



Simplifying JT-NM TR-1001-1 deployments through microservices

Richard Hastie – Senior Director – M&E Business Development
Mellanox Technologies



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What is JT-NM TR-1001-1:2018 v1.0?

- A Technical Recommendation (TR) developed by the Joint Task Force on Networked Media (JT-NM – AMWA, EBU, SMPTE and VSF)
- Scope is for professional media infrastructures utilizing the SMPTE ST 2110 and AMWA NMOS family of standards and specifications
- Details a System Environment and Device Behaviors For SMPTE ST 2110 Media Nodes in Engineered Networks
- Specifically covers:
 - Networks
 - Media Node Registration and Connection Management



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JT-NM TR-1001 Needed Services - Default

Features	Switch Service	Media Node Service (Client)	DC Infrastructure Service	AMWA NMOS Service
Unicast Routing (Control)	✓			
Multicast Routing (Media)	✓			
Precision Time Protocol (PTP)	✓	✓		
Link-Layer Discovery Protocol (LLDP)	✓	✓		
Dynamic Host Configuration Protocol (DHCP)		✓	✓	
Domain Name Service (DNS)		✓	✓	
NMOS IS-04 Registry		✓		✓
Network Time Protocol (NTP)	✓	✓		



JT-NM TR-1001 Needed Services - Migrate

Features	Switch Service	Media Node Service (Client)	DC Infrastructure Service	AMWA NMOS Service
Unicast Routing (Control)	✓			
Multicast Routing (Media)	✓			
Precision Time Protocol (PTP)	✓	✓		
Link-Layer Discovery Protocol (LLDP)	✓	✓		
Dynamic Host Configuration Protocol (DHCP)		✓	✓	
Domain Name Service (DNS)		✓	✓	
NMOS IS-04 Registry		✓		✓
Network Time Protocol (NTP)	✓	✓		

Remove and simplify the environment by running them as microservices





JT-NM TR-1001 Needed Services - Optimised

Features	Switch Service	Media Node Service (Client)	DC Infrastructure Service	AMWA NMOS Service
Unicast Routing (Control)	✓			
Multicast Routing (Media)	✓			
Precision Time Protocol (PTP)	✓	✓		
Link-Layer Discovery Protocol (LLDP)	✓	✓		
Dynamic Host Configuration Protocol (DHCP)	✓	✓		
Domain Name Service (DNS)	✓	✓		
NMOS IS-04 Registry	✓	✓		
Network Time Protocol (NTP)	✓	✓		



What is a microservice?

“The microservice architectural style is an approach to developing a single application as a suite of small services, each running in its own process and communicating with lightweight mechanisms, often an HTTP resource API.

These services are built around business capabilities and independently deployable by fully automated deployment machinery.”

James Lewis and Martin Fowler

<http://martinfowler.com/microservices/>

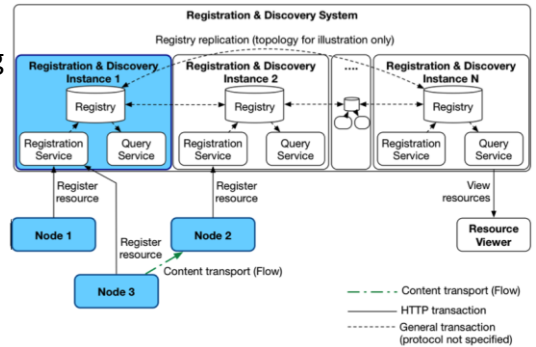
<https://www.nginx.com/blog/introduction-to-microservices/>





Dematerializing IS-04 Registry to an open microservice

- Containerised **open-sourced** implementation of AMWA IS-04 Registry from Sony
- Supplied as a self-contained Docker image making it **platform agnostic**
- Includes everything needed
 - Supports mDNS and DNS-SD Discovery
 - Full Registration and Query Services
 - In-built registry browser
 - Fully tested within industry interops
 - GA and in production with customers

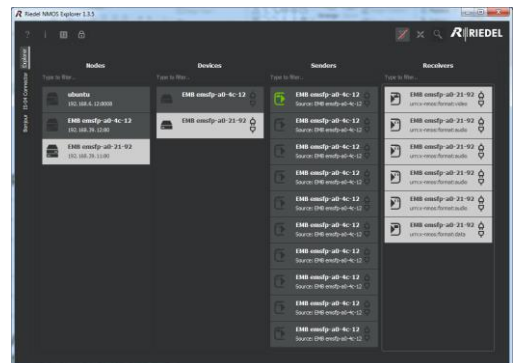


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Mellanox IS-04 Registry Container

- Supports following AMWA standards today
 - AMWA NMOS IS-04 v1.0 - v1.2, v1.3 (new)
 - AMWA NMOS IS-05 v1.0, v1.1 (new)
 - AMWA NMOS IS-06 v1.0 (using Mellanox NEO as Network Controller)
 - AMWA NMOS IS-07 v1.0
 - AMWA NMOS IS-09 v1.0-Dev (beta)
 - AMWA NMOS BCP003-01 (beta)
- AMWA IS-05 Node functionality is installed but turned off by default

