

Cisco IOS Software Release 12.2(53)SG for Cisco Catalyst 4500 Series Supervisor Engines, Cisco Catalyst 4900 Fixed-Configuration Switches, and Cisco Catalyst 4900M Switch

PB553133

Overview

This product bulletin describes some of the primary hardware and software features supported by Cisco[®] IOS[®] Software Release 12.2(53)SG for the Cisco Catalyst[®] 4500 Supervisor Engine 6-E, Cisco Catalyst 4900 Series Switches, Cisco Catalyst 4900M Switch, Cisco Catalyst 4500 Series Supervisor Engine V-10GE, Cisco Catalyst 4500 Supervisor Engine V, Cisco 4500 Supervisor Engine IV, Cisco Catalyst 4500 Series Supervisor II-Plus-10GE, Cisco Catalyst 4500 Series Supervisor Engine II-Plus-TS, and Cisco 4500 Series Supervisor Engine II-Plus.

Primary Hardware and Software Service Innovations Delivered in Release 12.2(53)S

Cisco announces Cisco IOS Software Release 12.2(53)SG for all shipping Cisco Catalyst 4500 Series (classic and Cisco Catalyst 4500 Supervisor Engines 6-E and 6L-E), Cisco Catalyst 4900 Series, and Cisco Catalyst 4900M switches. 12.2(53)SG is the base release for a new extended maintenance train. For detailed information about release trains, visit

http://www.cisco.com/en/US/prod/collateral/switches/ps5718/ps4324/product_bulletin_c25_468800.html.

The following list highlights the primary hardware and software features in this release:

- Supervisor 6L-E hardware supported in mainline release
- Open Shortest Path First (OSPF) for routed access: designed to allow customer to extend Layer 3 to the access
- IP multicast load splitting: Equal Cost Multipath (ECMP) using S, G, and next hop
- Repackaging of features from IP Base to LAN Base

Release Overview

Table 1 provides a release overview.

Table 1. Release Overview

Feature	Cisco Catalyst Chassis 4500 Supervisors Cisco Catalyst 4900	Cisco Catalyst 4500 Supervisor Engine 6E Cisco Catalyst 4900M
Cisco IOS Software Release on Which First Support		
Hardware		
Supervisor 6L-E	–	12.2(53)SG
IP Routing and Multicast		
OSPF for Routed Access	Not Supported	12.2(53)SG
IP Multicast Load Splitting: ECMP Using S, G, and Next Hop	12.2(53)SG	12.2(53)SG
Repackaging of Features in LAN Base image	12.2(53)SG	12.2(53)SG

Features

The following new features of Cisco IOS Software Release 12.2(53)SG are applicable to all supervisor engines and 4900 fixed-configuration systems, unless otherwise stated.

