

# Spring 2015 ONUG Meeting Highlights

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*Continued progress and momentum for open networking*

## **Executive Summary**

Today's networking world is complex, antiquated and full of proprietary products. The Open Networking User Group (ONUG) was built by end users around the idea that open networking is essential to helping business by providing agility and flexibility. Unlike many other consortiums, ONUG is driven by the end customers, not the vendors. ONUG members put together the use cases, business requirements and functional requirements that are then shared with vendors. At this Spring 2015 meeting, ONUG reviewed the progress of their existing working groups. In addition, testing was added for the existing use cases, giving vendors a set of functional requirements to test against in order to verify that their solutions are meeting the needs that were outlined in the ONUG use cases.

## **State of The Industry**

This year's meeting was held at Columbia University in NYC and there was a very purposeful reason to choose this location. In the introductory presentation the point was made that the ONUG group needs to more openly embrace the academic community because of their vast depth of knowledge. As an organization, ONUG is focused on the sustainability of a vocal user community and operationalizing open technologies in order to both remove workload delivery friction and create business value.

The ONUG journey started successfully in Spring 2013 at Fidelity Investment as an experiment. This was followed by the Fall 2013 meeting at JP Morgan Chase where voting was held on the initial use cases. By Spring of 2014 working groups were formed and then by that Fall the first white papers were released to outline the use case requirements. Now, this Spring (2015), the first results of verification testing were shared, providing an important momentum for the open networking world.

But what is driving the need for open networking? An interesting point brought up was that the same complaints leveled against the mainframe world in the past (too difficult to work with, expensive, proprietary, not agile enough) are now being leveled at the server, storage and networking silos of today that replaced much of those mainframe functions. The cloud is pressuring traditional IT the same way that this "traditional" IT was pressuring the mainframe 20 years ago. Shrinking the time to market is the biggest issue for customers that is specifically driving open networking, with the need to innovate being a critical component to making this happen. CapEx reduction, often assumed when discussing any open initiatives, was actually not cited as a key driver. When polled, 93% of the audience indicated that they were currently not open, somewhat or only a little open; clearly indicating that there is a great opportunity for upside because the demand is high and the install base is still small.

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Open networking is viewed as being about choice and options, with the biggest consideration around interoperability, chiefly to mitigate being locked in by service providers or equipment vendors.

## Creating Business Value With Cloud Infrastructure

Adrian Cockcroft of Battery Ventures addressed the event with a discussion about how cloud infrastructure was changing the market. The discussion centered around how enterprise IT can actually be its own worst enemy at times, ignoring trends until it is too late and users go around IT to get the services they need. NetFlix was the example used of a company that embraced cloud early, opting to go “all in” on the strategy instead of trying to build their own massively scaled infrastructure.

The point that Adrian was making was that technology is moving quickly, and innovation requires not only understanding, but investment. For instance, Docker wasn’t on anyone’s roadmap last year, but in 2015, just about every company is investigating how they can utilize Docker (which is not only disrupting IT, but also disrupting VMware, the previous market disruptor.)

With the move to the cloud, companies are also moving towards Dev Ops in their application development environment. They are stepping away from optimizing IT for cost and now looking at optimizing for speed when delivering business applications, because in the cloud age cycles are shrinking and businesses need to be more agile.

While all of the businesses in the room had CIOs, the previous example of NetFlix stood in sharp contrast – they do not have a CIO, nor have they ever had one. IT is actually embedded into the business instead, which is where it can deliver the most value.

Part of successfully re-establishing IT as a leading function in a business lies in understanding Value Chain Mapping, the idea that you align how you deliver (or procure) a service based on its value to the company. A company’s unique “special sauce” or proprietary IP should be delivered through Agile IT, developing the resources quickly and efficiently for a time to market advantage. Those things that are important, but not your core, should be focused on best of breed vendors and Lean IT – finding those that can do it best already in the market so that you don’t have to recreate the wheel. And for those parts of your business that are the most undifferentiated, look for utility suppliers that can drive the best quality at the lowest price – and don’t try to do those things yourself.

