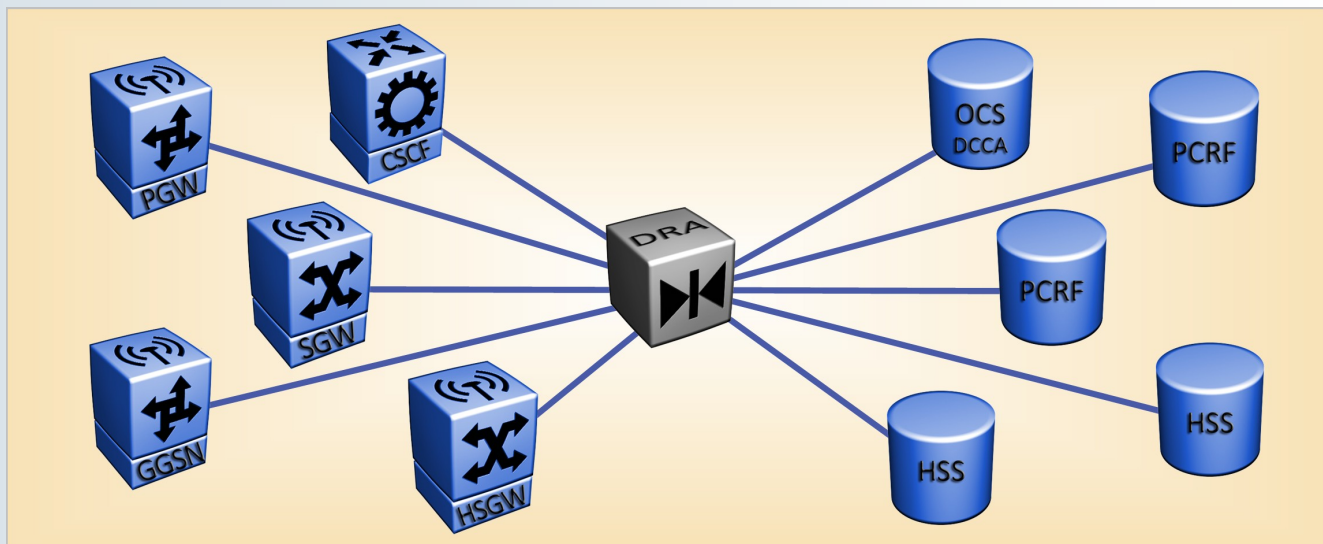




Surround your DRA with **dsTest** Load Generators and Server Emulators. See our [product pages](#) for more information.

Identify Routing Bottlenecks

The Diameter Routing Agent (DRA) is a critical component of the LTE core network. Among its many responsibilities is that of balancing Diameter signaling in the Evolved Packet Core (EPC) between clients and the available destination servers. Not only does a DRA balance the load but it must maintain session state when interacting with certain servers to ensure that subscriber activity is properly tracked.

dsTest is the only solution on the market today that can deliver hundreds of thousands of stateful Diameter transactions per second from clients and servers to test the DRA's ability to proxy, redirect, and relay. Generate traffic simulating subscriber activity from thousands of clients (simulated PCEFs, HSGWs, MMEs, ASs) routed via DRA to hundreds of servers (emulated PCRFs, HSSs, and OCSs).

Unlike some test tools, **dsTest** provides stateful, standards-based applications that react appropriately to both expected and unexpected events without the need for scripting. Where **dsTest** surpasses all other tools is in its capacity, its performance, and the ease with which you can customize the scenarios and messages to achieve your test goals.

Capacity

With a single one rack unit server, **dsTest** can host more than 50,000,000 simulated subscribers. It can also scale to beyond 5,000 emulated nodes to create a virtual network that routes various traffic types towards the DUT.*

* see [Capacity and Performance](#)

Performance

dsTest is leading the performance testing market. Our interface applications such as Gx are completely stateful and capable of generating hundreds of thousands of transactions per second.

Flexible Simulations

dsTest utilizes a Subscriber Profile Repository (SPR) to host subscriber entries. Multiple emulated nodes can utilize the SPR to create complex signaling traffic across many interfaces. In addition to the subscriber information, each subscriber profile includes a **SmartProfile™**, which allows you to define behavior and supplemental information.

Customize Behavior

The **SmartEvents™** feature gives you the ability to extend the state machine of an interface application and to define the behavior of individual subscribers or groups of subscribers.

- ♦ Modify the behavior of an application
- ♦ Trigger client-initiated, server-initiated, or network-initiated procedures based on time or on the result of another procedure
- ♦ Coordinate the actions of multiple interface applications to simulate subscriber activity

Customize Messages

Use the **SmartAVP™** feature to insert, delete, or replace AVPs in Diameter messages. **SmartAVP** not only enables you to define proprietary signaling or to corrupt AVPs to facilitate negative testing, when used in conjunction with **SmartEvents**, you can specify exactly when your **SmartAVPs** are used.