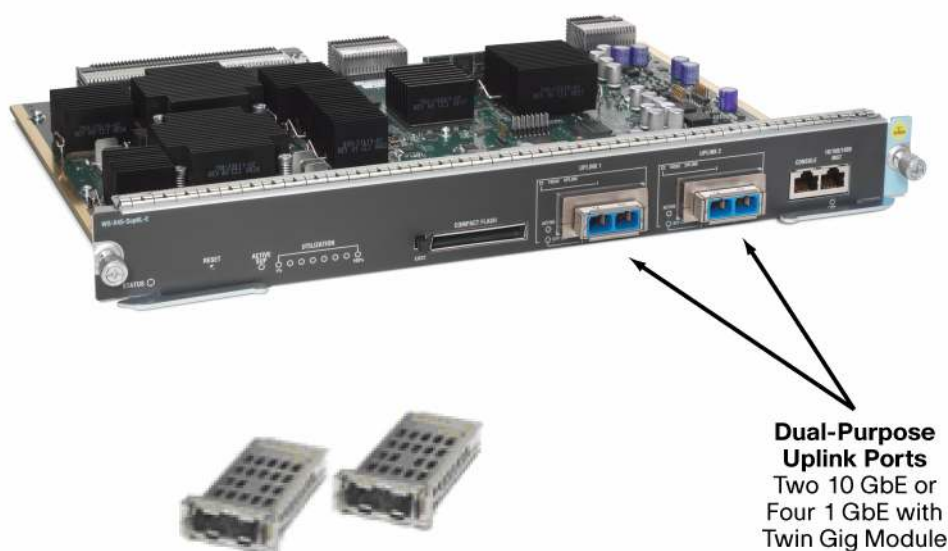
Hardware

Supervisor 6L-E

Cisco Catalyst 4500 E-Series Supervisor for High-Performance Enterprise Access

In May 2009 Cisco announced the Cisco Catalyst 4500 Supervisor Engine 6L-E (Figure 1), optimized for high-performance enterprise access. With the introduction of Cisco IOS Software Release 12.2(53)SG, Supervisor 6L-E is now supported in a mainline release that will also be a long-term maintenance release. Supervisor Engine 6L-E enhances the Cisco Catalyst 4500 E-Series by facilitating performance, enabling services, and protecting investments for enterprises and small and medium-sized businesses (SMBs) deploying business-critical applications. The competitive pricing on the supervisor engine makes it an ideal entry-point offering.

Figure 1. Cisco Catalyst 4500 Supervisor Engine 6L-E



Dual-Purpose Uplink Ports
Two 10 GbE or
Four 1 GbE with
Twin Gig Module

Product Overview

The Supervisor Engine 6L-E provides a fourfold increase in per-slot switching capacity from previous-generation Layer 2 Cisco Catalyst 4500 supervisor engines at 24 Gbps per slot.

Primary Supervisor Engine 6L-E performance features include:

- Centralized 280-Gbps switching capacity with 225 Mpps of throughput
- IPv6 support in hardware, providing wire-rate forwarding for IPv6 networks
- Dynamic hardware forwarding-table allocations for easy IPv4-to-IPv6 migration
- Advanced quality of service (QoS) support with eight queues per port, dynamic queue sizing, and hierarchical policing
- FAT file system for easier network administration
- Dual 10 Gigabit Ethernet uplinks (X2 optics)

The Cisco Catalyst 4500 E-Series offers services essential for business-critical real-time applications. The Cisco Catalyst 4500 E-Series is easy to manage with features such as Smartports, EEM, and SMARTCallHome. These features combined with standard Cisco Catalyst 4500 features such as QoS, multicast, IPv6, and security features including L2 security, IEEE 802.1X, and Control Plane Policing (CoPP) make it an ideal platform for enterprise access.

Power consumption on the Supervisor Engine 6L-E is optimized, and the supervisor engine shows a 70 percent decline in power consumed/Gbps when compared with the WS-X4013+. The supervisor engine also allows the Cisco Catalyst 4500 chassis to minimize power usage by automatically sensing unused slots and turning off power to the ASICs on unused slots. When combined with Cisco Catalyst 4500 line cards, the system supports Power over Ethernet (PoE), Cisco enhanced PoE, and premium PoE features such as 30W per port.

The Supervisor Engine 6L-E offers flexibility and investment protection. It supports Cisco Catalyst 4500 E-Series line cards in addition to all currently shipping classic Cisco IOS Software supervisor engines, classic line cards dating back to 1999. Classic and E-Series line cards can be mixed and matched with no performance degradation. Twin Gigabit Ethernet converter modules offer flexibility for up to four Gigabit Ethernet Small Form-Factor Pluggable (SFP) uplinks in the X2 optic slots, allowing a phased migration to 10 Gigabit Ethernet. The Supervisor Engine 6L-E works with the 7-slot, 6-slot, and 3-slot E-series chassis and all shipping Cisco Catalyst 4500 power supplies.

Ordering Information

To place an order, visit the Cisco Ordering Page: <http://www.cisco.com/en/US/ordering/index.shtml> (see Table 2.).

To download software, visit the Cisco Software Center: <http://tools.cisco.com/ITDIT/ISTMAIN/servlet/index>.

Table 2. Ordering Information

Product Number	Description
WS-X45-SUP6L-E (=)	Cisco Catalyst 4500 E Series Supervisor Engine 6L-E, 2x10GE (X2) or 4x1GE (SFP), Console RJ-45

Software Features

IP Routing and Multicast

OSPF for Routed Access (Supervisor Engine 6L-E, Supervisor Engine 6-E, and 4900M only):

OSPF for routed access is designed specifically to enable customers to extend Layer 3 routing capabilities to the access or wiring closet.

Note: OSPF for routed access supports only one OSPFv2 and one OSPFv3 instance with a maximum number of 200 dynamically learned routes.

