




CASE STUDY

Situation:

As the first and only recognized interactive gaming jurisdiction in Asia, First Cagayan Converge Data Center, Inc. (FCCDCI) provides IT and network services to more than a hundred licensed online gaming operators and to its own hotel and casino guests.

Most games and sports occur in real time, so the network that streams the activities must continuously operate at optimum levels to avoid service disruption.

Challenges:

- Deliver real-time online gaming with minimal delays
- Eliminate customer complaints caused by network congestion
- Provide predictable bandwidth services to all customers

Solution:

Deployment of the Saisei FlowCommand Network Performance Enforcement software to manage traffic in real time on a per-group, per-flow basis.

Results:

Network performance improved so much that FCCDCI was able to:

- ✓ Retain the business of gaming operators threatening to exit
- ✓ Push network utilization up from 50% to 80%
- ✓ Identify and filter forbidden network traffic
- ✓ Provide equal and fair access to all hosts and users

Gaming Provider Aces Customer Service by Tightly Controlling Bandwidth Usage

Digitization and networking have changed the rules in many industries, and it's no different for gaming. Wagers can now span continents, and gamers can participate from around the world. Online gaming and sports-betting have become such huge draws that researcher Statista predicts that the 2016 market will be more than \$46 billion, nearly double what it was in 2012¹.

Making all this activity a success, of course, hinges on having a robust communications network that supports interactive sessions in real time. One that is super-fast and unflappable. Delays, freezes, or outages severely impact the bottom line – a second of downtime translates into thousands if not millions in lost revenue potential.

First Cagayan Converge Data Center, Inc. (FCCDCI), based in Pasig City in the Philippines, learned that it needed a way to control its bandwidth when it became the first legitimate interactive gaming jurisdiction in Asia in 2007. The company tried different solutions from varying vendors over the years with minimal improvement. Ultimate success finally came in the form of network performance enforcement software from Saisei, which has allowed the company to retain once-disgruntled customers and to boost the utilization of its network for a far greater return on its bandwidth investments.

Without proper traffic management, some users could encroach on the bandwidth available to other gamers. That could cause congestion, slowdowns, and generally unhappy players

Performance Management

FCCDCI provides network capacity, game hosting, and collocation services to gaming authorities around the globe, explains John Cornejo, IT consultant to FCCDCI. It aggregates bandwidth from a number of telecommunications providers and resells it to its gaming customers.

Some of FCCDCI's interactive gaming operators broker bets on sporting competitions. Others stream video of table games – like poker, baccarat, roulette, blackjack, and others – to online participants. So they have customers who are sensitive to the quality of video.



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"If the video freezes for a moment, a gamer might feel gyped out, because he's betting on what he is able to see", observes Cornejo. Not only that, an addition of a mere five-millisecond delay will cause a gaming operator's network to terminate, he says, putting paid gaming sessions and sports bets in jeopardy.

FCCDCI also operates its own hotels and gaming casinos, where it needs to provide fair and equal network access to paying customers. So finding a way to deliver fair bandwidth and eliminating network congestion remain a primary focus for the company. The company's eight-year-old, fiber-based network infrastructure currently serves more than a hundred operators. But without the required traffic management capabilities to set and enforce performance policies, certain users with bandwidth-exploiting applications could encroach on the bandwidth available to other gamers. That could cause congestion, slowdowns, and generally unhappy players.

Granular Traffic Control

Eventually, FCCDCI turned to flow-control software from Saisei, a startup with patented technology that allocates a guaranteed bit rate to each discrete network traffic flow. The software simultaneously monitors millions of concurrent IP flows, tracks each individual flow with 40 metrics, applies any combination of these metrics in a policy, and can execute those policies in less than a second.

FCCDCI has installed Saisei's FlowCommand in multiple locations as a virtual edge appliance to "control congestion and manage fair usage," says Cornejo.

The deep visibility provided by FlowCommand puts FCCDCI back in the driver's seat so it can control what experiences its operator customers – and, in turn, its customers' customers – have.

