



TEST YOUR DEFENSES

How Xena helps test the performance of Ethernet-based systems used on modern battlefields.



Interconnected Battlefield



Ensuring information flows quickly and smoothly between different groups on the battlefield - and those coordinating their operations - is essential.

Ethernet is the technology most frequently used for these ad-hoc networks.

This document looks at how Xena's Ethernet test solutions can be used to validate the resilience and performance of devices and services on the interconnected battlefield.

HQ Tactical
Operations

Wireless
LAN

MILITARY SATCOM

WAN Nodes
with wireless access

WIN-T

Warfighter Information Network-Tactical

Platforms like WIN-T (Warfighter Information Network-Tactical) allow forces to securely transmit real-time video, view maps, request artillery support, access mission command applications and connect with commanders. This requires resilient, high speed, low latency networks.

Intelligence Services

Encryption

NATO

SIPRNet

12:30

ARMED FORCES

US



JTIDS

Joint Tactical Information Distribution System

Other systems - like JTIDS - allow a strategic sharing of information between partner countries and agencies.

This demands interoperability and a secure network.



ETHERNET EVERYWHERE

The networking technology most frequently used for connecting units on battlefield and in command centres is Ethernet.

Ethernet can handle very large amounts of data – the top speed is now 800Gbps.

Using Ethernet also ensures interoperability. It is a tried and tested technology based on well-defined international

standards that all suppliers support.

As a result, ethernet is used ubiquitously by the military. The trend is clearly to take existing COTS switches and other core networking devices and ruggedize them for use on the battlefield.

Xena has over 10 years' experience in testing the performance and features of such devices.