Shifting the focus of development towards DevOps and agile processes will lead businesses to deliver in faster cycles, with smaller releases and more targeted services. Release management becomes more of a challenge, but each release has fewer dependencies, allowing for less complication. The Docker methodology was pointed out as it enables a developer to encapsulate the application and ease the deployment. Ultimately businesses will need to move faster and reduce cycles as cloud technologies are redesigning how things will get done.

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## Open Cloud Infrastructure

As the market talks about open networking, it is important to put it into the context of the larger open cloud infrastructure, which includes the server, storage and networking that are the essential building blocks, as well as the software and tools that sit on top of these physical devices – often as overlays.

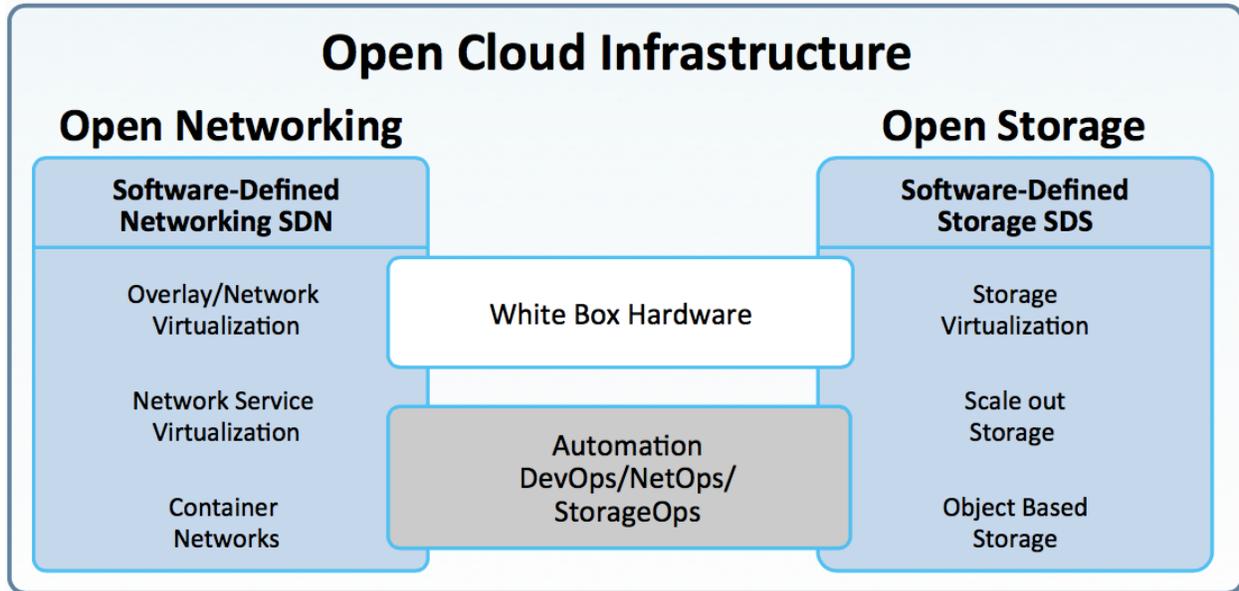


Figure 1 Open Cloud Infrastructure (source: Nick Lippis, ONUG Co-Founder, ONUG Keynote)

## Testing Use Cases With Ixia

Developing use cases is a critical step in driving the right product features with vendors. Understanding how the products will be used needs to be transformed into actual, functional products that customers can utilize. But the only way to truly ensure that the products match the use cases is through some sort of testing or validation.

ONUG chose Ixia as its testing partner; they were chosen to help the working groups test and document the vendors' applicability to the established use cases. While this is not a "certification program" as many in the industry are accustomed to, it is a validation that the vendors are both listening to, and addressing the needs of the customers, which is an important validation. Ixia was involved in both test plan development with ONUG working groups as well as feature verification testing.

## Use Case Working Group Updates

Previous ONUG meetings had established use cases and the working groups have been executing on their plans to define and document the six primary use cases. The six primary use cases have developed to the point that they were now ready to begin testing products against the needs that ONUG had identified. Below are the updates from each of these groups.