Using the software, every single flow is associated in real-time with the following:

"Two [gaming] operators were threatening to pull out because of really bad network congestion that was rendering service unavailable," reports Ed Lopez, FCCDCI's chief technology officer.

The amount of bandwidth to be delivered to each gaming operator is specified in the operator's subscription contract. To supply the contracted capacity, the company first attempted to use the traffic management capabilities embedded in its WAN routers. But Lopez says that the routers "weren't very good in controlling usage, which then becomes an issue during billing time. We have to make sure what we sell is what's paid for. If we don't control bandwidth properly, we lose out on revenue."

What's more, over-usage by one customer infringes on the bandwidth of others, and this leads to poorer service, he says.

- **The application it is serving** (for example, a specific website, business application, or a protocol such as VoIP). This allows FCCDCI to filter traffic off the network based on application type according to policy or to report certain traffic types to its customers.
- **The geographic location it is serving** (such as a country or city), allowing FCCDCI to filter traffic originating from unapproved locations off the network.
- **The hosts (internal and external) it is connecting**, so it can identify how much traffic each generates.
- **The users it is serving** (via an address-to-user database such as Microsoft Active Directory or Open LDAP)
- **Custom groups.** For example, applications, geographic locations, hosts, and users can be combined into a custom group, and flows from that group can be treated in a certain way, such as rate-limited or assigned a certain percentage of overall bandwidth.



Guaranteed Rates, Predictable Service

The capabilities have paid off in a variety of ways, Cornejo says:

- ✓ **Satisfied customers.** The two gaming operators who threatened to take their business elsewhere have decided to remain FCCDCI customers, says Cornejo. And the company has been able to eliminate the milliseconds of latency that can terminate a gaming session and its associated revenue.
 - ✓ **Network utilization boost.** Because the traffic flows have become controllable and predictable, the company now operates its network at 80% utilization, up from 50% utilization before the Saisei software was installed. As a result, FCCDCI realizes a bigger return on its existing bandwidth investment. And it can postpone new bandwidth investments by getting more out of what it already has.
 - ✓ **Ability to filter “bad” traffic.** Cornejo points out that as part of his country’s regulatory mandate, he must report application activity to the government. Gaming traffic is not allowed to originate from the United States or the Philippines, and FlowCommand gives him a way to identify that traffic and report and filter it accordingly.
 - ✓ **Usage measurement.** Detailed visibility into the network helps FCCDCI verify with its customers how much bandwidth they are using. In some cases, the company determined that operators were using more bandwidth than they had contracted for, which some customers denied. However, FCCDCI was able to show reports of the traffic loads, which included a breakdown of traffic by application type. Sometimes, there was application traffic on the network that the customer didn’t know about, consuming valuable bandwidth in the background.
- Security.** In fact, FCCDCI was able to identify application traffic that its customers’ own internal policies did not allow on the network. For example, though some operators forbid use of Facebook and other social media, the Saisei tool was able to show that such application traffic was indeed on operator networks, sometimes pushing the customer over its subscribed bandwidth limit. FCCDCI was able to inform its gaming operator customers, who could take measures to enforce the policy.
- Guaranteed transport rates.** FCCDCI also uses FlowCommand to ensure equal Wi-Fi access for all its own hotel and casino guests. Because Wi-Fi is a shared network medium, prior to the Saisei tool, big applications hogged bandwidth and shut other users off the network. A FlowCommand feature called host equalization, however, makes sure that every user sharing a link gets exactly the same percentage of the available bandwidth that every other user has, regardless of what application(s) they might be running. So the more processing-intensive apps no longer hog bandwidth from other apps, Cornejo says.
- Ability to offer premium services.** The Wi-Fi network usually serves about many hundreds of concurrent guests per day, and Cornejo says he’s considering using the Saisei software to create premium services for those who are willing to pay a premium for additional bandwidth. By controlling the rate of each specific flow, FCCDCI can successfully provide equal services to all, premium services to some users willing to pay more, or a mix of the two.

What’s important is that the company now has the ability to make sure all parties have access to the bandwidth that they are entitled to, whether that’s a minimum 1 Mbps for an individual user, 2 Mbps for a gaming table, or 5 Mbps for VIP users. “No one gets kicked off the network anymore,” Cornejo says.

