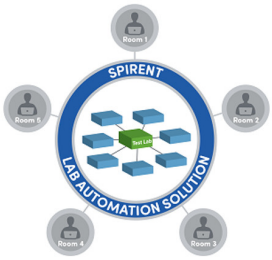

spirent Lab Power Conservation Solution Owner's Manual

Spirent Managed Solutions
SOLUTION BRIEF

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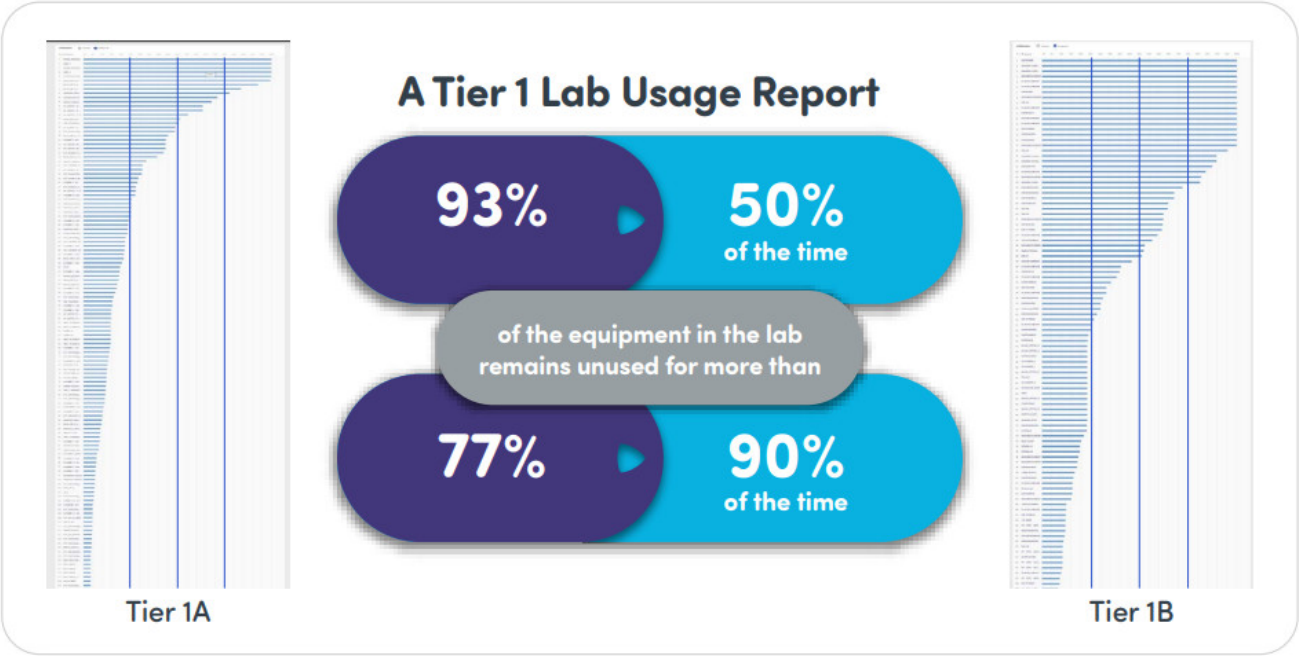
Lab Power Conservation Solution
The Challenge: Reducing Power and Cooling Costs
Telecommunication network carriers, services providers, equipment manufacturers, suppliers, and enterprise organizations have common areas of concern with controlling power and cooling costs in their test labs. In addition, Sustainability and minimizing impacts to the environment are in focus.
Over the past two years, commercial energy prices increased an average of 13% in the U.S., and is surging more so globally. And for test labs, 5G equipment requires 2-3 times more energy than 4G if network equipment is not intelligently controlled.
In the recent past, for each dollar spent on power as much as an additional $1.40 is spent on cooling. Typically, labs and data centers are designed to be more energy efficient. Meanwhile, inflation trends are significantly impacting already high energy costs, compelling leaders to search for meaningful and holistic solutions to address this challenge.

What's needed to control power and cooling costs in test labs?
Recognize test hardware in labs is energy-intensive and lab utilization is inefficient, where unused equipment is often left on. All this test equipment is mounted in highly air-conditioned environments, driving costs of powering the equipment and cooling unnecessarily high.
Understand the bigger picture, beyond rising cooling and power costs. Capex costs soar as redundant equipment drives up budget spend across teams in the same labs, or other global locations, precisely when budgets are getting tighter.
Realize Opex costs will continue to rise as long as manual test configuration is involved in any aspect of testing, which also leads to high labor costs, lower productivity, and slower time to market.

