



Malaysia's Ministry of Education bridges the urban-rural digital divide with virtual desktops

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DATO'AMIRUL RAHMAN BIN ABDUL RAHIM
EXECUTIVE CHAIRMAN
BITARA INDUK

AT A GLANCE

Challenge

- Realize investment in information and communication technology (ICT) solutions to bridge urban-rural digital divide across ~10,000 schools, from preschool through post-secondary
- Overcome geographical diversity and environmental conditions
- Provide an easy-to-deploy desktop solution, supporting centralized content servers to increase IT efficiency
- Support diverse 32/64-bit applications and content, including videos, nationally required educational courseware, and operating systems

Solution

- Initial deployment of 25,000 Teradici® PCoIP® Zero Clients
- VMware® Horizon View™ Virtual Desktop Infrastructure (VDI) hosts.
- Bitara, Induk systems integration services

Results

- **Optimized user experience:** VDI with zero client performance is equivalent to traditional PCs across locations, independent of hardware
- **Enhanced learning:** Students have more reliable, continuous access to applications and content
- **Affordable:** Fits budget for large deployment, both initially and in terms of lower maintenance and longer refresh cycles
- **Low infrastructure requirements:** Can operate efficiently over slow connections, pushing only pixels to endpoints
- **Simplicity:** Flexible, easy-to-move and easy-to-set-up virtual desktops with zero clients do not require local IT experts



Malaysia's Ministry of Education has set forth an ambitious vision to modernize teaching in its 10,000 schools, and support the development of the country as a whole. The Malaysia Education Blueprint, 2013-2025 spans preschool through post-secondary education, and impacts approximately 6 million students. The major resulting Ministry initiatives include significant investments in technology, which will cost-effectively scale up the quality of learning across all of Malaysia.



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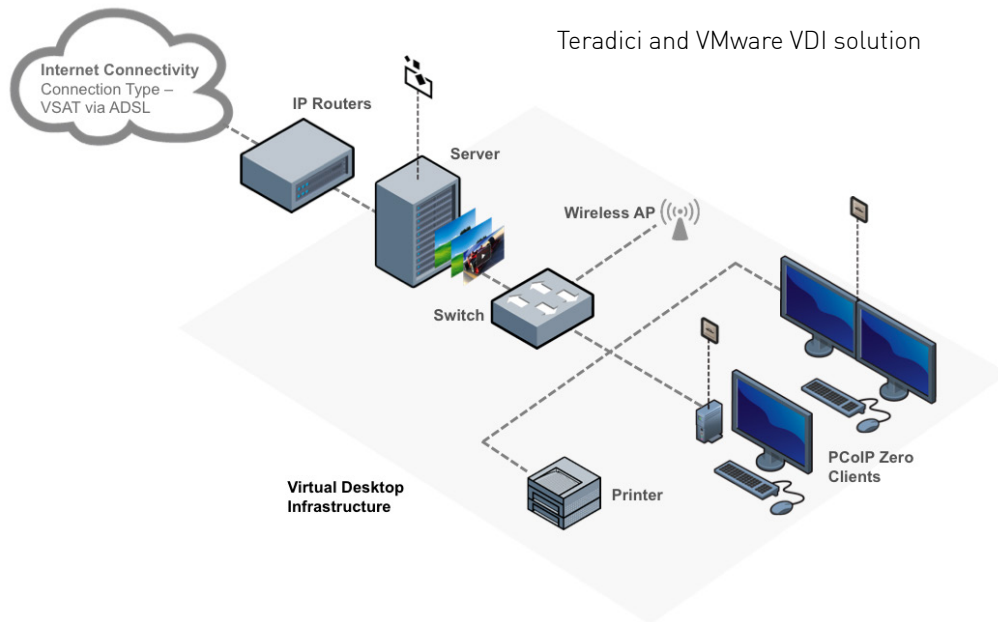
Malaysia's geography poses significant challenges for educators who aim to reach all children, whether they live in urban, rural, or inland areas. The country's 14 states span two main islands and numerous smaller islands in the Sea of China, and access to information and communications technology (ICT) varies significantly depending on the proximity to a major city and the surrounding terrain. In the Malaysia Education Blueprint, 2013-2025, the Ministry of Education defined 11 strategic and operational shifts required to bridge the urban-rural digital divide in the country's school districts and promote uniform, quality learning for all schools. Successful implementation of the resulting initiatives calls for overcoming considerable challenges:

- In rural and inland areas, infrastructure limitations make it difficult to access the Internet; solar electricity, diesel powered generators and VSAT satellite links are the only power and connectivity resources in some remote villages.
- ICT budgets vary. In urban areas, commercial partners contribute equipment and supplies. Remote sites must rely solely on government funding.
- IT staff are not located at every school site. Technology deployments must be easy; remote administration, management and troubleshooting is a priority requirement.

The Ministry recognized that the technology-centric education blueprint called for an entirely new approach for desktop computing. The goal was formidable: to affordably deliver high-quality computing and digital education resources to school children at 1,250 primary schools in rural, inland and urban areas of the country, in some cases for the very first time. "We set out to give each user – each student – a great technology experience with lower costs of deployment and maintenance," said Mohd Rizal bin Hilme, CIO of Bitara Induk. "One part of the solution was to have a computer lab in each school. Second, we had to deliver up-to-date content and courseware in each school." The evaluations soon focused on the desktop, where the environment challenges led them to thin clients and eventually zero clients. Bitara ultimately recommended Virtual Desktop Infrastructure (VDI), based on VMware Horizon View and Teradici PCoIP Zero Clients. With VDI, most maintenance can be performed remotely, freeing teachers from the burden of being IT managers. The zero clients create a robust low maintenance end point solution.