ABOUT SAISEI

Saisei is a Sunnyvale, California-based software company that is revolutionizing network analysis and control for the challenges that mobility, cloud, SDN, NFV, and the Internet of Things are bringing to networks today. Its scalable, real-time Network Performance Enforcement software solutions provide the speed and smarts needed to instantly analyze and enforce policy on the millions of applications, users, and devices populating networks today. Enterprises and service providers can now use their full network bandwidth knowing that unexpected traffic surges are automatically accommodated and all user traffic will get through even the busiest of network links with no dropped sessions, resulting in dramatic savings, accelerated revenue growth and a great user experience.

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CASE STUDY

Situation:

NHN Entertainment wanted to build customer loyalty and retention by providing reliable, high-performance experiences with its online and mobile games. To do that, it needed to understand the traffic flow patterns on its network so that it could accurately conduct capacity planning and re-jigger links that threatened to slow down. This required detailed network monitoring for visibility into statistics based on source country, source network, NHN server, capacity usage and other variables.

Challenges:

Some applications were not performing well, particularly from overseas countries. The company risked losing customers and developing a reputation for less-than-stellar gaming experiences, which would have threatened its ability to compete in its industry.

Solution:

Deployment of the Saisei real-time FlowCommand software-based network performance enforcement (NPE) tool.

Results:

NHN has visibility into all traffic flows and can tune capacity as needed to retain performance levels. It can also detect and mitigate DDoS attacks to keep performance humming.

Game Maker Keeps Users Playing in Real Time Using Flow-based Network Visibility and Control Tool

NHN Entertainment is the third largest game company in Korea with more than 20 million members and a peak concurrent user base of 290,000. The company develops its own online role-playing games (RPGs), mobile phone games, sports games, arcade games, and puzzle games. It hosts them on 4,000 networked servers accessed by customers all over the world.

NHN needs to make sure that its customers have consistent, superior experiences with its interactive gaming applications or it risks losing business to competitors.

For NHN, creating optimal experiences required the ability to increase network link capacity when application performance began to degrade. That meant NHN needed constant visibility into what was happening on the network, flow by flow.

The company sought a monitoring, analysis and fault detection tool that would let it see activity levels in real time. Always knowing where traffic was coming from and which servers it was accessing would allow the company to continually tune the network as needed to ensure consistent application performance and keep users happy.

“The tool is helping us provide a high-quality gaming experience to our users around the globe, which is important to increasing end-user loyalty and expanding our business.”

- JooHwan Kim, NHN Entertainment

Getting Per-Flow Network Stats

Any lag time or performance glitch is detrimental to the real-time gaming experience, particularly with Massively Multiplayer Online Role Playing Games (MMORPG) games, which NHN provides. Gamers that don't have fast, reliable experiences tend to become frustrated and switch providers. That causes customer churn and has an obvious negative effect on the company's revenue and reputation.

Finding a software-based monitoring tool wasn't a snap, though. “We looked at many of the top networking products, but they were very costly and complex,” explains JooHwan Kim, NHN's Infrastructure Operations Team Leader. “Also, most were hardware-based, which meant we couldn't take economic advantage of unused servers in our integrated data centers to run the tools



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Seeing the Whole Network Picture

It's tough to control what you can't see. But Saisei FlowCommand has taken care of the visibility problem for NHN. Unlike other network visibility and control products, Saisei FlowCommand network performance enforcement (NPE) software tracks each individual micro flow that traverses the network in real time. It gathers status information about the flows based on a number of variables, including performance level, application, user, location, network domain (Autonomous System, or AS, number), and threat characteristics. The data collected are all used to build powerful network policies to make the network and the applications that run on it perform their best.

Instead of using older network performance-enhancing technologies, such as queuing and data compression, Saisei NPE provides discrete flow-based control that allows IP link utilization to run 24/7 at 95 percent. The result is the elimination of user application timeouts or restarts, which boosts real-time interactive application performance.