INSIGHTS & STRATEGY

## SD-WAN Working Group

One of the most developed use cases and one of the earliest drivers of ONUG was the Software Defined WAN (SD-WAN). With 7 vendors already delivering products in this space, this was one of the most discussed and advanced of all of the discussions.

The SD-WAN use case testing utilized two simulated data centers and 2 simulated branch locations (or simulated clouds). The WAN connections were routed over both MPLS and a broadband connection, with the SD-WAN creating redundancy and connection diversity. In the testing, all of the traffic was meshed between sites. One of the more interesting comments was that in a production environment, connection diversity is extremely hard to test (the actual statement used the word “impossible”).

The goal of the testing was to show reliability, failover and continuity despite the loss of a connection. Some demonstrated the ability to prioritize and steer traffic based on different business rules that were tied to real time traffic analysis.

For the future, integration with VMware and OpenStack was requested, along with interoperability at the data plane, but as one on the panel put it, “be careful of what you wish for” as this level of functionality creates an entirely new set of requirements that may far exceed what has already been documented for SD-WAN.

You can find more detailed information on this working group result [here](#).

## Virtual Networks/Overlays Working Group Update

Virtual networks and overlays are an important part of the overall open networking architecture. Overlays are important they are being deployed in both corporate data centers and public clouds like AWS. IT leaders require the ability to set one policy that is shared across these different cloud environments. The requirements for this use case had been assembled since the last meeting, just in time for the feature verification testing to happen prior to the Spring 2015 meeting.

Two of the more important pieces to test included end to end monitoring (as the most important), followed by control plane scaling. The third important function was the correlation and performance of the overlay state. With an overlay, the challenge for many administrators becomes tying a problem on a virtual layer back to a physical piece of equipment or even down to the actual physical port.

Part of the testing involved simulating network failures. One of the vendors chose to run the Hadoop Terasort benchmark during the tests to simulate a heavy load. Then, while the benchmark was running, simulated 640 different network failures including shutting down a controller every 70 seconds, shutting down a switch every 8 seconds, and a link every 4 seconds – all without changing the benchmark runtimes.

Because of the high bar set for this test, there were only a few vendors participating, but that did not seem to be a concern from the audience. While most customers are not at the point of saturation that the tests represented (100,000 VMs) they believe they will be

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there soon enough. When polled, 41% said they are in the evaluation stage for this use case, 24% said they are already in the lab test/certification stage.

You can find more detailed information on this working group result [here](#).

### **NSV Working Group Update**

Network Services Virtualization is an enterprise initiative to move physical appliances to software. This is often confused with NFV (Network Function Virtualization) which is a carrier-led initiative focused on the appliances on the edge of the data center. NSV utilizes a hypervisor running over an IP network and all of the testing required elements of resiliency to be scattered throughout. The importance of NSV and its scalability is tied to the need for a business to spin up resources while under load and then spin them back down later, all in an effort to respond to business needs and reduce operating expenses.

The biggest problems to solve with NSV are programmatic control and then being able to offer network functions as a service to their DevOps teams that are creating applications. NSV has not enjoyed the same groundswell of deployment support yet with 67% saying that it is not on their radar screen, however it is an area that is gaining more traction quickly.

The goal of the testing was to decouple the services from the infrastructure and be completely service agnostic. A key focus of this testing revolved around the ability to deliver the services from a virtualized software solution instead of being delivered from a dedicated hardware platform as they have been in the past. The testing did not test the actual platform functionality of the appliance (i.e. does the load balancer properly balance the load) instead, focusing on can the virtualized appliance function in the network.

You can find more detailed information on this working group result [here](#).

### **Traffic Monitoring/Visibility Working Group Update**

There are a variety of factors that are driving exponential growth of traffic over network infrastructure. The rise in IP traffic comes from a variety of places, including IP-based storage, cloud orchestration that makes it easier than ever to create new cloud instances, free migration/movement of VMs as the old layer 2 constraints no longer hold them down, as well as the implementation of big data/analytics in the enterprise. And as new technologies like the Internet of Things (IoT) continue to gain popularity, it is a safe bet that traffic will continue to grow, making monitoring and visibility more important as the underlay and overlay become saturated. Collecting and capturing traffic details for network infrastructure is complex and costly, but that pales to the challenges of trying to secure that data and then analyze it to glean insight into a network's performance and issues. Another important aspect is the relevancy of the data with respect to intrusions and other network threats. While being able to identify a suspect stream in real time adds much complexity, it allows an administrator to divert the traffic and more easily try to discern the intent.

