

Spirent TestCenter

CoAP/M2M Server Emulation Base Package

Constrained Application Protocol (CoAP) Application Testing

Constrained Application Protocol (CoAP) is a specialized web transfer protocol for use with constrained nodes and constrained networks in the Internet of Things (IoT). The protocol is designed for machine-to-machine (M2M) applications such as smart energy and building automation.

Spirent TestCenter CoAP/M2M Server Emulation provides solution for end-to-end functional, performance & security testing of M2M applications with real-world data, to help simulate and enable the rapid building, selection & deployment of IoT solutions.

The test solution covers the following:

- RFC 7252 Constrained Application Protocol (CoAP)
- RFC 7641 Observing Resources in the Constrained Application Protocol (CoAP)
- RFC 3986 Uniform Resource Identifier (URI)
- RFC 6690 "Constrained RESTful Environments (CoRE) Link Format"
- LwM2M Client & Server with full stack implementation
- DTLS Support over UDP for IPv4 (RFC 7250)
- CoAP Message types Supported—Bootstrapping, GET, PUT POST and DELETE

This package is an integrated component of Spirent TestCenter and works with other Spirent TestCenter components providing concurrent support for all key metropolitan and enterprise protocols, including spanning tree, VLAN, DHCP, QoS, Multicast and wire-rate data-plane traffic.

Internet of Things

Tens of bytes

Web Objects

CoAP

DTLS

UDP

IPv4 / IPv6
Ethernet

- Efficient objects
- Efficient web
- Optimized IP access

Features & Benefits

- Emulate main applicative scenarios to test smart grids and M2M, automotive telematics and the health sector, which use CoAP as application protocol
- Emulate key protocol in IPv6-based IoT networks, including retrieving Smart Meters readings, toggling light switches' status or collecting data from temperature sensors in a building, to test CoAP protocols with real-world data at a scale representing millions of sensors
- Emulate millions of Servers or end points
- Emulate full RFC (RFC 7252) support for CoAP
- Support for IPv4 or IPv6 server emulation
- Support for CoAP custom message types
- Supports Bootstrapping response without client requesting
- Supports Grouping servers based on call-flow
- Supports CoAP Server DTLS testing
- Single ARM testing by upload the certificate to Spirent test module
- Running multiple protocols concurrently on each port enables users test scalability and protocol functionality within the same test
- CoAP Device block allows user to build thousands of millions of sensors emulated simultaneously
- Interactive control of sensors group allows users to simulate real network conditions and see results on demand any time during a test without starting and stopping the protocols or traffic
- Interactive commands start/stop/flap or age-out, and send periodic update from group of sensors
- Use the advanced Command Sequencer with TCL scripts to send Telemetry commands, get Telemetry data, configure the DUT, run entire test and generate pass/fail results
- Log real-time exchange of control-plane messages and test over any media type or encapsulation supported by Spirent TestCenter
- Integrated data-plane traffic enables users to send, receive, inspect and accumulate statistics at wire-rate; this allows users to test data-plane router convergence and network high availability features like BFD and Graceful Restart; users can also can monitor the real-time effects that router configurations have on traffic and QoS classes
- Integrated with traffic wizard to quickly build traffic between traffic endpoints behind emulated routers
- View Routes command allows users to see routes advertised by the neighbor router (RIP, OSPFv2, IS-IS and BGP) per emulated router and optionally save the routes to a file (txt or csv) for later analysis
- Support for bidirectional capture and real-time decoder (BPK-1029A) which supports ladder diagrams for RIP, OSPF and BGP and view protocol events as they occur
- RIP, OSPFv2, IS-IS and BGP support for MD-5 authentication for verifying the security and evaluating the performance and behavior of their routers in realistic configurations
- For functional testing, each protocol has its own configurable timers, flag values and diagnostic codes
- Support for Ethernet, ATM and SONET media types and all associated encapsulations for testing over any supported media or encapsulation
- Support for L2TP and GRE tunneling on a per router basis for testing over any supported tunnel mode