NHN, which tracks and handles flows from nearly 300,000 concurrent users presently, has room for growth with the Saisei tool. FlowCommand supports up to 5 million flows, one billion individually tracked external hosts, and millions of distinct applications on a variety of network types.

- **Flow-based statistics.** NHN is now able to see detailed statistics across its network. Particularly helpful is seeing the traffic spread from many different countries on a per-user basis, so the company can identify how much traffic is hitting each of its 4,000 game servers. The Saisei software enables NHN to check network infrastructure capacity and use the data for future capacity planning. Armed with the performance information, NHN can decide to increase link capacity where gaming application performance is sub-optimal, which it has discovered happens most often on connections from overseas countries. In short, NHN has an instant, overall view of its service infrastructure. That allows the company to adjust the network for better application response times for their globally distributed mobile and online gaming users.

- **Security benefits.** FlowCommand's micro-flow level visibility and analysis capabilities also provide critical security benefits. In a recent instance, FlowCommand quickly detected and mitigated a distributed denial of service (DDoS) attack to NHN's server farm. The tool detected that the number of flows to a user was more one million, compared to 50,000 active flows normally. The tool immediately alerted the operator and promptly took action.

"The speed at which we can create customized dashboards to find a current network issue is fantastic. Using conditions and alerts, the software differentiates actionable analytics by doing a lot more than just notifications when certain conditions occur. Actions can be policies applied to real-time network traffic, a capability unique to Saisei."

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Detection and Action

NHN Entertainment is now able to see detailed statistics about what's going on in its network on a per-flow basis.

As a result, the company can:

- ✓ Determine traffic loads on each game server
- ✓ Check network infrastructure capacity and increase link capacity when and where necessary
- ✓ Detect and mitigate DDoS network attacks, which improves both security and performance
- ✓ Detect performance "distress" levels by application, user, and geographic location at any point in time to determine customers' quality of experience (QoE). By setting an alarm condition on the user distress, operators can easily detect which computer is having a network or service issue.

"The tool is helping us provide a high-quality gaming experience to our users around the globe, which is important to increasing end-user loyalty and expanding our business," says NHN's Kim. "Saisei's FlowCommand software is unique in its ability to do micro-flow level monitoring without packet capturing. Others normally do it by capturing the packets after identifying issues."

Packet capture would require a huge disk space and a powerful analysis tool to mine the raw data to uncover the flow statistics. Though the Saisei FlowCommand can also capture raw data packets if desired, it also allows NHN to skip the capture and simply browse all the traffic flows page by page. "It's extremely easy to use," Kim says.

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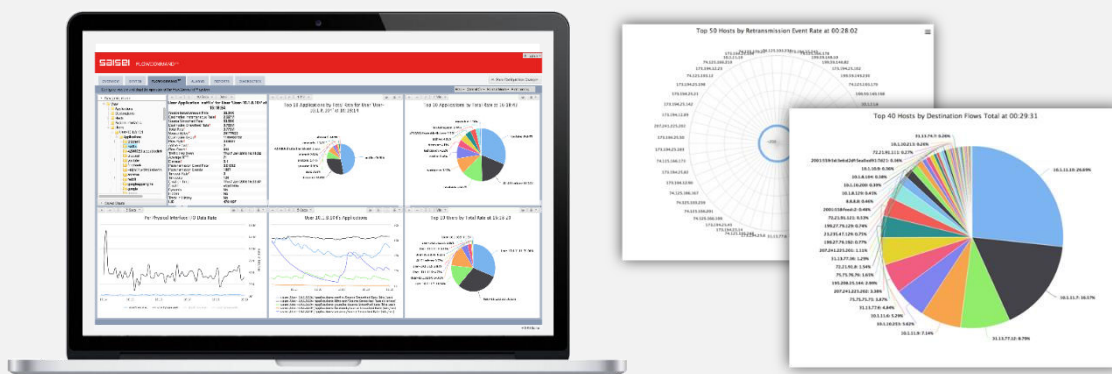
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Saisei



CASE STUDY: **Athermal**

Conference Wifi Providers up the game with Saisei

Situation

Large-scale events have become more high-tech than ever before. Reliable and fast bandwidth is required for live video streaming, apps, audience response, ticket management, registration, demonstrations, product processing, etc.

