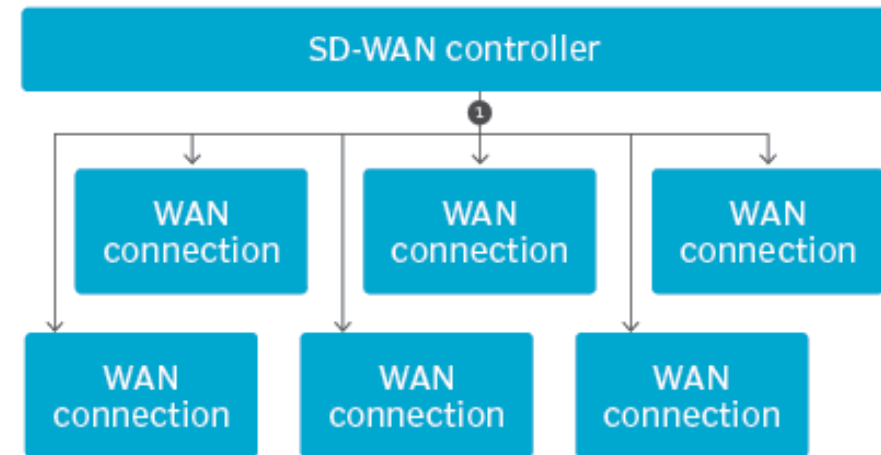
Traditional WAN
Each endpoint managed separately

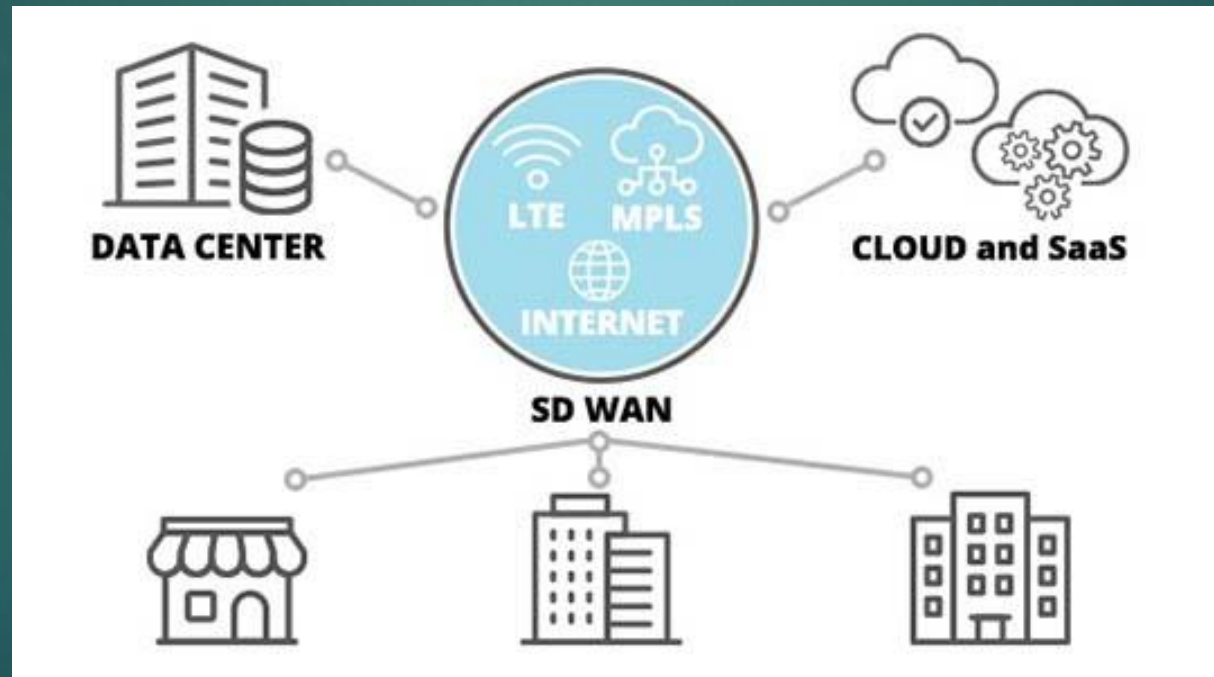**SD-WAN**
All endpoints managed together