Technical Specifications

CORE Group RFCs / Drafts	Description
RFC 7252	<p>CoAP Server Packet encapsulation and decapsulation</p> <p>Message layer</p> <ul style="list-style-type: none"> • Different message types <ul style="list-style-type: none"> – Request – Response – Ack – Reset • Duplicate detection, • Stop-and-wait retransmission with exponential backoff for Confirmable messages • asynchronous layer of operation <hr/> <p>Request / Response interactions, REST operations - Get, Put, Post, Delete</p> <ul style="list-style-type: none"> • Request message • Response message: piggybacked/separate <hr/> <p>Option processing</p> <ul style="list-style-type: none"> • Uri-Host, Uri-Port, Uri-Path, Uri-Query • Content Format option <ul style="list-style-type: none"> – Vender TLV format, JSON • MaxAge • Accept (for content formats) • Entity Tag (ETag) • Conditional Request • If None-Match • If Match <hr/> <p>Server / Resource Discovery</p> <ul style="list-style-type: none"> • DTLS • Raw public keys
Group Based Communication	<ul style="list-style-type: none"> • IP multicast • CoAP based group management
ietf-core-block	<ul style="list-style-type: none"> • Avoid fragmentation at IP and adaptation layers. • Split large transfer into multiple transactions at CoAP layer
RFC6690	Discovery
CoAP Minimum Request Interval	<p>To negotiate the minimum time between two subsequent requests for a single client and server pair:</p> <ul style="list-style-type: none"> • Prevent overloading of constrained servers
CoAP Patience Option	<p>For a unicast request:</p> <ul style="list-style-type: none"> • How long a Client is ready to wait for response. • CoAP server tries to send response within that specified timeframe. <p>For CoAP Observe notification:</p> <ul style="list-style-type: none"> • Patience that an observer should have in waiting for a subsequent notification (after time interval specified by Max-Age has elapsed) • If no change in variable being observed, server can assume that Client will do its best to provide notification before the Patience time interval runs out • If multiple clients are simultaneously observing a resource, server can use different delay parameters for different clients.
Stateful Observation in CoAP	<ul style="list-style-type: none"> • To avoid potential re-registration flooding (of CoAP clients with CoAP servers) • Server to provide a State that can be used by Client to decide about re-registration
Sleepy Node Support	<ul style="list-style-type: none"> • Resource directory to provide Sleep status
Max-Age	<ul style="list-style-type: none"> • A Max-Age configurable parameter and refreshed before transmissions.
UUID	<ul style="list-style-type: none"> • Each Server contain a uuid that complies with RFC4122 with the semantics of the ethernet PhysicalUUID in RFC6933 • Support DHCPv6 on server enabled with CoAP/DTSL.
UDP and Blockwise Transport	<ul style="list-style-type: none"> • Servers are expected to use UDP with blockwise transport for CoAP requests and responses

About Spirent Communications

Spirent Communications (LSE: SPT) is a global leader with deep expertise and decades of experience in testing, assurance, analytics and security, serving developers, service providers, and enterprise networks.

We help bring clarity to increasingly complex technological and business challenges.

Spirent's customers have made a promise to their customers to deliver superior performance. Spirent assures that those promises are fulfilled.

For more information, visit:
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Ordering Information

Part Number	Description
BPK-1369	CoAP Server Emulation Base Package
BPK-1169-2XMOD	CoAP Server Emulation Base Package for 2-slot Chassis
BPK-1373	CoAP Server Emulation without DTSL Base Package
BPK-1373-2XMOD	CoAP Server Emulation without DTSL Base Package for 2-Slot Chassis
V-BPK-1369-001	CoAP Server Emulation Base Package 1 Port
V-BPK-1369-004	CoAP Server Emulation Base Package 4 Port
V-BPK-1369-VCH	CoAP Server Emulation Base Package vChassis

CoAP Server Emulation is supported on both hardware and virtual ports on all the MX/FX/PX series cards.

CoAP licenses also available for N4U chassis in 2X-MOD license.

Contact Us

For more information, call your Spirent sales representative or visit us on the web at www.spirent.com/ContactSpirent.

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