Testing Diameter Routing

Use Case: Voice over LTE

In the following example, **dsTest** emulates the PCRF, PGW, and P-CSCF to simulate VoLTE subscriber activity through the DRA, initiating procedures with the PCRF over the Gx and Rx interfaces. **dsTest** can host thousands of PGWs and CSCFs attempting to connect to multiple PCRFs, requiring the DRA to route transactions for specific subscribers to the appropriate PCRF.

A shared subscriber database enables the PCRF to be provisioned with the same profiles that supply the emulated PGW and CSCF with subscriber identities, service definitions, custom AVPs, and the **SmartEvents** that define the four steps shown in the example message flow. Using a common repository keeps configured and dynamic subscriber information synchronized across all devices and applications.

1. Establish IP-CAN Session

Configure the PCEF emulator to initialize Gx IP-CAN sessions for some or all subscribers on startup at the rate you choose.

2. Activate Dedicated Bearer

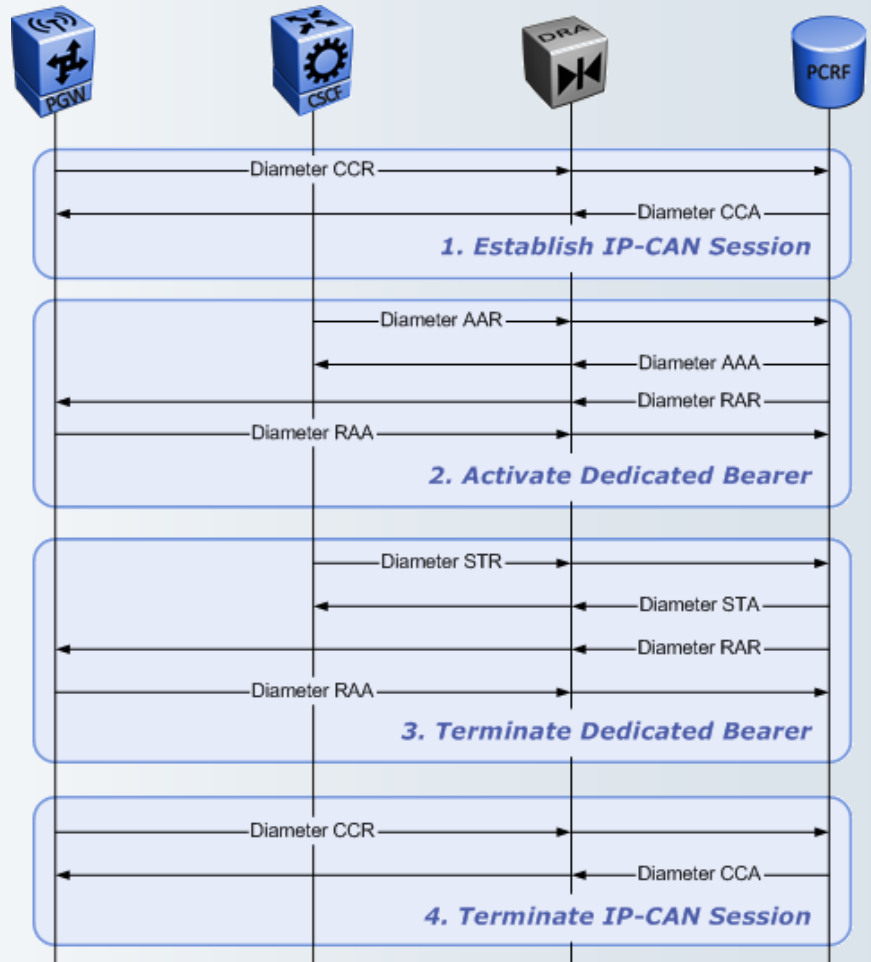
Configure **SmartEvents** to generate AARs for the specified service at some time after the Gx session is established and then set a timer for the simulated call duration. A PCRF will respond and then generate an RAR requesting that the PCEF install a new rule for the subscriber, which would result in a dedicated bearer activation.

3. Terminate Dedicated Bearer

Configure **SmartEvents** to initiate a service deactivation when the call timer expires. Upon receipt of the STR the PCRF will respond to the CSCF and then notify the PCEF to delete the dedicated bearer by removing the rule previously installed.

4. Terminate IP-CAN Session

Configure **SmartEvents** to simulate a detach at a time of your choosing with a terminate event that generates an STR for the Gx session. The PCRF will delete the session and reply to the PCEF.



dsTest DRA Testing

- ◆ Capacity: scale beyond 50,000,000 subscribers
- ◆ Performance: activate more than 100,000 IP-CAN sessions per second
- ◆ Coordinate actions between interfaces using **SmartEvents**
- ◆ Support for proprietary implementations with **SmartAVP**
- ◆ Validate the content of AVPs and policy rules received
- ◆ Measure performance and capacity

Designed explicitly to facilitate the cost-effective testing of high performance protocols and applications, **dsTest** is focused on 3GPP and 3GPP2 core network service interfaces to support your network evolution testing.

