Save Energy Dynamically with the HCLSoftware rApp

Maximizing Energy Efficiency in the RAN through VMware RIC without Service Degradation

PARTNER SOLUTION AT A GLANCE

HCL's Intelligent Dynamic Energy Saving (iDES) rApp uses AI/ML to proactively configure the network to cut energy costs without impacting service quality for subscribers.

MWC rAppathon PARTICIPANT

HCL's rApp was one of 7 innovative applications demonstrated during the rAppathon RIC developer's competition hosted by VMware and Intel at MWC 2023 in Barcelona.

HCLSoftware Company Overview
HCLSoftware is a division of HCL Technologies (HCL) and operates its primary software business. HCLSoftware develops, markets, sells, and supports over 30 product families in the areas of customer experience, digital solutions, secure DevOps, security, and automation. See *https://www.hcltechsw.com/*

Saving on network energy without compromising quality of service

As Communication Service Providers, or CSPs, transform their networks to deliver innovative services, they are under pressure to find the right compromise between guaranteeing quality of experience for their subscribers and reducing the energy needed to power their networks. If insufficient network resources are put to work, service quality will drop. If excessive network resources are used, energy is wasted and operating costs skyrocket. A recent study by McKinsey showed that the RAN consumes around 60% of the power consumed by a mobile network.

The Mobile RAN should adapt the resources that are necessary to meet the committed service quality and the demands of user traffic. The only question is how?

HCLSoftware's iDES rApp

HCL's iDES rApp uses artificial intelligence and machine learning (AI/ML) to predict future traffic load and expected user quality-of-experience. iDES then determines which cells to turn off in order to save energy while meeting key quality indicators (KQIs). An example of such a KQI is the maximum percentage of UEs below an SLA at any given time. It can safely turn off cells to reduce power consumption without compromising on QoE or turning cells back on when the quality of experience is expected to degrade.

Field deployments of iDES show that by extending cell off-time (or sleep time) of under-utilized cells, an additional 7% reduction in energy savings can be achieved compared to traditional techniques. This reduction translates to annual savings of $2 million for a Western Europe operator.

HCLSoftware's iDES rApp helps CSPs maximize cost reductions while assuring user-level quality of experience, or QoE. It uses artificial intelligence and machine learning

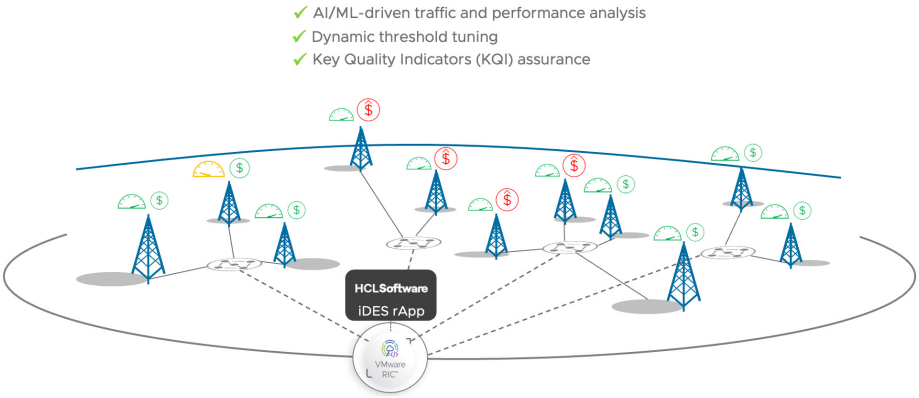
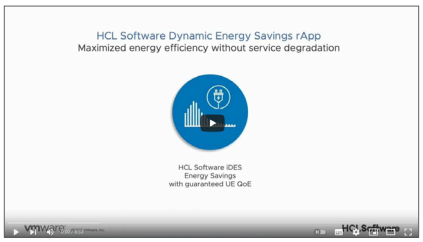


FIGURE 1: How the HCLSoftware rApp works with VMware RIC.

VIDEO DEMONSTRATION OF THE PARTNER'S SOLUTION ON VMWARE RIC



Maximizing energy efficiency with HCLSoftware's iDES rApp

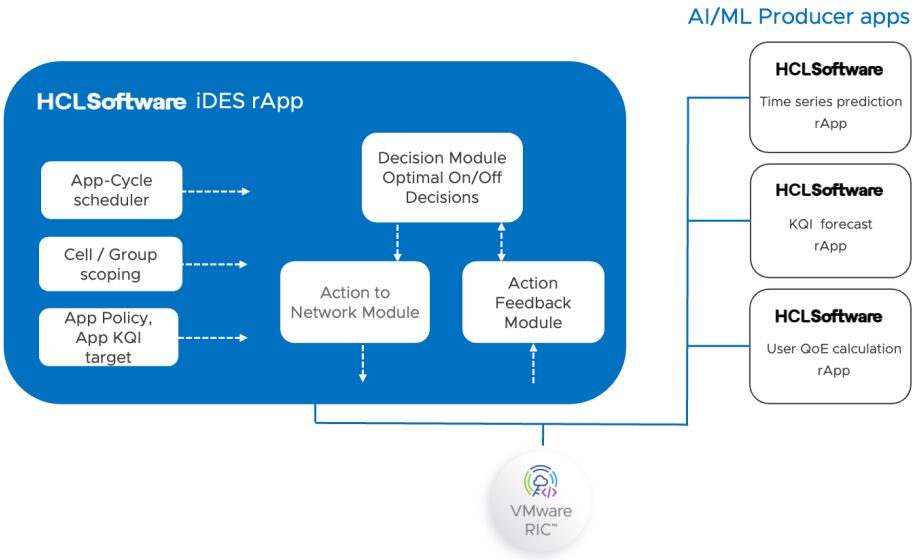
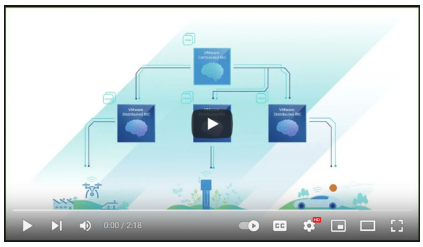


FIGURE 2: How the HCLSoftware rApp works with VMware RIC.