The number of devices being used, and the bandwidth required for each is growing exponentially with infrastructure severely lagging.

Challenges:

Being able to protect critical applications, provide presenters and exhibitors with predictable and reliable service and fulfil the demands of attendees is becoming increasingly difficult.

Solution:

Saisei's real-time FlowCommand software-based network performance enforcement (NPE) tool deployed to enhance for temporary convention Wi-Fi Solutions.

Results:

Athermal is now able to deliver superior quality of experience to all attendees by ensuring:

- ✓ Protection of critical applications required for event management;
- ✓ Application delivery guarantees;
- ✓ Elimination of rogue users/applications on the network;
- ✓ Enforcement of policies to align to commercial arrangements;
- ✓ SLA guarantees.



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Founded by two Internet Service Provider veterans in 2018, Atheral is building customer centric white-label and wholesale cloud solutions for Service Providers that decrease end user churn and increase profitability while being geo-redundant, highly available, and scalable.

Atheral focuses on redefining technology in the cloud to minimize capital expense while providing a scalable and predictable operating expense. Today their two core white-label platforms bring Voice over Internet Protocol (VoIP) and Internet Protocol Television (IPTV) to ISPs looking to compete with a triple-play package from incumbent providers.

The Co-Founders of Atheral have been working on temporary convention Wi-Fi solutions for attendees off and on throughout their careers.

While choosing the right access points along with RF and networking design were important, the bandwidth requirements in the age of streaming video, social media, and demos for cloud platforms would often saturate the upstream bandwidth available. Bandwidth has always been the limitation as many convention centers charge a premium for a connection, often \$10,000 or more for 100Mbps for just a few days.

“Our partnership with Saisei has allowed us to provide an improved quality of experience for the applications that matter most both to attendees and exhibitors using internet connectivity that would otherwise not be up to the job.”
- Daniel White, Co-Founder, Atheral

The Challenge: Ensuring Quality of Experience

Bandwidth consumption at events is growing at an exponential rate with the adoption of new technology. In simple terms, bandwidth allocation impacts how many people and devices can access the internet and what the quality of the delivery of these applications will be.

Atheral found that each event was seeing higher and higher demand for bandwidth; without the corresponding increase in underlying infrastructure. This meant that Atheral needed to find new solutions to be able to meet increasing consumer demand.

Additionally, as new technology was being adopted by event organizers, speakers and exhibitors – the reliability and consistency of delivery of bandwidth was becoming increasingly critical.

In simple terms, the ability to appropriately manage bandwidth was impacting:

- ✓ How many devices could be used concurrently inside the venues and public areas;
- ✓ Whether streaming presentations will be transmitted fast enough to display clearly without distortion or buffering;
- ✓ The ability to deliver live demonstrations and what applications exhibitors will be able to use;
- ✓ Event operations (registration; lead capturing and retrieval; etc);
- ✓ The experience that attendees have at the conference when trying to use productivity tools i.e. make video or VoIP calls; access emails; use social media; stream video; etc.



The Solution: Controlling Traffic with Saisei

With Saisei, Athermal has been able to implement several key policies in order to ensure the best possible Quality of Experience for all its event wifi users, whilst being able to reduce overall cost of bandwidth.

- **Protecting Critical Applications**

Saisei is able to instantly identify applications on the network and guarantee their quality of delivery. Using this functionality, Athermal is able to identify critical applications used by event organizers and is able to ensure that the quality of these applications is maintained at all times – even when the network becomes highly congested.

- **Protecting Critical Users**

As Saisei is able to not only enforce policy on an application level, but also on a user level, Athermal is able to match key users and ensure that they are prioritized on the network. This has been effectively used to:

- Enabling policies during key sessions in order to appropriately manage bandwidth allocation;
- Group users according to key functions in order to ensure that they receive a higher share of the available bandwidth; if required;
- Manage quotas on a user / group of users in accordance with commercial arrangements

- **Blocking Applications on Demand**

Certain applications have the ability to dramatically consume the available bandwidth for a particular user / group of users. With Saisei, these applications may be either de-prioritized (i.e. only given bandwidth in the event that there is availability on a best effort basis); or can be blocked altogether. Big wins are achieved through highly deprioritizing background downloads such as iOS updates that consume high amounts of bandwidth without providing a clear benefit to the user at the event.