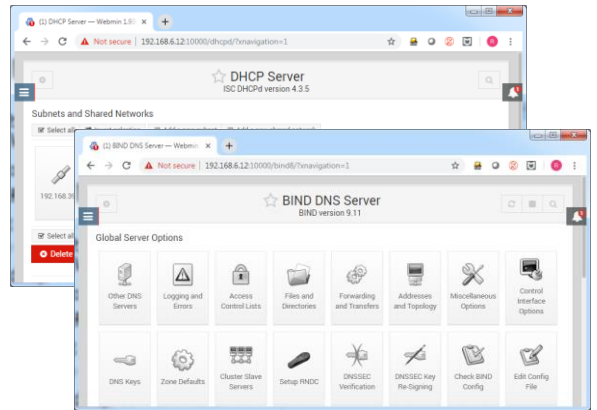


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Mellanox DHCP / DNS Container

- Containerised **open-sourced** implementation of Webmin, DHCP and DNS
- Supplied as a self-contained Docker image making it **platform agnostic**
- Includes everything needed
 - DNS using BIND v9.11
 - DHCP using isc-dhcp-server v4.3.5
 - WebGUI using Webmin v1.93
 - GA and in production with customers



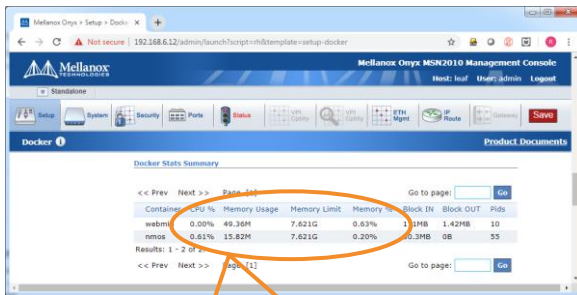
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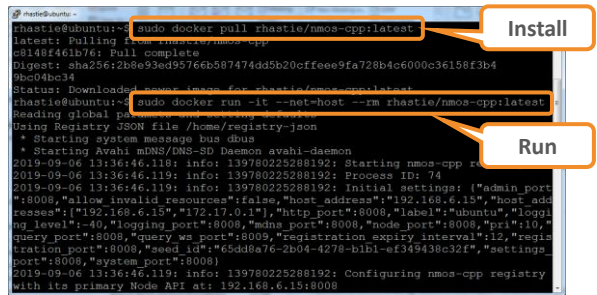
Run anywhere functionality...

Run it on a Mellanox switch

Run it on a generic server



Tiny memory and CPU footprint



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How to access the containers

- Published in the public-domain on Docker Hub
 - NMOS-CPP: `docker pull rhastie/nmos-cpp:latest`
 - Webmin-DHCP-DNS: `docker pull rhastie/webmin-dhcp-dns:latest`
- Note the Docker container tags for versioning
 - NMOS-CPP container versioning is aligned to the relevant Sony “commit” on GitHub
 - “latest” will always give you the latest version
- Please read the relevant “Overview” on Docker Hub for a brief explanation on how to use etc.



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Benefits of running these services in the network

- Eliminates DC infrastructure to support the relevant standards
 - You only need the network and media infrastructure – No servers required
- Technically more flexible – e.g. supports multiple VLANs
- Reduces the IP networking knowledge needed by the broadcast engineers
 - The containers once installed can auto-start on power up
- Installation can be done using automation tools, there by removing mistakes
- Completely repeatable – wipe and roll again
- Micro-services approach is well understood and widely deployed

Ultimately it reduces your IP transition costs!



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An example OBU optimised environment at IBC...

- Full **LIVE** demo using the Mellanox micro-services containers
- PHABRIX Booth - Hall 10 - 10.B12
 - Mellanox SN2010 switch with all containers running
 - PHABRIX Qx - Analysis & Monitoring
 - PHABRIX Sx TAGs - acting as sources and receivers for SDI to IP and IP to SDI
 - Embrionix emSFPs for SDI to IP
 - And other vendors equipment



Mellanox
SN2010 Switch



PHABRIX Qx



PHABRIX Sx TAG



Embrionix
emSFPs



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Next steps and direction

- To date
 - Open-sourced AMWA IS-04 Docker container
 - Open-sourced DHCP and DNS Docker container
- Next Steps
 - Currently looking at AMWA NMOS IS-10 - Authorization
 - Potential for a third-container acting as an IS-10 compliant OAuth Server
 - Potential for another container offering the AMWA testing tools to accelerate development environments



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Thank you

Richard Hastie, Mellanox Technologies
richh@mellanox.com / +44 (0) 7808 783169

Thank you to our Media Partners



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