Picture Source - Techtarget

SD-WAN Gateway

The SD-WAN Gateway can be thought of as a special case of the SD-WAN Edge that lets sites connect to other services or locations outside the corporate WAN

Feature Set (depends on vendor and product)

- Border Gateway Protocol (BGP) and Routing Support
- Bi-directional Priority Routing
- Secure and Private Direct Connection to Most Major Cloud Providers
- DDoS Mitigation
- Access to Gateway
- Seamless WAN Failover
- Per Packet Load Balancing
- Forward Error Correction
- Dynamic Path Selection / Bandwidth Aggregation Over Single Link
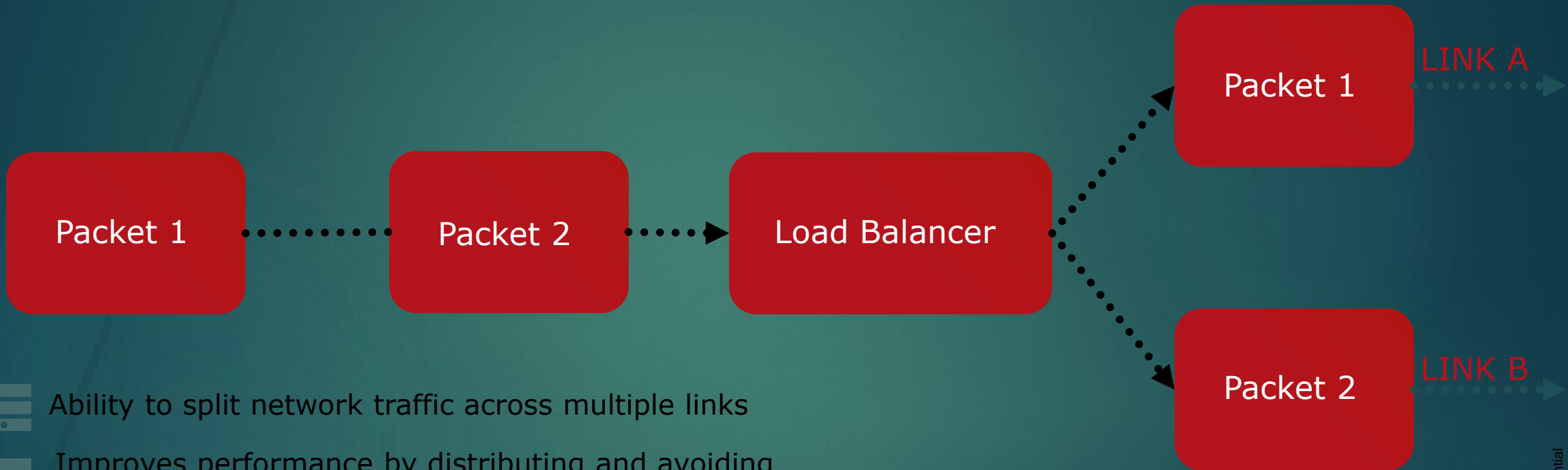
Standard Feature

LINK A

Path Selection and Preferred Path

Packet 1 → Packet 2 → **Path Selection/ Preferred Path**

Packet 1 → Packet 2

LINK B
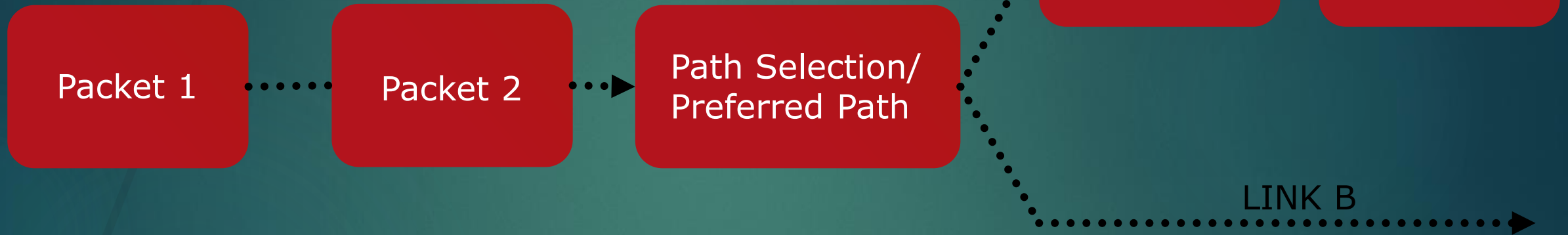
Ability to pick a preferred link for traffic based on link characteristics

