Abstraction and Control of Transport Networks (ACTN) Minutes
THURSDAY, July 24, 2014
1300-1500 Afternoon Session I
Location: Tudor 7/8

Chairs: Young Lee, Daniel King

1. Introduction (10 min)

Pronounced "Action".

Young presented the opening slides. The goal is to see if further discussion is warranted.

2. Multi Tenant VNO use case (Takuya Miyasaka, KDDI) (15 min)

https://datatracker.ietf.org/doc/draft-kumaki-actn-multitenant-vno/

Takuya presented his slides. He would like more efficient use of transport network resources, fast deployment of new services, and control of the core transport network by the service network operator (network programmability).

No Q&A.

3. Data Center Operator: Multi-domain Data Center Interconnect (Luyuan Fang, Microsoft) (15 min)

https://datatracker.ietf.org/doc/draft-fang-actn-multidomain-dci/

Luyuan presented her slides. She presented a list of requirements for standards-based abstraction with a common information/data model.

Eric Nordmark: Are you assuming that the overall controller has visibility to every link?

Luyuan: No, the central controller does not have access to all details in all networks, the top controller only sees summarized abstracts.

Eric: Also, are the any issues with the interconnection points between networks?

Luyuan: There are multiple WGs in the IETF working on this right now.

Oscar Gonzalez: Will the central administrator be in the same administration as the subnetworks, or will there be multiple providers and business relationships?

Luyuan: All of the above.

Daniel: Why do we need this now? What are the business motivations? Speakers should talk about what the motivations are from a business perspective. Why do we need this flexibility? Is the primary motivator that it takes too long to create new services, or are the other motivations as well?

Luyuan: Sometimes between large data centers the size of the interconnection is very large and expensive, we need to do something about that as well.

4. Transport Network Operators: On-demand E2E Connectivity Services in Multiple Vendor Domain Transport Networks/Virtual Network Operation for Multiple Domains in a Single Operator Network (Hosong Lee, Korea Telecom, Oscar Gonzalez, Telefonica) (20 min)

https://datatracker.ietf.org/doc/draft-klee-actn-connectivity-multi-vendor-domains/

https://datatracker.ietf.org/doc/draft-lopez-actn-vno-multidomains/

Hosong presented his slides. He presented the problems he sees with current approaches and high-level requirements for improvements.

Ruediger Kunze: The control plane should be simpler. We talk about simplification of networks, and if we expend more time on the control plane, we create more complexity.

Adrian Farrel: I agree, but this might not be the right venue. The control that you may want to exert on these networks, do you want to be controlling the internetwork connectivity, or inside the networks as well?

Hosong: the borders.

Eric Nordmark: Are these capabilities that already exist when talking about single domains? Do you have APIs for a single domain today?

Hosong: No, each vendor has their own, and they're not well specified. We need standard APIs.

Eric Nordmark (?) : From your operational experience, what kind of format do you have for the domain preference and local policy? Are the simple, or complicated and difficult to capture?

Hosong: We have multiple domains, we have no current preferences.

Daniel: It's a multi-dimensional problem.

Kireeti Kompella: Question for the last three presenters. The last presentation talked about the CE connecting to the network, the last two speakers spoke about service entities within the provider. It's important to specify what we're going after, because the scales and details are different.

Young: That's a good point. CE is not customer edge, but it is an access point within provider domain (I talked to KT on this before the meeting).

Oscar presented his slides. It's a similar use case with KT's, and their goals are creation of a virtualized environment allowing operators to view the abstraction of the underlying multi-administrator, multi-vendor, multi-technology networks. The operation and control/management of these multiple networks are as if it is a single virtualized network.

Igor Bryskin: Does the transport domain give you any necessary information, or do you need to figure it all out yourself?

Oscar: You can ask for what they have, or you might have to do it yourself, it can go both ways.

Igor: Would it be a good idea to have a data model where you tell the little guys that I don't know how to operate you, please present yourself as abstract nodes.

Oscar: That could work, but you have to be careful to not lose the details that may have an important impact. It is simple, but when you're running a million things, you could lose important information on the details.

Young: It's an excellent question; we should look into different possibilities and alternatives.

5. Mobile Network Operators: Mobile Backhaul Packet Transport Networks/Mobile Virtual Network Operation for Multiple Domains in a Single Operator Network (Weiqiang Cheng, China Mobile, Rod Hwang, SK Telecom) (20 min)

https://datatracker.ietf.org/doc/draft-cheng-actn-ptn-requirements/

https://datatracker.ietf.org/doc/draft-shin-actn-mvno-multi-domain/

Weiqiang presented his slides. He talked about his service and networks requirements for multi-domain end-to-end control, resource coordination, virtual networks/"network slices", and migration from current NMSes to a "super controller" with compatibility with current EMS/OSS interfaces.

Kireeti: Have you considered using MPLS instead of MPLS-TP, and using seamless MPLS for the access network?

Weiqiang: No, MPLS-TP has been working very well, it's extremely easy to manage, more than 80% of the nodes are in the metro and access layer and the number of nodes are so large, if we bring in MPLS it will totally reconstruct the network. It's stable and easy to maintain.

Young: The goal for ACTN is to use existing equipment and networks as much as possible.

Rod presented his slides. He presented their 4G and 5G network overviews, and virtual network operations for mobile operator networks. They want their 5G network to have a virtualized architecture with centralized control and packet-optical integration for multi-layer integration.