- **Fair Usage Policy (Host Equalization)**

By using Saisei's fair sharing feature, bandwidth is able to be fairly shared between the users of each group (organisers, speakers, exhibitors, attendees; etc). By enabling this simple feature, the impact of rogue users was immediately mitigated, resulting in a far improved Quality of Experience for all.

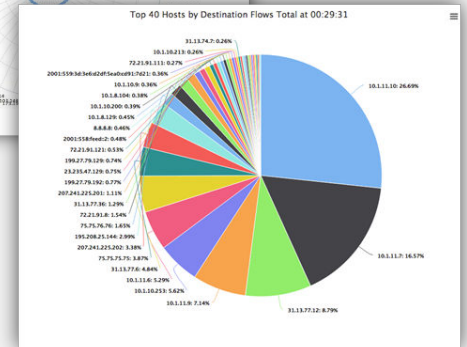
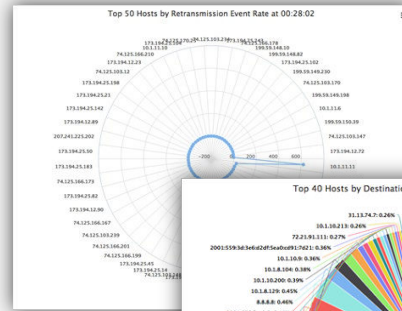
- **Troubleshooting**

Using Saisei's Real Time dashboards, troubleshooting at events has become a breeze. When issues arise, the time to resolution is paramount – with Saisei's insights dashboards, operators are able to see exactly what is happening on the network in Real Time – per user, application, access point, etc.

“Reliable internet is critical for conference attendees and exhibitors alike. Attendees often have to split their time learning in sessions and walking the exhibit hall while managing their businesses while away. Exhibitors rely on a solid internet connection for everything from keeping in touch with customers not at the show, to in person credit card purchases, to demonstrations of internet connected products.”

- Daniel White, Co-Founder, Athermal





Saisei

ABOUT SAISEI

Saisei is a Sunnyvale, California-based software company that is revolutionizing network analysis and control for the challenges that mobility, cloud, SDN, NFV, and the Internet of Things are bringing to networks today. Its scalable, real-time Network Performance Enforcement software solutions provide the speed and smarts needed to instantly analyze and enforce policy on the millions of applications, users, and devices populating networks today. Enterprises and service providers can now use their full network bandwidth knowing that unexpected traffic surges are automatically accommodated, and all user traffic will get through even the busiest of network links with no dropped sessions, resulting in dramatic savings, accelerated revenue growth and a great user experience.

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CASE STUDY

Situation:

As the managed services provider to Malaysia's largest property-construction group, Sunway Digital Wave (SDW) provides a centralized network infrastructure and Internet services to a vast and varied user community, including rolling out broadband services to new residential and commercial customers outside the Sunway Group of companies and in new geographies.

Challenges:

- The most bandwidth-intensive users were hogging bandwidth from others, resulting in network congestion and complaints from other users about applications and network performance.
- The current Exinda Network Orchestrator solution couldn't provide the bandwidth fair usage needed, nor could other WAN optimization and DPI products, such as BlueCoat PacketShaper, that SDW evaluated.
- SDW is in the process of building out a Software Defined Network to support business expansion to new regions and new residential users and broadband technologies. SDW's network planners and operations staff needed targeted, real-time analysis of traffic and users' bandwidth usage.

Solution:

Deployed Saisei FlowCommand at the heart of their SDN network, as the only solution that provided the real-time fair usage and greater network visibility, analytics, control and security needed to deliver superior Quality of Experience (QoE) to their users.