Features

Network interface applications (client load generators or server node emulators) are individually licensed, allowing you to purchase only the interface functionality that your test plans require. Applications focus on true emulation rather than scripted commands and responses. Server node emulators automatically coordinate procedures between interface applications, where applicable, when more than one application is active. Surround your server network elements with client load generators or use our server node emulators to provide network services for your client network elements.

- ◆ Measure call performance and capacity
- ◆ Verify new mobility features and standards before deployment
- ◆ Identify performance ceilings and bottlenecks
- ◆ Validate system scalability with easily scalable subscriber loads
- ◆ Plan capacity
- ◆ Interactive control and monitoring for real-time test configuration, event triggering, and value modification
- ◆ Unattended test modes for users creating real-world scenarios with heavy load and long-duration stability tests

Capacity and Performance

In an optimal configuration, **dsTest** supports the following maximums on the reference platform:

- ◆ Tens of millions of subscribers depending on memory capacity and emulator configuration
- ◆ Expanded memory capacity results in a nearly linear expansion of subscriber capacity
- ◆ Tens of thousands of transactions/second per active core (an application layer request/response exchange is considered a transaction)

Performance can be impacted by:

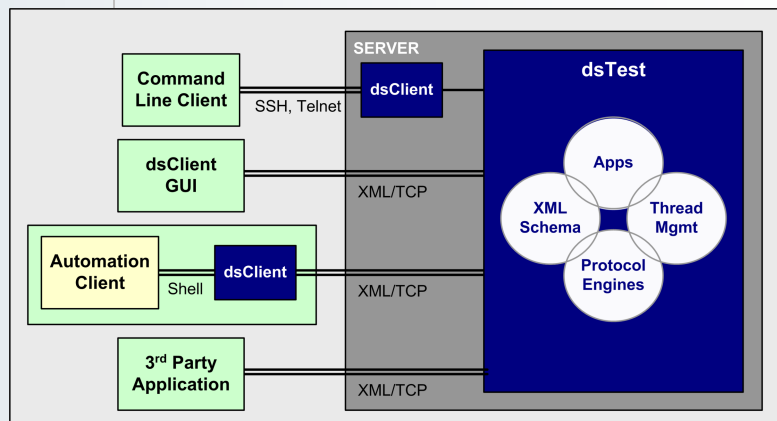
- ◆ the number of messages required for each call
- ◆ the amount of subscriber data required for each message
- ◆ the number of features enabled
- ◆ the cache structure/size
- ◆ the memory bus and I/O throughput
- ◆ the number of CPU cores and CPU clock speed

Capacity is largely based on the amount of available memory and can also be impacted by the configuration.

Architecture

dsTest is designed to run on a wide variety of computer platforms, spanning the range of laptops through multi-processor, multi-core servers. The highly-threaded software architecture is designed to efficiently utilize multi-core and 64-bit CPUs.

- ◆ Software-based solution can be installed on commercial, off-the-shelf hardware
- ◆ Remote monitoring and control via command line interface
- ◆ Configure test scenarios with XML files that are validated against a published XML Schema to prevent invalid definitions



- ◆ Use the XML wizard in the **dsClient™** GUI to configure XML files without the need to write XML
- ◆ Control **dsTest** via a wide variety of automation environments such as Tcl and shell scripts
- ◆ Published server control interface (XML/TCP) to allow development of third party client applications

Applications

Ordering Information

See our web site, www.developingsolutions.com, for the latest product information.

Infrastructure

- ◆ DST-PL-1—dsTest Platform, 1 active thread, 500K subscribers
- ◆ DST-PL-3—dsTest Platform, 3 active threads, 500K subscribers
- ◆ DST-PL-6—dsTest Platform, 6 active threads, 500K subscribers
- ◆ DST-PL-7—dsTest Platform, 7 active threads, 500K subscribers
- ◆ DST-PL-11—dsTest Platform, 11 active threads, 500K subscribers
- ◆ DST-PL-15—dsTest Platform, 15 active threads, 500K subscribers
- ◆ DST-PL-19—dsTest Platform, 19 active threads, 500K subscribers
- ◆ DST-PL-23—dsTest Platform, 23 active threads, 500K subscribers
- ◆ DST-SUB-500—Additional subscribers in increments of 500K

Interface Applications

- ◆ DST-GX-LG—Gx Client Interface (GGSN/PDN-GW)
- ◆ DST-GX—Gx Server Interface (PCRF)
- ◆ DST-RX-LG—Rx Client Interface (CSCF)
- ◆ DST-RX—Rx Server Interface (PCRF)

Maintenance & Support

Our Help Desk is available Monday through Friday between the hours of 8 am and 5 pm CST.

Products are sold with a 30-day warranty that includes free support during that period. Extended maintenance agreements are available, which include all upgrades and future releases to the features licensed.

Services

Developing Solutions provides a variety of professional services that include the customization of our products to meet the specific requirements of individual applications.

Contact us for more information.



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