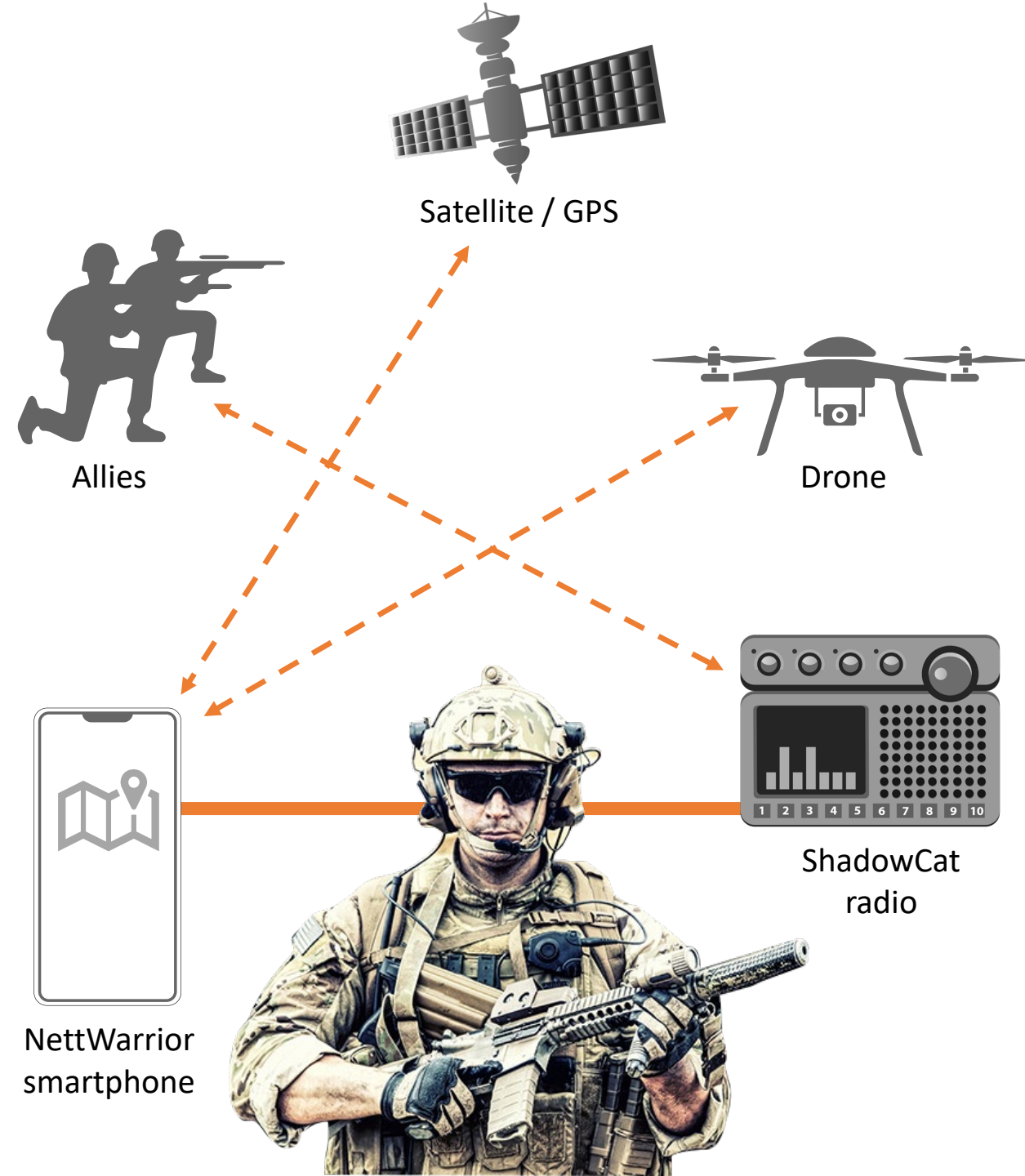
SIMPLE SCENARIO USING ETHERNET

Soldiers may have a Rifleman or ShadowCat Radio plus a NettWarrior smartphone connected via a standard RJ45 Ethernet cable or a military M12 style connector.

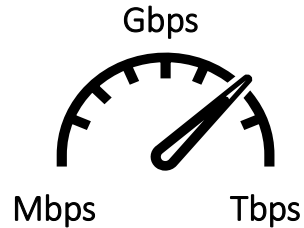
This lets them access data feeds from overhead drones, JTIDS command station or air support. They can communicate securely with other units and receive precise GPS data.

The Ethernet switches used in these devices are ruggedized COTS switches. They allow the broadest range of interconnecting devices where there are very few - if any - protocol requirements.

The Ethernet interface allows connectivity to other devices without the need to know about security technologies such as encryption or frequency hopping.

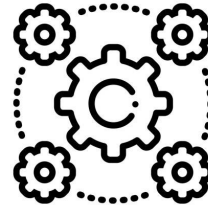


WHAT NEEDS TESTING?



Performance

Performance is critical. Can people get the data they need when they need it? Does the data flow smoothly – also across a heterogenous network topology deployed in remote, hostile environments? What is the impact of heavy encryption? What about mobility?



Interoperability

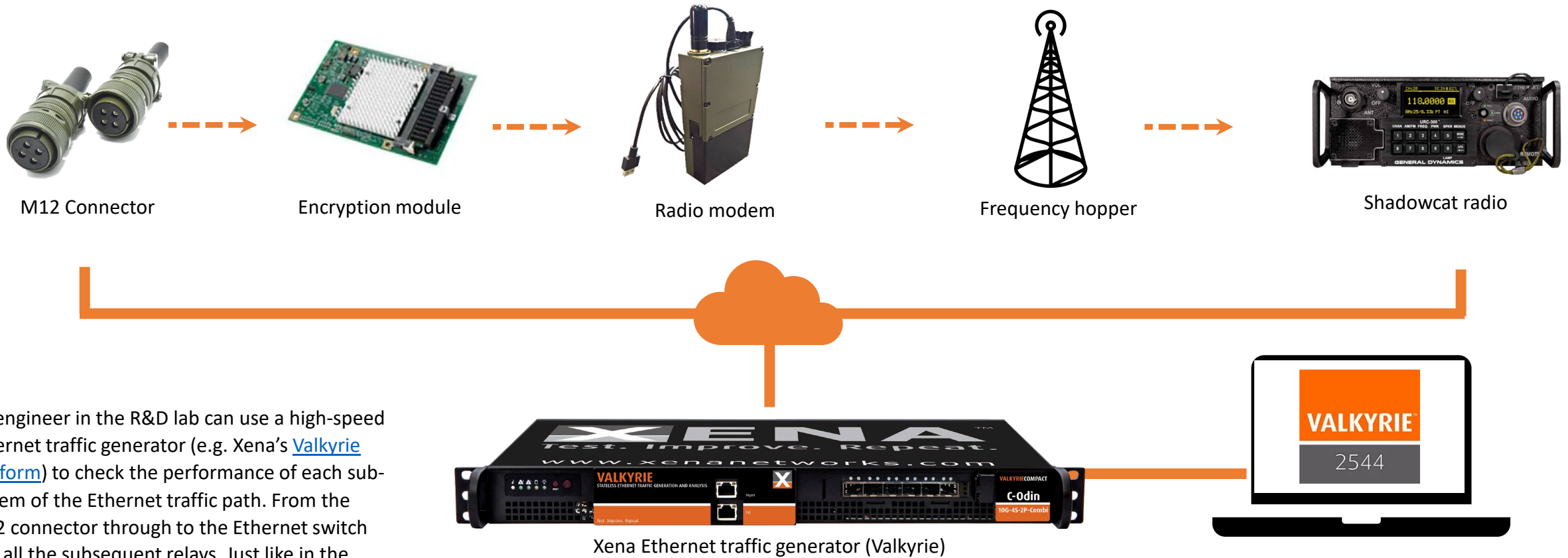
Expecting software and networking components – switches, radios, phones, transceivers - from different manufacturers to all work seamlessly together out of the box is naïve, also in civilian life. Interoperability testing is crucial.