RAN PROGRAMMABILITY

The RAN intelligent controller gives applications from different vendors access to the functions running in the control and management planes of your radio access network, empowering you to program and optimize your RAN by using methods like artificial intelligence and machine learning.



Demo Video: Activating Network Programmability with VMware RIC

to predict service performance levels and to forecast the effect of cell state changes. In this way, it can safely turn off cells to reduce power consumption without compromising on QoE, or it can turn cells back on when the quality of experience is set to degrade.

How it Works

The HCLSoftware iDES rApp integrates with VMware Centralized RIC and uses resources and services provided by the RIC's R1 interface, including network and user/UE data, network configuration interface, policy, and GUI.

The iDES rApp includes several decision-making modules that process input information to make network configuration decisions. iDES works in conjunction with supporting rApps that use AI/ML to forecast changes in network load and the quality of users experience (QoE).

iDES enables mobile operators to set a target value for a key quality indicator (KQI) which determines the service quality that the network must provide to its end-users. For example, set a KQI which mandates that up to 20% of Users/UEs might experience throughput below 8Mbps.

iDES will turn cells off only when the KQI can be guaranteed and turn cells back on when the algorithms predict the KQI would be breached. Cell on/off decisions are sent to the VMWare RIC over R1, which then send to the network.

Finally, the Action Feedback Module validates that any changes made by the rApp deliver the desired impact.

The graph below illustrates the impact of the iDES rApp on a network. In this example, the static default dSON configuration for a cell puts the cell in sleep mode between 2 AM and 7 AM during off-peak hours. However, with iDES enabled, the rApp determines that the sleep time can be extended from 00:30 AM to 09:30 AM. This is without impacting SLA guarantees on QoE for subscribers, as the rApp's algorithms predict that the KQI will stay below the 20% threshold even if this cell is turned off.

VMWARE RIC AT A GLANCE

VMware RIC lets you programmatically manage and control your radio access network (RAN). The RAN intelligent controllers from VMware enable third-party application developers to tap into network data, process it, and use it to modify RAN behavior.

VMware Distributed RIC hosts near-real-time applications (xApps), and VMware Centralized RIC runs non-real-time applications (rApps). These apps introduce new use cases — automation, optimization, and service customization — that fuel innovation across a telecommunications network.

KEY BENEFITS

- **Multi-vendor interoperability and a vibrant partner ecosystem** – use a vendor- and technology-agnostic platform and tap pioneering solutions.
- **Network optimization** – gain network-wide observability and automate optimization with AI/ML.
- **Efficiency** – reduce energy consumption and improve spectrum utilization by using applications from various partners.

RIC SDK PARTNER PROGRAM

A rich developer ecosystem is critical to the successful adoption of open RAN technology. The VMware RIC SDK Partner Program expands access to and simplifies the development of RIC applications. The program gives partners access to RIC SDKs as well as training videos and application developer support. To find out more, visit *https://techpartnerhub.vmware.com/programs/vmware-ric*

LEARN MORE

For more information about the VMware Telco Cloud or VMware RIC, call 1-877-VMWARE (outside North America, dial +1-650-427-5000) or visit *https://telco.vmware.com/*

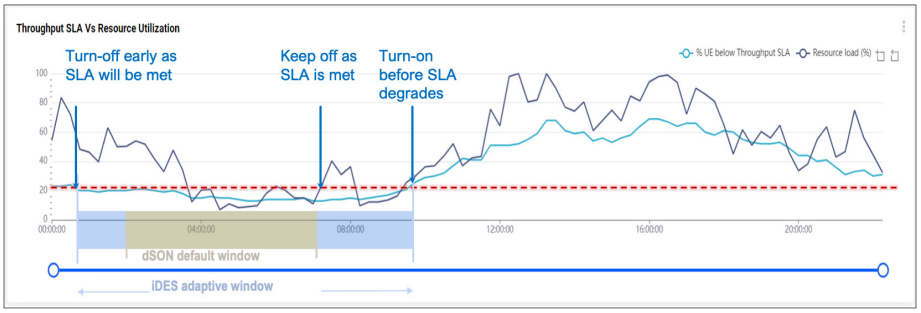


FIGURE 3: The impact of the iDES rApp on a network.

Benefits

HCLSoftware iDES rApp is a tested and proven solution that has successfully demonstrated its ability to provide additional energy savings beyond the standard dSON energy-saving feature. In a specific cluster for a Tier 1 customer in Western Europe, the application achieved an additional 7% energy savings per eNodeB, resulting in a daily saving of 3 kWh a day per eNodeB. With HCLSoftware's Energy Savings rApp and VMware Centralized RIC, CSPs can maximize customer experience and guarantee SLAs while keeping energy costs under control.

VMware and the Path to a Disaggregated, Programmable RAN

For the past five years, VMware has been methodically introducing new telco cloud solutions and changing expectations in the service provider industry about modernization. With an established footprint in telco cloud deployments globally, VMware has been expanding its capabilities to address the challenges in the disaggregation of the RAN.

With a horizontal platform that enables workload consistency from the core and the RAN to the public cloud, we've revealed what is possible – simplicity, speed, agility, and far-reaching automation. The objective is to enable our customers to modernize their entire networks, simplify their operations with end-to-end consistency, and further disaggregate their RAN.

vmware® | HCLSoftware