With the typical topology (hub and spoke) in a campus environment, where the wiring closets (spokes) are connected to the distribution switch (hub) forwarding all nonlocal traffic to the distribution layer, the wiring closet switch need not hold a complete routing table. A best practice design, where the distribution switch sends a default route to the wiring closet switch to reach interarea and external routes (OSPF stub or totally stubby areas configuration), should be used when OSPF for routed access is used in the wiring closet.

For routed access layer designs using OSPF, please visit

<http://www.cisco.com/en/US/docs/solutions/Enterprise/Campus/routed-ex.html>.

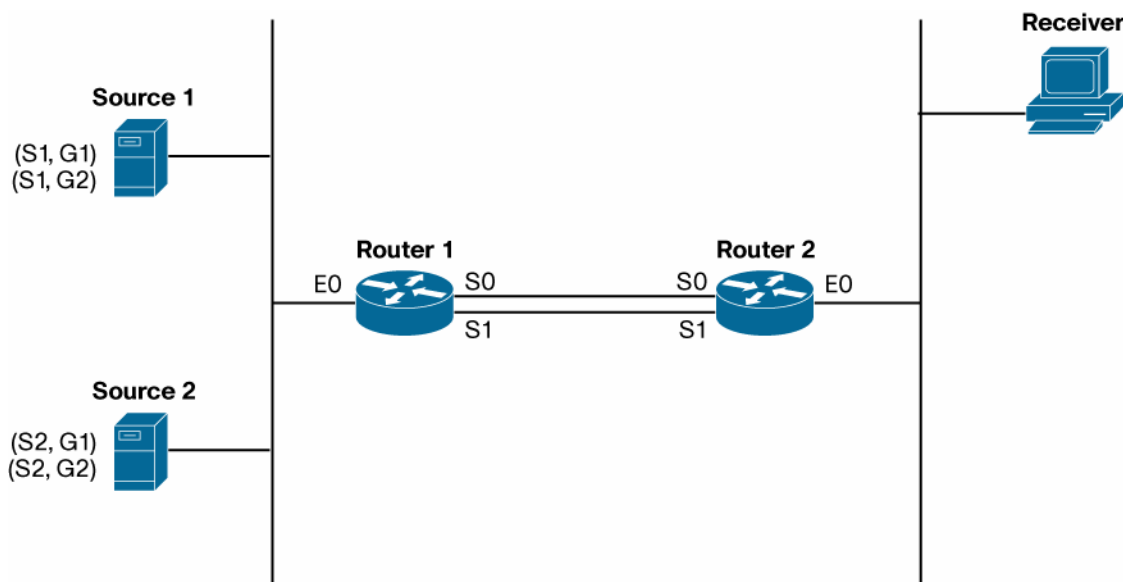
With Cisco IOS Software Release 12.2(53)SG, the IP Base image supports OSPF for routed access. The Enterprise Services image is required if you need multiple OSPFv2 and OSPFv3 instances without route restrictions.

Additionally, Enterprise Services is required to enable the VRF-lite feature.

IP Multicast Load Splitting: Equal Cost Multipath (ECMP) Using S, G, and Next Hop

If two or more equal-cost paths from a source are available, unicast traffic will be load split across those paths. However, by default, multicast traffic is not load split across multiple equal-cost paths. In general, multicast traffic flows down from the reverse path forwarding (RPF) neighbor. According to PIM specifications, this neighbor must have the highest IP address if more than one neighbor has the same metric. (See Figure 2.)

Figure 2. Default Behavior for IP Multicast When Multiple Equal-Cost Paths Exist



In Figure 2, two sources, S1 and S2, are sending traffic to IPv4 multicast groups, G1 and G2. Without further configuration, IPv4 multicast traffic in the topology illustrated in Figure 2 would always flow across one serial interface (either serial interface 0 or serial interface 1), depending on which interface has the higher IP address.

Configuring load splitting with the `ip multicast multipath` command causes the system to load split multicast traffic across multiple equal-cost paths based on source address using the S-hash algorithm. When the `ip multicast multipath` command is configured and multiple equal-cost paths exist, the path in which multicast traffic will travel is selected based on the source IP address. Multicast traffic from different sources will be load split across the different equal-cost paths. Load splitting will not occur across equal-cost paths for multicast traffic from the same source sent to different multicast groups.