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Traffic visibility remains an important aspect to open networking, and as the abstraction between the underlay and overlay continues to get more complex, this monitoring and analysis will gain even more prominence.

Understanding the data helps drive a better understanding of the network infrastructure's cost and usage. Three of largest challenges in the monitoring and collection of this data revolve around the large number of packet inspection tools (all of which add an additional level of support and service), sampling accuracies and data loss due to oversubscription.

You can find more detailed information on this working group result [here](#).

### **Network State Collection Working Group Update**

To properly understand the health and security of the network, it is important to determine the state and the vulnerability of the network; analytics are the key to insight. One of the most challenging issues is when state changes on a device; this change can often manifest itself individually or in impacts to other devices or services throughout the data center.

While everyone wants a predictable environment, troubleshooting and optimization have traditionally been very difficult tasks because they require state data from a variety of sources, many of which are not interoperable. Understanding a disruption is complicated, especially when there is little visibility to how entire networks can be affected by a single device state change. An additional level of complexity is added by a lack of predictive analytical models to indicate specific network problems that can occur following changes in the state of devices in the network.

The goal of this working group is to define the needs for network analytics and help drive better interoperability. As an example, if load balancing is available as a service (not as a hardware appliance), state information about data traffic could help identify when new microservices could be spun up to handle the need and then spun back down once the need subsides. Network services should ideally be autoscaling with the ability to grow based on network traffic conditions, but today, too many data formats make this task difficult. Clearly interoperability can help boost insight.

You can find more detailed information on this working group result [here](#).

### **Common Management Tools Working Group Update**

This working group is focusing on a common model for management across storage, networking and servers. Today, each of these resources comes with its own management tools and its own language for describing the features, functions and states of the different devices. The goal is to define a reference architecture that anyone from any of the 3 disciplines could understand.

Because of the complexity of these products, the management architecture needs to be able to comprehend the application environment, operating environment as well as the physical/virtual chassis. Orchestration managers and Dev Ops tools need the ability to

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tie into software defined servers, storage and networking because management tools need to be able to comprehend both the overlay and the underlay. Standard APIs that would allow management tools to be able to be plugged in to the framework will either need to be developed or adopted.

The developed model identified the following functional areas:

1. Core / System utilities (system utilities)
2. Complimentary/Collateral App Services (applications)
3. System services (system services)
4. Automated provisioning service /ONIE (system services, kernel and lower layers)

With network virtualization becoming more prevalent - allowing functions to be able to be moved out towards the switch layer - any management would need to be able to comprehend a multi device (like a software-based load balancer running as a virtual service on a distributed network switch).

It was pointed out that the group is currently light on membership and that the team is actively soliciting additional members to join and help complete the work.

You can find more detailed information on this working group result [here](#).

## **The Great Debate: Open vs. Closed**

The ONUG organization encourages open debate as this helps drive discussions within the working group as well as within the general population. As open networking is challenging the predominant network norms, sponsoring a debate helps continue that theme. At this meeting the debate was about open source versus closed source.

For years, the Internet has relied on open source because traditional software was too slow to change. As of late open source is seeing a new resurgence in traditional enterprises because they are being challenged by smaller companies that are using cloud-based services instead of traditional IT to be more competitive.

Open source works best in environments where the work is complex, the cost is high and it requires a large number of contributors. Contributors engage on open source projects when either they or their companies see value in the work that they are doing, making those projects with the most contributors generally the most valuable projects. Developers are most interested in working on projects if they believe that the projects will benefit them within their daily lives. Collaboration grows over time; as the value continues to increase, more contributors are drawn in to the project. For instance, according to the presenters, OpenDaylight currently has approximately 250 contributors, the more established OpenStack has approximately 1,500 contributors, but Linux, the poster child for open source, hosts approximately 14,000 developers.