Results:

- ✓ Significantly reduced user complaints about network performance.
- ✓ Optimized bandwidth utilization by more than 30%, resulting in a cost savings of more than \$80,000 and delayed CAPEX on upgrades for more than 6 months.
- ✓ Ability to provide customers proactive policy enforcement, reporting, and analytics on their applications, users and dynamic bandwidth usage -- and to deliver broadband services that match user needs.
- ✓ Increased security posture with real-time network traffic forensics.
- ✓ Capability to troubleshoot and resolve any network issues much more quickly.
- ✓ Ability to efficiently and reliably provision new broadband tiered services to residential and commercial clients in new regions.

Service Provider Delivers Fair Usage and a VIP Experience to Users in Malaysia's Top Hotels, Retail Malls, Medical Center, Theme Park, and Educational Institutions

Sunway Group is one of Malaysia's largest and most renowned property-construction groups with a market cap of nearly RM12 billion and 12 business divisions operating in 50 locations worldwide. Its businesses include a diversified portfolio comprising the country's largest hotel chain, retail malls, medical centers, office towers, real estate properties, university campuses, student accommodations, and theme parks.

As the primary network infrastructure and Internet managed services provider to the Sunway groups, Sunway Digital Wave (SDW) plays a critical role. It is responsible for ensuring consistently reliable and high-quality applications performance and Internet access to the Sunway groups' more than 30,000 users.

Sunway Digital Wave needed to provide consistent, high-quality experience to users bringing on new applications and next-gen devices all vying for network access and bandwidth.

Bandwidth Consumers Depriving Other Users Degrading Applications and Network Performance

As Sunway's businesses have expanded, they've needed more and more network bandwidth to keep up with user demand. When SDW first started operation in 2008, each business group was purchasing bandwidth from different service providers, typically 50-100 Mbps a month. SDW was able to acquire wholesale Internet bandwidth and provide bandwidth based on service tiered to all the Sunway groups in a more equitable and efficient manner, providing better pricing and services to the businesses.

SDW has continued to build out its network infrastructure, migrating to a Software Defined Network (SDN), to support the diverse user needs of the medical centers, hotels, office and retail properties, and educational institutions using a growing array of applications and devices in locations across Malaysia and the world.

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One of the key challenges SDW faced, however, was the first and largest users accessing the network consumed most of the bandwidth, compromising performance for other users and high-priority applications. SDW needed a way to guarantee a predictable, quality applications experience for all users.

“What we saw was a group of users would grab all the bandwidth and not let go, hogging the bandwidth from new entrance users. The users with the highest consumption would remain and the other users didn’t get their fair share of bandwidth. We started to get complaints about network performance, particularly from internal customers who were frustrated by slow applications and Internet access that wasn’t enabling them to do their jobs,” said Daniel Soh, Assistant General Manager, Sunway Digital Wave.

“We were using Exinda’s Network Orchestrator, and evaluated other WAN optimization and DPI solutions like BlueCoat’s PacketShaper, but neither could provide the fair usage we needed. Both Exinda and BlueCoat allocate bandwidth by users and networks, but we continued to see situations where a group of users would consume all the bandwidth and hold onto it until they became inactive and released the bandwidth to others. This results in users not getting the broadband service they’re allocated and have paid for.

- Daniel Soh, Assistant General Manager, Sunway Digital Wave.

Delivering a First Class Experience on SDN

SDW was introduced to Saisei’s FlowCommand network performance enforcement solution in 2015. The company put the software into a trial deployment and, after seeing what it could do, immediately deployed the solution in their production SDN network.

“Saisei’s FlowCommand software was the only solution we found that could provide the fair usage to all users that we needed. Customers get what they pay for and we can deliver the bandwidth needed for a high-quality, reliable and consistent user experience,” said Soh.

Taking advantage of patented flow-control technology, FlowCommand guarantees that each user or host has equal access to the network regardless of how many users are on the network or what applications they are running. It identifies, monitors and controls every single flow on a critical broadband link – up to millions of concurrent data, voice and video sessions – in real time without any impact on network performance. With FlowCommand, aggressive applications – including P2P applications, high volumes of YouTube traffic or file transfers, that grab huge percentages of link bandwidth and crash other users – get the same percentage of a link’s bandwidth as every other user on the network. Every user session – video, VoIP call or other application – will successfully transit a Saisei-managed link and never stall or time out again.