Note: The `ip multicast multipath` command load splits the traffic and does not load balance the traffic. Traffic from a source will use only one path, even if the traffic far outweighs traffic from other sources.

In Cisco IOS Software Release 12.2(53)SG, the `ip multicast multipath` command can be used with the `s-g-hash` and `next-hop-based` keywords to enable ECMP multicast load splitting based on source, group, and next-hop address. The `next-hop-based` keyword enables a more complex hash, the next-hop-based S-G-hash algorithm, which is based on source, group, and next-hop address. The next-hop-based S-G-hash algorithm is predictable because no randomization is used in calculating the hash value. Unlike the S-hash and basic S-G-hash algorithms, the hash mechanism used by the next-hop-based S-G-hash algorithm is not subject to polarization.

For detailed information about load splitting IP multicast traffic over ECMP, read the white paper at http://www.cisco.com/en/US/docs/ios/12_4t/ip_mcast/configuration/guide.

Repackaging of Features in the LAN Base image:

The LAN base image is supported on the Supervisor II-Plus-10GE and the Supervisor 6L-E only. It is primarily focused on customer Layer 2 requirements containing basic access layer functionality. Release 12.2(53)SG adds the following features to the LAN Base image to meet the continuing access requirements of today's customers.

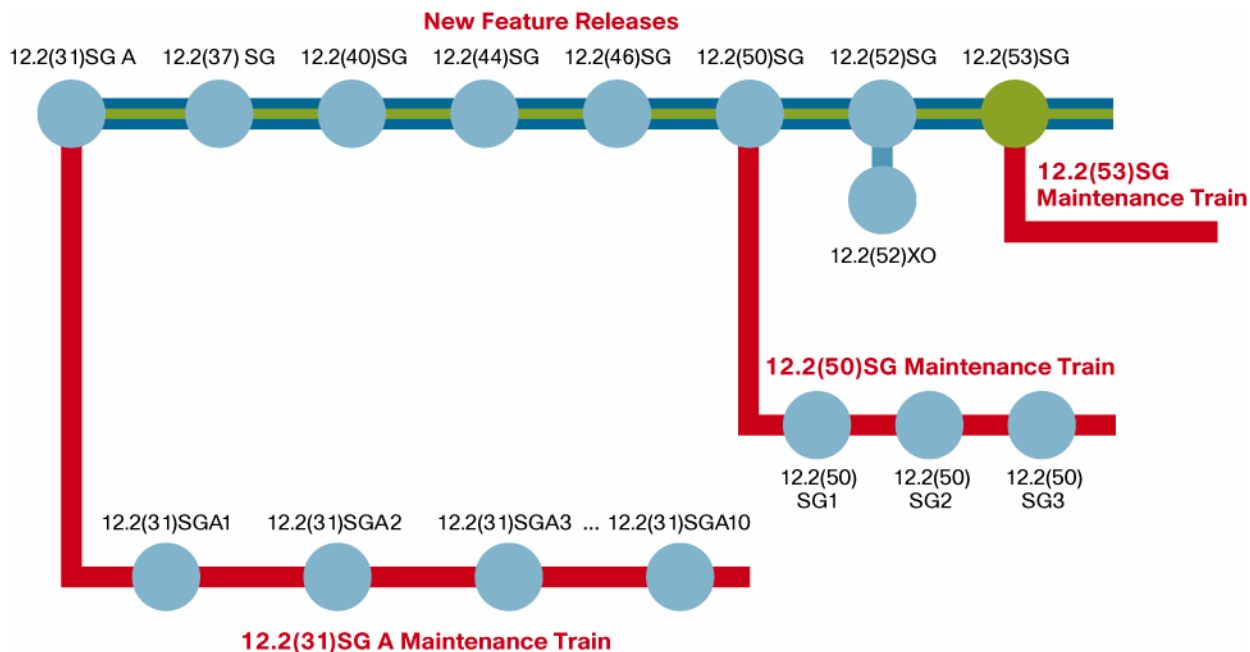
Table 3. List of features added to LAN Base package in 12.2(53)SG