However, the recommendation was primarily based on performance. Bitara's CIO explained, "We tested the three leading protocol alternatives – Remote Desktop Protocol (RDP), ICA, and PCoIP. Using the Ministry's educational applications, and within the environmental conditions in Malaysia, we found that PCoIP was very, very good compared to the other choices." When streaming to multiple endpoints, the first two protocols can congest the network. In contrast, running VDI using the PCoIP protocol compresses, encrypts and rapidly transports pixels – and Teradici's PCoIP implementation executes at the chip level.

The initial deployment of 25,000 PCoIP Zero Clients means students have more reliable, continuous access to applications and content, and doesn't require local IT expertise.



Bitara's CIO said, "We were blown away by the results. And the Teradici PCoIP zero clients and VMware software support all of the Ministry's applications and content and courseware – the solution enables all of the delivery mechanisms we need. We need to deliver a fast experience to the user – with high resolution. Our tests showed us that PCoIP is the only protocol that can deliver."

The Ministry approved Bitara's recommendations for a Teradici and VMware VDI solution based on the promises for ease of deployment and administration, and the ability to cost-effectively enable access to rich educational content across all geographies with no extra burden for teachers in remote and rural areas. Azlin bin Sanip, the Ministry's Secretariat and member of the ICT Program Management Office (PMO), explains, "The dream of our nation is to provide education to all children. However, in rural and inland areas, [students] have difficulty accessing the Internet because of the [lack of] infrastructure there. Access can be very slow. We need a solution to overcome this... so that we can keep all content in a central server."

To help bring all Malaysian schools up to an equivalent infrastructure level, the Ministry accepted recommendations from Bitara for a large-scale VDI solution. "We feel that [VDI] is ideal because firstly it reduces the initial costs and secondly it reduces PC maintenance costs," said Azlin bin Sanip.

"The Malaysian government recognizes that human capital is the most important investment a developing nation can make for its people," said Dato' Amirul Rahman Bin Abdul Rahim, Chairman of Bitara Induk. "By using the technology we recommend – Horizon View and PCoIP zero clients – I believe the gap between urban and rural schools can be shortened, and every student will get the same opportunity."

To demonstrate the viability of the large-scale VDI solution, a first-phase deployment was initiated at 120 elementary schools in the state of Sabah, a remote, rural area of the country where electricity is provided to the village by solar and diesel generator and Internet is delivered by a 2 Mbps VSAT satellite link. With minimal onsite IT setup and

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"Virtual desktops are convenient and user-friendly for my pupils," adds Ahmad Daud bin Abdul Hamid, Headmaster of Sawah Sempadan Primary School. "With the new system, we can count on zero clients to deliver high-performance computing to each child in the classroom, with no dependency on traditional desktop PCs. It took only a few minutes of simple instruction for our pupils to take a 15-minute exam, with a teacher observing from two computer screens."

Upon successful completion of the pilot phase of the deployment, under the most challenging rural conditions, by the end of 2013, the solution was introduced at a total of 1,250 schools. The VDI deployment of PCoIP Zero Client desktops and VMware Horizon View has met 100 percent of the rigorous auditing standards required by the Inspector General of the Malaysian Ministry of Education, and has the acceptance of the Headmaster and teachers at all the schools.

"Working hand-in-hand with Teradici and VMware, we're committed to enhancing the way teaching and learning happens in Malaysia, even under the harshest environmental conditions," said Dato' Amirul Rahman bin Abdul Rahim. "If the enthusiasm among teachers and students throughout this first phase of deployment is any indicator, the Ministry's investment in virtual desktops will pay off in a very bright future for the nation's school children."

without modification to the classroom environment, Bitara worked with Teradici and VMware to introduce high-performance computing and educational resources.

In this first stage of deployment, desktops, applications, and data were consolidated into a simple, repeatable centralized virtualized desktop infrastructure. Educational resources are now being shared among the schools, and IT administrators are empowered to manage, secure, and broker services to students and staff in accordance with Ministry policies.

Using this simple, repeatable model, the high performance and low power of PCoIP zero client desktops allowed the installations to be completed in record time with on-the-ground technical support by Bitara and Teradici at every location.



Products used

PCoIP Zero Clients

VMware Horizon View



AHMAD DAUD BIN ABDUL HAMID
HEADMASTER

Ahmad Daud bin Abdul Hamid, the headmaster at one of the schools, said, "There is indeed a lot of difference now... we previously used CPUs and monitors, one pupil to one computer. In a lab we might have 40 computers, which means 40 monitors and CPUs. When problems occur, the repair process was long. But with this new cloud system, it's better. We don't face many problems. I'm very excited with the change. We don't need a CPU, just a monitor. This is very good for my pupils because it's more convenient and user-friendly."

Aziz bin Sanip spoke for the Ministry when he summarized a similar optimism about the project: "The Ministry of Education sought a solution that could bridge the urban-rural digital divide. Together with Teradici and VMware, we have helped the Ministry prove that virtual desktop technology is indeed such a solution, making it easy for teachers to teach and, most importantly, for students to learn. With the introduction of the VDI solution, our students will improve in their learning and the standard of education between students in urban and rural schools will be equal."