Highlights

- Lab consolidation reducing physical footprint, energy use and carbon emissions
- Equipment utility reduction through shared equipment and automated test scheduling
- Automated power down of unused gear for optimal power consumption management
- Accurate equipment utilization reporting for data-driven equipment investments and planning

How can all this be addressed effectively?



The Solution:

Lab Power Conservation Solution

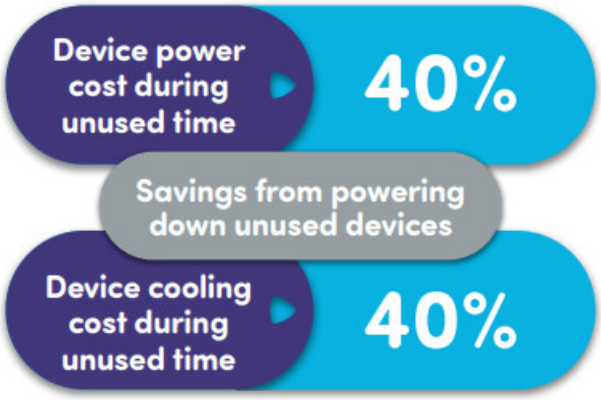
Spirent's Lab Power Conservation Solution is a subset of the Lab as a Service (LaaS) solution. The solution abstracts physical, virtual and hybrid lab resources (that may be geographically dispersed) with systems and processes to provide a "Virtual Lab" for each test team. Through their LaaS interface, each test team reserves lab resources to support fully automated builds of any test topology. Teams have their own lab in a designated timeslot which can be rapidly reconfigured at will. Diverse global test teams from different organizations possess a comprehensive platform to automate testing that is fully compatible with inhouse or third-party automation tools.
With these capabilities in place, the following Lab Power Conservation and cost control capabilities include:

- Lab consolidation to help reduce physical footprint, energy use and carbon emissions

- Equipment utility reduction through shared equipment and automated test scheduling improve equipment usage
- Automated power down of unused gear for optimal power consumption management
- Accurate equipment utilization reporting about the utilization of each piece of equipment facilitates data-driven equipment investments and planning

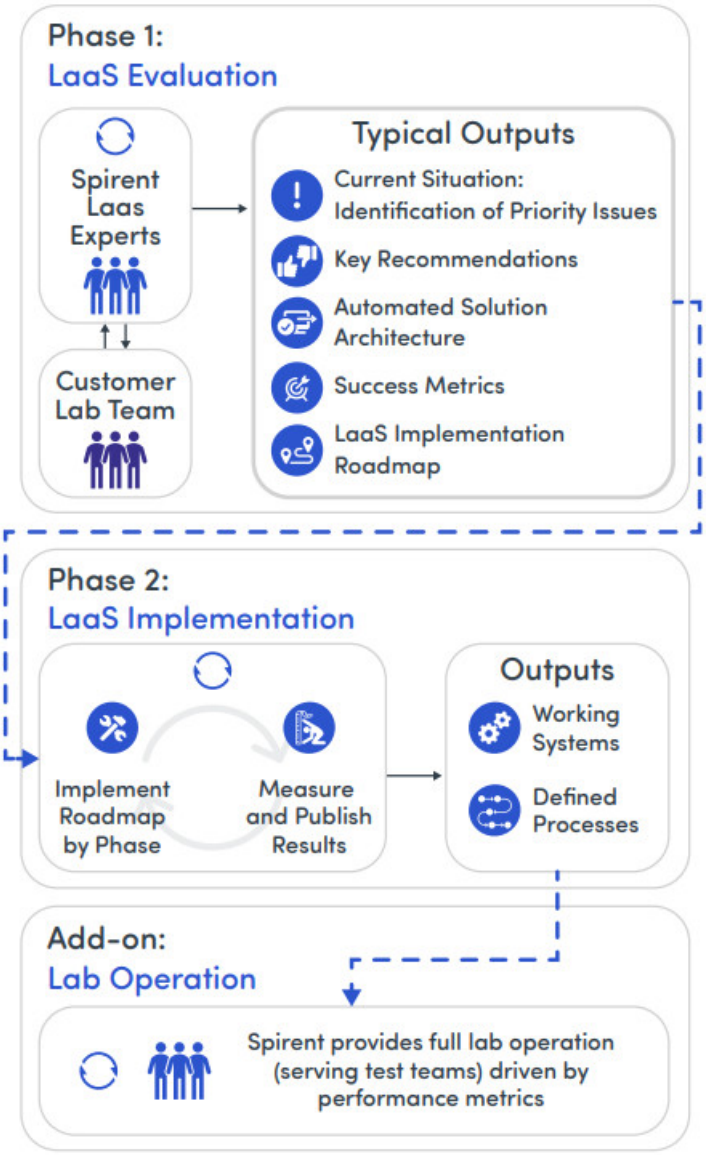
Business value:

- Reduce cost and environmental impact as labs operate with more modest power and cooling infrastructure
- Realize optimized tool and human resource management with efficient utilization of lab resources
- Reduce Capex with efficient sharing, device utilization and full automation of common functions (up to 75% reduction)
- Lower Opex associated with electricity and cooling using Power Distribution Unit (up to 20% reduction)
- Leverage experts with specialized power conservation knowledge from day one to optimize energy cost savings



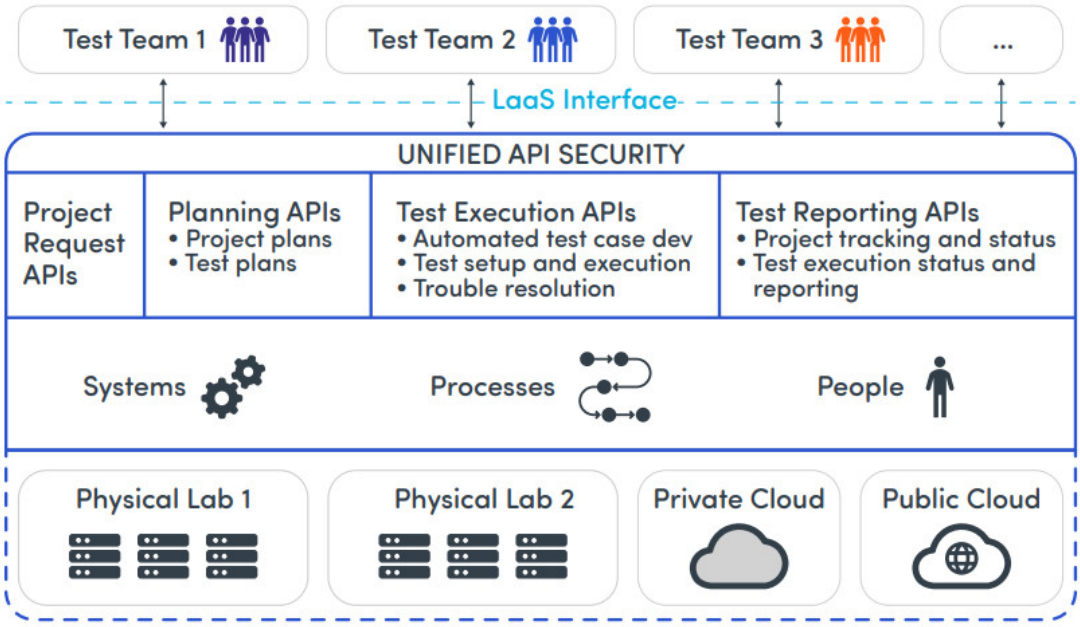
The Spirent Solution Process. In its role as the pioneer of lab automation for networks, Spirent created the LaaS Managed Solution. It involves two phases, with an additional add-on option:

- LaaS Evaluation. Working closely with the customer, the process identifies the customer's priority issues with key recommendations and proposed automation solution architecture. The plan also includes success metrics and a LaaS implementation roadmap.
- LaaS Implementation. This involves implementing the planned solution by phases, delivering working systems and defined processes. This is where tangible business benefits are realized, with results measured against the defined success metrics. Dynamic test team collaboration is established and refined continuously.
- Managed Lab Operation. With this option, Spirent provides full operation of the lab, assuring all test teams are served per customer requirements, driven by performance metrics, adopting continuous improvements to assure uniform continuous integration/continuous delivery (CI/CD) and continuous testing across all teams.



Why Spirent?