Feature Name	Description
EnergyWise	EnergyWise is an innovative energy management architecture that is available to the entire Cisco Catalyst switching portfolio.
Rapid Per Vlan Spanning Tree (RPVST+)	Rapid PVST+ is an updated implementation of STP that allows you to create one spanning tree topology for each VLAN.
Smartports	SmartPorts is a cross-Catalyst solution that simplifies the configuration of critical features for Ethernet networks. SmartPorts makes available configuration best practices with pre-tested, Cisco-recommended, switch port configurations or "templates".
AutoQoS	AutoQoS dramatically simplifies QoS deployment by automating QoS features for voice traffic in a consistent manner and leveraging the advanced functionality and intelligence of Cisco IOS Software.
Enhanced Power over Ethernet	Cisco Enhanced PoE is Cisco's extension to the IEEE 802.3af standard that delivers up to 20W per port.
Multicast Listener Discovery (MLD) Snooping	Enable efficient distribution of IP version 6 (IPv6) multicast data to clients and routers in a switched network.
Flexlink+	Allows users to configure a Flex Link pair to allow both ports to forward the traffic for a set of VLANs which are mutually exclusive.

Cisco Catalyst 4500 Cisco IOS Software Release Trains

Figure 3 shows a simplified illustration of the Cisco IOS Software branch diagram with Release 12.2(53)SG, this new extended maintenance release.

Figure 3. Simplified illustration of the Cisco IOS Software Branch Diagram for Catalyst 4500/4900



Cisco Catalyst 4500 Cisco IOS Software Migration Guide

- Customers requiring the latest Cisco Catalyst 4500 Series hardware and software features should migrate to Cisco IOS Software Release 12.2(53)SG.
- Cisco IOS Software Release 12.2(31)SGA and 12.2(50)SG will continue to offer rebuilds on their respective maintenance trains.

Release 12.2(53)SG Summary

Release 12.2(53)SG is the base release for a new extended maintenance train. For information about release trains, visit http://www.cisco.com/en/US/prod/collateral/switches/ps5718/ps4324/product_bulletin_c25_468800.html.

This release provides hardware support for Supervisor Engine 6L-E and software support for OSPF for routed access, IP multicast load splitting with ECMP and some repackaging of features from the IP Base image to the LAN Base image.

Support

Support for Cisco IOS Software Release 12.2(53)SG follows the standard Cisco support policy, available at http://www.cisco.com/en/US/products/products_end-of-life_policy.html.

For more information about the Cisco Catalyst 4500 Series, visit <http://www.cisco.com/univercd/cc/td/doc/product/lan/cat4000/index.htm>.

Ordering Information

Table 3 shows the Cisco IOS Software Release 12.2(53)SG product numbers and images for the Cisco Catalyst 4500 Series, and Table 4 shows Cisco IOS Software Release 12.2(50)SG product numbers and images for the Cisco Catalyst 4900 Series.

Table 4. Cisco IOS Software Release 12.2(53)SG Product Numbers and Images for Cisco Catalyst 4500 Series

Product Number	Description	Image
S45IPB-12253SG(=)	Cisco IOS Software for the Cisco Catalyst 4500 Series Supervisor Engines II-Plus, II-Plus-TS, II-Plus-10GE, IV, V, and V-10GE (IP Base image without Crypto)	Cat4500-ipbase-mz
S45IPBK9-12253SG(=)	Cisco IOS Software for the Cisco Catalyst 4500 Series Supervisor Engines II-Plus, II-Plus-TS, II-Plus-10GE, IV, V, and V-10GE (IP Base image with Triple Data Encryption Standard [3DES])	Cat4500-ipbasek9-mz
S45ES-12253SG(=)	Cisco IOS Software for the Cisco Catalyst 4500 Series Supervisor Engines IV, V, and V-10GE (Enterprise Services image with Border Gateway Protocol [BGP] support, without Crypto)	Cat4500-entservices-mz
S45ESK9-12253SG(=)	Cisco IOS Software for the Cisco Catalyst 4500 Series Supervisor Engines IV, V, and V-10GE (Enterprise Services image with 3DES and BGP support)	Cat4500-entservicesk9-mz
S45EIPB-12253SG(=)	Cisco IOS Software for the Cisco Catalyst 4500 Supervisor Engine 6-E and 6L-E (IP Base image)	Cat4500e-ipbase-mz
S45EIPBK9-12253SG(=)	Cisco IOS Software for the Cisco Catalyst 4500 Series Supervisor Engine 6-E and 6L-E (IP Base image with 3DES)	Cat4500e-ipbasek9-mz
S45EES-12253SG(=)	Cisco IOS Software for the Cisco Catalyst 4500 Series Supervisor Engine 6-E (Enterprise Services image)	Cat4500e-entservices-mz
S45EESK9-12253SG(=)	Cisco IOS Software for the Cisco Catalyst 4500 Series Supervisor Engine 6-E (Enterprise Services image with 3DES)	Cat4500e-entservicesk9-mz
S45ELBK9-12253SG	Cisco IOS Software for the Cisco Catalyst 4500 Series Supervisor Engine 6L-E (LAN Base image with 3DES)	cat4500e-lanbase-mz
S45ELB-12253SG	Cisco IOS Software for the Cisco Catalyst 4500 Series Supervisor Engine 6L-E (LAN Base image)	cat4500e-lanbase-mz
S45EIPBUK9-12253SG=	Cisco IOS Software for the Cisco Catalyst 4500 Series Supervisor Engine 6L-E (IP Base Upgrade image with 3DES)	Cat4500e-ipbase-mz
S45EIPBU-12253SG=	Cisco IOS Software for the Cisco Catalyst 4500 Series Supervisor Engine 6L-E (IP Base	Cat4500e-ipbase-mz