No Q&A.

6. Research: Toward Ultimate Convergence of All Networks (Dan King, University of Lancaster) (5 min)

Dan presented "TOUCAN: Towards Ultimate Convergence of All Networks". It is a UK-sponsored program to develop a technology-agnostic system that focuses on end-to-end optimization of infrastructures and services, using commodity hardware as much as possible.

There is some amount of overlap between TOUCAN and ACTN, and Dan's primary interest is leveraging ACTN (and other standards work) as much as possible to prevent reinventing the wheel.

No Q&A.

7. Open Discussion (25 min)

Young led the open discussion. We are talking about multi-domain; each domain has its own control structure. There needs to be some abstraction of multi-domain to simplify operations and provide virtual network slicing. He presented a summary slide of what the operators presented today. Questions for the group: What are the commonalities, and what is missing and not covered today? Are there requirements that require standardized solutions?

Stephen Shew: He has some comments on the list that he feels are still applicable. There are some sources of standardized solutions and framework, such as Y.1311, Y.1312, and Y.1313. There is also good work in the ONF's architecture group. It was a large overlap with SDN. There is also a modeling team in TMF that is useful. Don't reinvent the wheel, look at other work that has happened or is happening to make our work here easier.

Dan: To operators, If this other work is available, are these applicable to your use cases, is it available from the vendors? If there are solutions available, why aren't they already being used?

Young: We definitely don't want to reinvent the wheel; there are also worthwhile tools in the IETF that we can use. Stephen, would you be able to help identify non-IETF technologies and a gap analysis?

Stephen: He'll be happy to put stuff on the list and put the pointers out there.

Martin Vigoureux: Are there differences between inter-technology, inter-region, and inter-domain?

Daniel: It depends. We'll discuss more on the list.

Daniel: Are there any operators in the room with more use cases? (No response)

Young asked if this is a valid problem space, do we see obvious protocol work, are people willing to work on the problem space, and how should we progress?

Martin: I see protocol work, and we have to go beyond boxes and arrows and refine deeply and precisely what the problem space is, otherwise we will spend too much time doing functional architectures.

Daniel: Is the IETF the right place to do the work, and if so, where?

Martin: One of the valid problems I see in this space could be done in PCE. It's a tiny part of the problem space. There is other work as well.

Andrew Sullivan: I'm on the IAB and need to write a report on this BOF. I've heard that we need simplicity and a common framework, but we also don't need to change things. That is going to be hard without adding a new layer of management, and will that be creating a complex system that will make things worse?

Young: Operators have great pressure on cost of operation, so they want to use their current equipment, but they need a function or module on existing HW to allow them to simplify operations. We are trying to develop something that is workable with current networks as much as possible, but we should also look to the future. It's a good question, but it has business implications as well.

Eric: Another facet on these questions is what is the success criteria? Are people looking for a common northbound data model across multiple vendors and domains? Then you write a standard that represents the lowest common denominator. Would that be success? You might lose some current functionality, but if LCD is success, it's not that hard.

Igor: Regarding complexity, the goal is to make things much simpler, not more complex. You can do this by using a common abstraction and data model.

?: Have you looked at Netconf and a YANG model? Is that all we need here?

Young: Yes, that may be an important part of the work. But there are other aspects beyond models to fully support what operators are saying today.

Ruediger: There is a lot of homework for operators to reduce complexity, and he agrees that Netconf and YANG will be useful here.

Weiqiang: Operators considering upgrading from older to newer systems have to ask if its reasonable and cost-effective. China Mobile would like ACTN-like capabilities to add flexibility to the network, but it's not necessary for all network aspects. For example, with backhaul, you don't need a very dynamic network because you set things up one and it never changes. So they would like to add some dynamic aspects to the network, but it's not their primary goal. China Mobile also has some ideas on APIs to share. They need APIs between controllers. There may be different models for different conditions. The main issue is that there are no standard APIs for their management requirements.

Donald ?: This is a valid use case,. There is work being done in the cloud Ethernet Forum and there's a lot of commonality between the use cases presented there and those here. They are using Netconf and YANG for their requirements.

Richard ?: I'm from academia, and from that point of view, there needs to be a simple view of transport networks. However, transport networks are complicated by nature, and can you summarize that complexity into a simple model? There is going to be huge loss of information. For a transport network, some behaviors have to be removed, perhaps restricting to the static parts of the network, and that's the only way there's any hope of modeling it.

Young: We need to recognize that complex operation remains in domain control which we are not changing. We are primarily concerned about end-to-end abstraction and control based on such abstraction to offer multi-domain solutions for operational simplicity.

Adrian: I want to start by thanking operators for showing up and discussing their problems, that's very rare. I see common threads, and also some stuff that goes off on its own, and we need to concentrate on the common threads. To operators, some of this stuff has commonality and can be interoperable, but other things need to be discussed privately with your vendors. It's also extremely premature to be talking about solutions. Need more understanding on architecture and functional model.

Question for the room: Who in the room would be willing to write text to scope the problem and frame solutions? (Some number of hands went up about 20). Adrian suggested that people start to use the list to contribute this text on scope, framework, and requirements, so that we can see if there is indeed further work that needs to be done in the IETF.

6. Summary & Next Steps (10 min)

(Nothing here, ran out of time)