Reliability (QA)

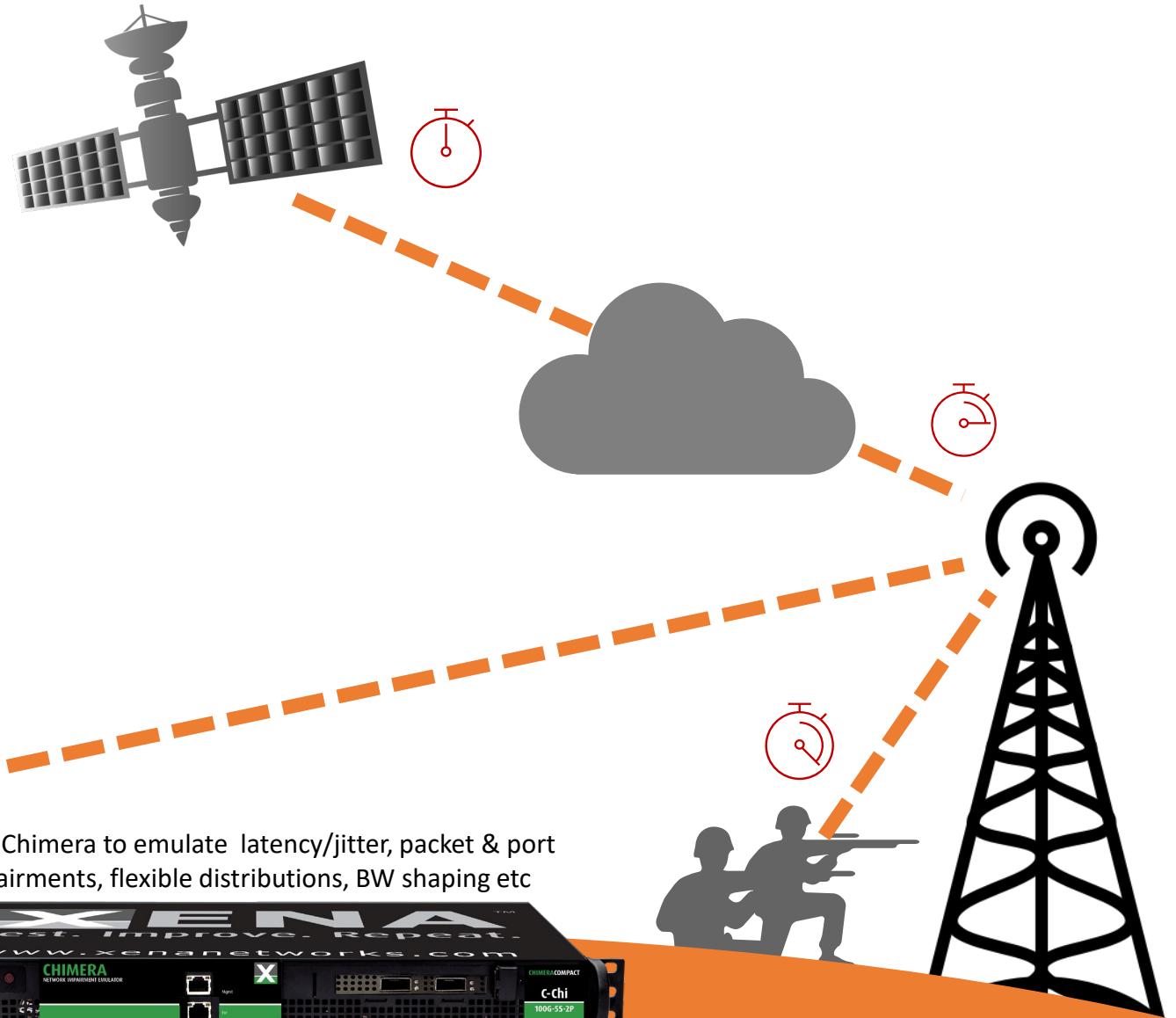
Military equipment is ruggedized for a reason. But who tests if all still works when its time to shake, rattle & roll? Simulating the data flows to see if equipment continues to function under real-life conditions is a must.

TESTING IN THE LAB



SIMULATING REAL WORLD CONDITIONS

Some sub-systems - such as the satellite relay - are not always available. These sub-systems can be emulated using an **impairment device** (like [Chimera, Xena's network impairment emulator](#)) to re-create the delay and emulate the lost or mis-ordered packets thereby accurately simulating the complexity of these real-life sub-systems.



Use Chimera to emulate latency/jitter, packet & port impairments, flexible distributions, BW shaping etc



Test. Improve. Repeat.



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