SDW has deployed FlowCommand at the heart of their SDN network. The software solution sits in the company’s network operations center behind their firewalls, and all Internet traffic goes through FlowCommand. FlowCommand can manage as much as 10 Gbps of traffic, which will support their network needs well into the future.

FlowCommand has given SDW a way to see, prioritize and report on bandwidth consumption throughout its network, allowing the IT team to make the most of available capacity, ensure a high-quality user experience, and easily produce reports to management and its users.

“Fair usage was the biggest requirement for us, but FlowCommand has provided us a number of important benefits in terms of much more advanced and instantaneous visibility, analytics and control. The control of our bandwidth is markedly better across the board. We’ve improved bandwidth utilization by more than 30%, which has translated into a more than \$80,000 bandwidth cost savings and delayed capex on upgrades for more than 6 months,” said Soh.

“With FlowCommand’s metadata analytics, we can identify traffic details on all users, applications, and locations on our network. We can see bandwidth usage and types of traffic coming through, and can even report this back to customers on a regular basis so they can take actions as needed,” said Soh.

For example, Sunway’s university gives SDW the policies they want enforced, such as restricting access to gaming and other sites, and SDW enforces those for them in addition to monitoring traffic patterns. FlowCommand enables SDW to generate daily reports which it shares with the university. The university’s bandwidth-intensive distance learning and video conferencing applications, with the recreational and other traffic generated by students, were causing network congestion at peak times.

"With FlowCommand's advanced reporting and monitoring, we were able to see that traffic from student hostels and dormitories typically peaked between 4 p.m. and 1 a.m., so we'd need more bandwidth then and could allocate it to the hostel. With time-based policy, we can now share the daily and historical usage reports with the university and show changing usage trends and how we're conserving resources and managing available bandwidth strategically," said Soh.

FlowCommand have also helped augment SDW's security posture. They are able to identify problems early and mitigate

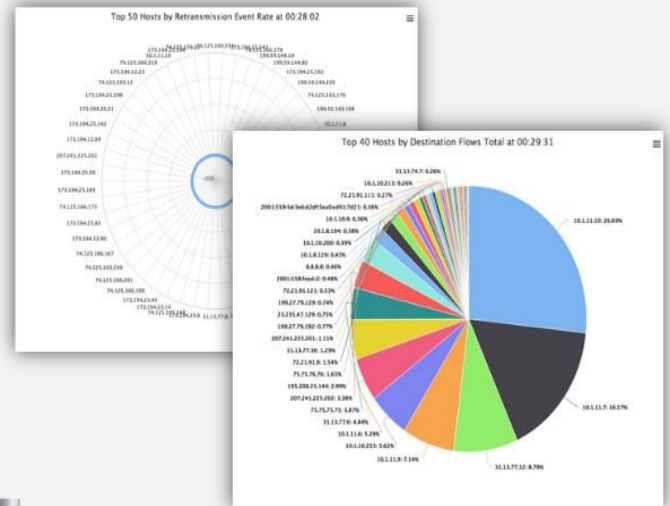
them early. They can drill down further to pinpoint the exact user and device and intervene if there are any security threats or activities taking place outside of the customer's acceptable use policy, such as traffic from an unknown source.

This granular, real-time network visibility and control has also helped them troubleshoot and resolve any network issues more quickly. And "FlowCommand's ease-of-use and intuitive interface is a much welcomed feature," said Soh.

Transforming the Way People Live, Learn, Work and Play in a Connected Environment

Using FlowCommand and new broadband technologies, SDW is continuing to expand, providing services to Sunway Group users in other states of the country as well as to new commercial and residential customers outside of the Sunway Group.

"Sunway Group's efforts toward building a first-class infrastructure in Malaysia is helping to transform our country into one of Asia's leading economies. Their vision is to transform the way people live, learn, work and play in a safe, healthy, connected environment. Our technology decisions are based on this, and Saisei's solution is helping us make this vision a reality," added Soh.



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