One of the complaints raised about open source is that while there may be thousands of eyes on the code during the time of development, there are few, if any looking for vulnerabilities once the code is launched. While open source generally has a good track

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record, there have been instances where vulnerabilities like Heartbleed (while not necessarily inserted into the code maliciously) may exist. Closed source software often has more focus on searching for vulnerabilities because these can directly impact the revenue streams for the products and the bottom line of the vendors.

Additionally, there is a bit of a “chicken and egg” with respect to open source and closed source software. For either, there is a level of critical mass that needs to be achieved in order to ensure that it will continue to be available and supported in the future. Neither type of software is immune to this factor as both open source and closed source applications have disappeared from the market based on lack of end customer interest. But as with all software, open or closed, it gets better with use – the more people that deploy the software, the more stable it will generally be. When asked whether one trusts open source, the short answer was “it depends.” This is mainly because for the most part nobody in the open source community has the responsibility to test the software.

The discussion also focused on open source as a “free” software. In reality it is not free, as the companies providing the software need to generate a revenue stream in order to stay in business. Even though these vendors are selling service and support packages, customers still need to be more self sufficient and should have an expectation of some level of technical expertise with the software as the customer is typically expected to be more on the front line of issues.

An interesting point was that the biggest beneficiary around open source was the closed source community. Some of the largest software companies, including names like IBM, Microsoft, Oracle and SAP all leverage open source projects to some degree even though they are all delivering closed source software that runs on top of it. Service providers were another example of companies that might be running closed source software on top of a set of open source software and tools. In this case the administrators are responsible for the QoS of the applications but not necessarily for the QoS of the underlying architecture.

Open source works best in an environment with a “slow moving front,” where conditions can arise, people can debate how to address it and then the community can respond. When conditions and needs are changing quickly, closed source seems to do a better job because a company can dictate and direct their developers to immediately attack the problem.

## **Fireside Chats**

Two fireside chats were held with just customers in the room (no vendors) in order to discuss two strategic topics, one was on Software Defined WAN and the other was on Open Storage.

### **SD WAN**

SD WAN is a hot space for vendors today. In the past year there have been a plethora of new options coming to market, and that is actually making it harder for businesses to assess their options as there are more choices. Some of the customers had looked at

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solutions a year or more ago and may have decided against taking the plunge, but now, with the new functionality it merits a second look. Unfortunately, with more vendors in the mix, the evaluations are becoming more complex.

The hardest part of the process is actually selling the idea to the business. In most cases there are not dollars budgeted to cover any type of WAN modernization and it is hard to get dollars allocated to the project. A primary concern in trying to sell it to the business is that it is hard to show the ROI or pinpoint the issues that are driving the need for the update, especially if all of the decision making is in a headquarters as opposed to being distributed to remote locations. One customer proposed taking dollars from another project in order to fund a pilot, just to get the process rolling.

Just approaching SD WAN from a cost avoidance perspective is difficult. Even though one can show a cost savings, unless they can also show some business advantage, a WAN project is not likely to get the proper attention. The project needs to be a partnership with finance and operations; all of the groups need to be engaged as they will be looking at different factors. The finance factors will come together later as the underpinnings for the vendors selection criteria. The operations factors will be important for supportability and any features not present that operations requires can be part of the feature request to the vendor for future functionality.

There are multiple providers in the market, including incumbent vendors, established competitors and new startup options. When considering who to evaluate it was important to include the incumbent; for startups it was important to look at their track record (as well as funding) and consider what happens if they do not make it or are bought up. In hindsight it would also have been good to benchmark the broadband providers as part of the overall evaluation. While this would have added a level of complexity, it also might have resulted in better overall ROI visibility for the project.

Many carriers are now starting to either roll out or plan SD WANs. This is good because there are convenience and support benefits to buying this as a service from a carrier. However, because SD WAN came to life as a response to MPLS not meeting customer needs, some were skeptical that SD WAN from their carrier might still leave them wanting. Broadband has also changed, from being the “ugly dog” to now being “good enough.” Most believe that the majority of their traffic could be routed over broadband, reserving MPLS bandwidth for the most critical applications. From a security perspective, most agreed that vendors and carriers are not providing enough security and that it is really the role of the customer to continually try to penetrate their network.