Dynamic and Fixed path selection options
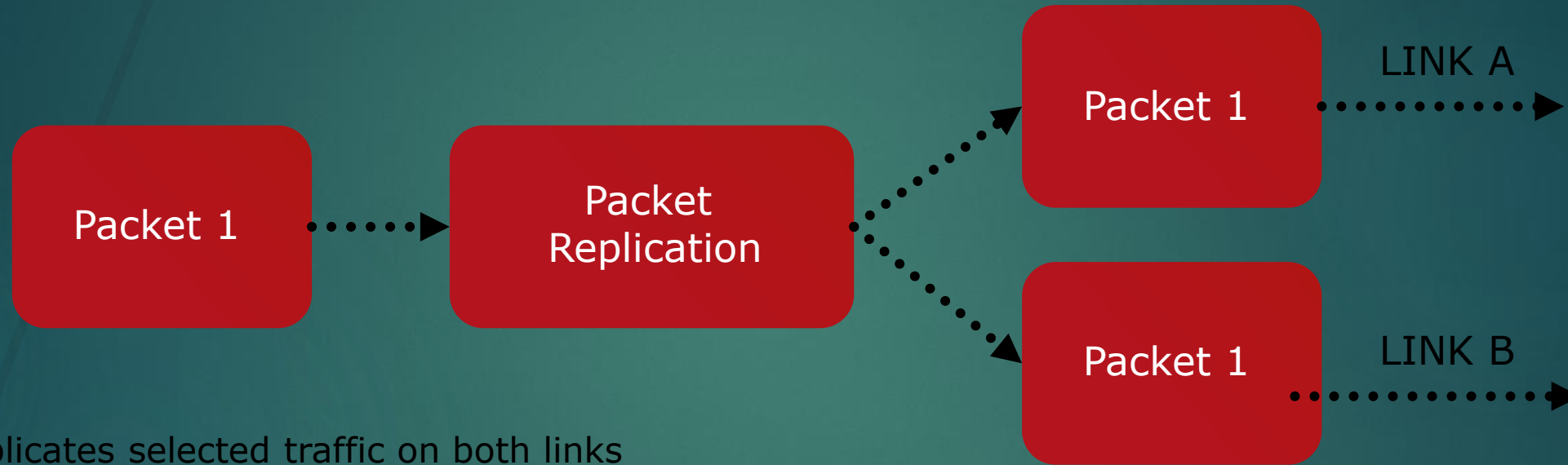
Dynamic is usually based on packet loss or latency

Improves application and network performance because 'best' link is always chosen

Improves failover and reliability

Packet Replication

LINK A

Packet 1

Packet Replication

Packet 1 → LINK A

Packet 1 → LINK B

Replicates selected traffic on both links

Substantial gain in application quality for voice and video

Eliminates loss and jitter

Improves reliability

Can also be performed on a single link (certain technologies)

ScanSource Confidential

Advantages Over Traditional WAN

Category	Traditional WAN	SD-WAN with Controller
Management	Decentralized, manual configuration at each site	Centralized via a controller or orchestrator (single pane of glass)
Routing Logic	Static, circuit-based routing (often MPLS)	Dynamic, policy-based routing based on application, latency, loss, jitter, etc.
Failover	Requires manual intervention or BGP/OSPF-based configuration	Automatic, real-time failover across multiple links
Visibility	Limited visibility into app-level traffic	Deep application-layer visibility and analytics
Provisioning	Time-consuming and hardware-driven	Fast, cloud-based provisioning via templates and automation
Security Integration	Typically handled separately via firewalls at each site	Can be integrated into the SD-WAN fabric or via SASE for cloud-delivered security
Cost Structure	Expensive dedicated circuits (e.g., MPLS)	Leverages lower-cost broadband, LTE, satellite, etc. alongside MPLS
Traffic Prioritization	Manual QoS setups, limited agility	Application-aware traffic shaping and prioritization out of the box

Managed SD-WAN
A third-party service provider (e.g., a telco or MSP) handles the deployment, configuration, monitoring, and maintenance of the SD-WAN solution.