Spirent's Lab Power Conservation solution employs test and validation efficiencies and strategies drawn from an authoritative portfolio of capabilities and established leadership in broad technology and domain expertise. This stems from offering a comprehensive suite of solutions for cutting-edge technologies in networking, cybersecurity, and positioning, including 5G, 5G Core, Cloud, Secure SD-WAN, SDN, NFV, Wi-Fi 6, and more. A pioneer in lab and test automation, our expertise includes DevOps and CI/CD, which employs industry-recognized best practices for test and assurance to achieve comprehensive continuous testing.



Case Study: Reducing Lab Power Consumption

Based on a Spirent Lab Automation engagement

Annual costs

Description	# of racks	Rack power density (kW)	Total (kW)	Energy rate(S/kWh)	Annual cost ($ operating 24/7)
Lab equipment (5kW racks)	250	5	1250	$0.10	$1,095,000
Cooling load (PUE: 2.4)*			1750	$0.10	$1,533,000
		Total	3000		$2,628,000

Annual savings

Description	Annual cost	Projected cost(40% savings)	Overall savings
Lab equipment Existing system watts	$1,095,000	$657,000	$438,000
Cooling load (PUE: 2.4)*	$1,533,000	$919,800	$613,200
	$2,628,000	$1,576,800	$1,051,200

* PUE = power usage effectiveness

Environmental Impact / Year

Based on US EPA Impact Model

Correlated impact by reducing power generation thru fossil fuel sources

	7,450 metric tons CO2 equivalent / year
	1,600 gasoline cars removed road / year
	906 million smart phone charges / year
	123,000 tree seedlings 0-10 years 8,800 acres of forest / year

The Global Services Delivery Process

Spirent Managed Solutions — Lab Power Conservation Solution
Discover: Gather requirements; perform gap analysis
Define: Identify solutions that scale seamlessly to integrate flexibly with disparate systems; present roadmap; illustrate ROI
Develop: Create next-gen end-to-end solutions driven by our technology and service portfolio
Deliver: Manage projects; ensure outcomes are measurable, tracked by KPIs and improved over time
Debrief: Ensure customer requirements and expectations have been met

SPIRENT MANAGED SOLUTIONS — LAB POWER CONSERVATION SOLUTION

Our Customers

Spirent has been a pioneer since the advent of network, wireless and GNSS testing, validation and assurance, and has provided services to customers across a broad range of global industries. These varied business sectors include global navigation satellite systems, aircraft and automotive manufacturers, as well as telecommunications and wireless service providers, network equipment manufacturers, petroleum, education, the media, financial institutions and stock exchanges, technology enterprises and publishing giants. Spirent also services governments worldwide, which includes military and space agency projects.

Spirent Expertise

Spirent provides services expertise for all major communications vendors — from Lab to Live. This end-to-end proficiency draws from a deep bench of seasoned professionals who are qualified experts in our technology portfolio. Our services cover devices, infrastructure, cloud infrastructure, networks, network applications, security and assurance, all powered by state-of-the-art lab and test automation. Such industry expertise maximizes your solution capabilities and ensures you deliver your product or service to market on time and with optimal quality.

Spirent Services Portfolio

Spirent's Lab Power Conservation Solution is part of a comprehensive suite of services and solutions. Spirent's portfolio of services for an initiative's entire lifecycle — from Lab to Live — helps organizations achieve their short-

term testing and validation goals, while building a strong framework for future and enduring business success.

Managed Solutions

Performing strategic operational functions for customers:

- Lab as a Service
- Test as a Service
- Certification as a Service
- Deployment as a Service
- SecurityLabs

Professional Services

Providing a broad range of test and validation services enabling Spirent products and solutions that involves:

- Implementation and Integration
- Customer Training
- Resident Engineers

Consulting Services

Supporting custom projects, helping customers with specific strategies and objectives:

- Assessments and strategy
- Planning and design
- Network architecture and engineering
- Test methodologies

For more information, visit: **https://www.spirent.com/products/services-managed-solutions**

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: **www.spirent.com**

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Documents / Resources

	spirent Lab Power Conservation Solution [pdf] Owner's Manual Lab Power Conservation Solution, Power Conservation Solution, Conservation Solution, Solution

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- Automated Testing and Assurance Solutions - Spirent
- Managed Solutions for Test and Assurance - Spirent
- User Manual