## Open Storage

The key goal for open storage was to create a multi-tenant infrastructure that is designed to support big data applications, analytics and Hadoop. The storage needs for these applications are scaling out rapidly and any solution needs to be able to comprehend this and scale faster than the data. The addition of open storage allows customers to create a large big data silo with servers and VMs connected to that pool via network switches, producing more east-west traffic, unlike classic SAN and NAS that generate more north-south traffic. Data growth is driving open storage; for instance one

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customer had 24 petabytes of storage at the end of 2013 and in just four years, at the end of 2017, they expect 94 petabytes, almost a 300% increase in the amount of storage consumed.

One of the challenges with storage is that there are too many use cases. IT starts out with a few in mind, but as soon as groups see the resource, they start thinking about their own needs. What starts out as an experiment rapidly grows out of control while the toolkits are also maturing and changing, making it hard to keep up with the latest functionality.

Some common uses for the data store included equities research into how moving positions impacts risk in real time or Monte Carlo simulations. Cloudera, Hortonworks and Hadoop workloads are more adept at working with open storage as conventional solutions like EMC and NetApp don't really meet the need because they essentially create more silos.

Open storage, however, is not without its challenges, with management being one of the largest issues. While "breaking down the silos" sounds good on paper, once this happens, who is responsible for the data? Who manages the data? How can one monitor the usage and bill back to the appropriate departments? Is this owned by a storage team or a compute team? With open storage there is often a skillset gap and what companies need is a benevolent leader who can take ownership of the data store and make sure that it is managed properly – for all.

### **An Analyst's Viewpoint**

Having been at the Fall 2014 ONUG meeting as well as this meeting, we were struck by the amount of progress that has been made. In the past we had been critical of consortia because, while they start out with passion, they often fizzle as the initial cause for their formation subsides or the members start pursuing newer, shinier prizes.

Conversations with customers continued to be upbeat and there remains a feeling that the work they are doing is having a direct impact. Most importantly, now that testing has been added to the mix, there is a clear signal from the vendors back to the customers that they are not only willing to listen to their needs, but that they are also willing to put their products up for scrutiny to prove this point.

With respect to the working groups, it was good to see the progress that was being made, with both definition and testing. We had several conversations with customers regarding the testing and certification. The testing itself does not certify any type of technical qualification, it is essentially an acknowledgement that the product meets the needs that have been laid out in the use cases. Some customers were a bit confused by this (mostly by the certification stamp), but we believe, overall, that it was a major net positive for the group as it sets a bar for functionality that reflects what the customers have been requesting. What was unclear, for instance, was how to judge those vendors that might have achieved 8 of the 10 categories in a test. Does this mean that the product is only 80% as good as another that scored on 10 of 10? Is this a "B" grade or a "C" grade? Ultimately it comes down to two factors: 1.) whether the two categories were

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needed by the customer and 2.) why there was not a passing grade (was the feature missing or present but not functional)? For future testing we'd like to see some additional clarity here.

As we look at open networking, it is pretty clear that the cracks in the proprietary walls are starting to increase and it is getting harder to hold back the momentum. Both at the event, and right after, we are seeing some real momentum in the market towards open networking strategies:

- Cisco Systems was in the "Great Debate: Open vs. Closed." While most would have expected that they would weigh in on the closed side, Cisco took the pro-open source stance, arguing that open source (and by proxy, open networking) was good for the market.
- Arista Networks and Nuage Networks, both attendees, announced a collaboration project the week after. Nuage is already a joint venture with Alcatel-Lucent Enterprise, making this announcement even more interesting as it points to a potential market opportunity that is so large that other allegiances aren't getting in the way of innovation.

Just looking at the amount of traction that open networking is having, the market is feeling like the snowball gaining mass as it goes down the hill, but there is still much work to do.

While customers were engaged and interested, the informal polls in the room point to the fact that most are still in the investigative phases. There is clearly still a long road to go for open networking, but the momentum that we are seeing in the market, combined with the work that these customers are doing to drive the requirements, are both good indications that open networking is not in danger of losing steam any time soon.

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