Product Number	Description	Image
	Upgrade image)	
S45LB-12253SG	Cisco IOS Software for the Cisco Catalyst 4500 Series Supervisor Engine II-Plus-10GE (LAN Base image)	cat4500-lanbase-mz
S45LB-12253SG	Cisco IOS Software for the Cisco Catalyst 4500 Series Supervisor Engine II-Plus-10GE (LAN Base image with 3DES)	cat4500-lanbasek9-mz
S45IPBU-12253SG=	Cisco IOS Software for the Cisco Catalyst 4500 Series Supervisor Engine II-Plus-10GE (IP Base Upgrade image)	Cat4500-ipbase-mz
S45IPBU-12253SG=	Cisco IOS Software for the Cisco Catalyst 4500 Series Supervisor Engine II-Plus-10GE (IP Base Upgrade image with 3DES)	Cat4500-ipbasek9-mz

Table 5. Cisco IOS Software Release 12.2(50)SG Product Numbers and Images for Cisco Catalyst 4900 Series

Product Number	Description	Image
S49IPB-12253SG(=)	Cisco IOS Software for Cisco Catalyst 4900 Series Switches (IP Base image)	cat4500-ipbase-mz
S49IPBK9-12253SG(=)	Cisco IOS Software for Cisco Catalyst 4900 Series Switches (IP Base image with 3DES)	cat4500-ipbasek9-mz
S49ES-12253SG(=)	Cisco IOS Software for Cisco Catalyst 4900 Series Switches (Enterprise Services image with BGP support)	cat4500-entservices-mz
S49ESK9-12253SG(=)	Cisco IOS Software for Cisco Catalyst 4900 Series Switches (Enterprise Services image with 3DES and BGP support)	cat4500-entservicesk9-mz
S49MIPB-12253SG(=)	Cisco IOS Software for Cisco Catalyst 4900M Switches (IP Base image)	cat4500e-ipbase-mz
S49MIPBK9-12253SG(=)	Cisco IOS Software for Cisco Catalyst 4900M Switches (IP Base image with 3DES)	cat4500e-ipbasek9-mz
S49MES-12253SG(=)	Cisco IOS Software for Cisco Catalyst 4900M Switches (Enterprise Services image with BGP support)	cat4500e-entservices-mz
S49MESK9-12253SG(=)	Cisco IOS Software for Cisco Catalyst 4900M Switches (Enterprise Services image with 3DES and BGP support)	cat4500e-entservicesk9-mz
S49LB-12253SG=	Cisco IOS Software for Cisco Catalyst 4900 Series Switches (LAN Base image)	cat4500-lanbase-mz
S49LBK9-12253SG=	Cisco IOS Software for Cisco Catalyst 4900 Series Switches (LAN Base image with 3DES)	cat4500-lanbasek9-mz



Americas Headquarters
Cisco Systems, Inc.
San Jose, CA

Asia Pacific Headquarters
Cisco Systems (USA) Pte. Ltd.
Singapore

Europe Headquarters
Cisco Systems International BV
Amsterdam, The Netherlands

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