✅ Pros:

▶ Hands-off management: Provider handles all setup, updates, and troubleshooting.

▶ 24/7 support: Usually includes a dedicated support team and SLAs.

▶ Faster deployment: Providers often have streamlined deployment processes.

▶ Integrated security: Providers may bundle security services (firewall, SASE, etc.).

▶ Single vendor accountability: Easier to manage issues via one point of contact.

Managed SD-WAN

❌ Cons:

Less control: Limited flexibility for in-house customization.

Recurring costs: Monthly service fees can be higher over time.

Vendor lock-in: Harder to switch vendors or customize hardware/software.

Self-Managed SD-WAN
Your internal IT team is responsible for the full SD-WAN lifecycle — from planning and deployment to maintenance and support.

✅ Pros:

- Full control: You define policies, routing, security, etc.

- Customization: Tailor the solution to specific business needs.

- Potential cost savings: No monthly MSP fees (though CAPEX may be higher).
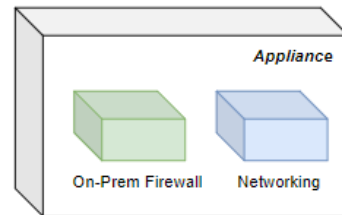
Self-Managed SD-WAN

❌ Cons:

Higher internal resource demand: Requires skilled network engineers.

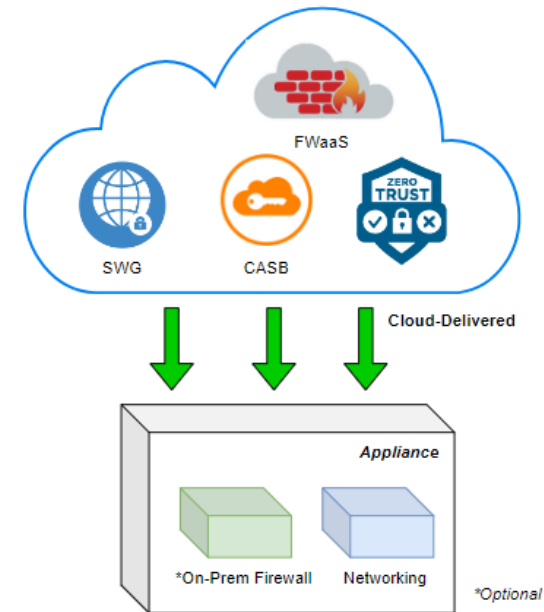Longer deployment times: Planning, testing, and rollout are all on you.

Responsibility for uptime: If something breaks, it's your team's job to fix it.

SD-WAN vs SASE

Feature	SD-WAN	SASE
Application-Aware Routing	✅	✅ (via integrated SD-WAN)
Path Selection & Load Balancing	✅	✅ (via SD-WAN component)
Centralized Management	✅	✅ – policy enforcement in cloud
Encrypted Tunnels (IPsec/SSL)	✅	✅
Zero Trust Network Access (ZTNA)	🚫	✅
Cloud Access Security Broker (CASB)	🚫	✅
Secure Web Gateway (SWG)	🚫	✅
Firewall as a Service (FWaaS)	⚠️ Basic or 3rd-party	✅ Built-in
Data Loss Prevention (DLP)	🚫	✅
Remote Workforce Support	⚠️ Limited (site-focused)	✅ Remote & mobile-first
Threat Protection & Visibility	🚫	✅ Real-time, cloud-delivered inspection

Cost

Deployment Size (Number of Sites/Branches)
•**Small businesses (5-10 sites)**: $100 to $500 per site per month.
•**Medium-sized deployments (10-50 sites)**: $75 to $300 per site per month.

Vendor Pricing Models
Different vendors price SD-WAN solutions differently. Some popular options:
•**Cisco Meraki**: Often **$100-$200 per site per month.**
•**VMware SD-WAN (formerly VeloCloud): $75-$200 per site per month.**
•**Fortinet SD-WAN**: **$50-$150 per site per month**, especially if bundled with security services

Hardware vs Software
•Some solutions require **physical appliances at each location**, which may cost:
  • **$500-$2,000 per device (one-time)**.

TOP 15 SD-WAN VENDORS DEPLOYMENT GUIDES

Thank you from Dan Merwin and Broadcast Telecom

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