Media Platform Automation

Steven Soenens, Skyline Communications

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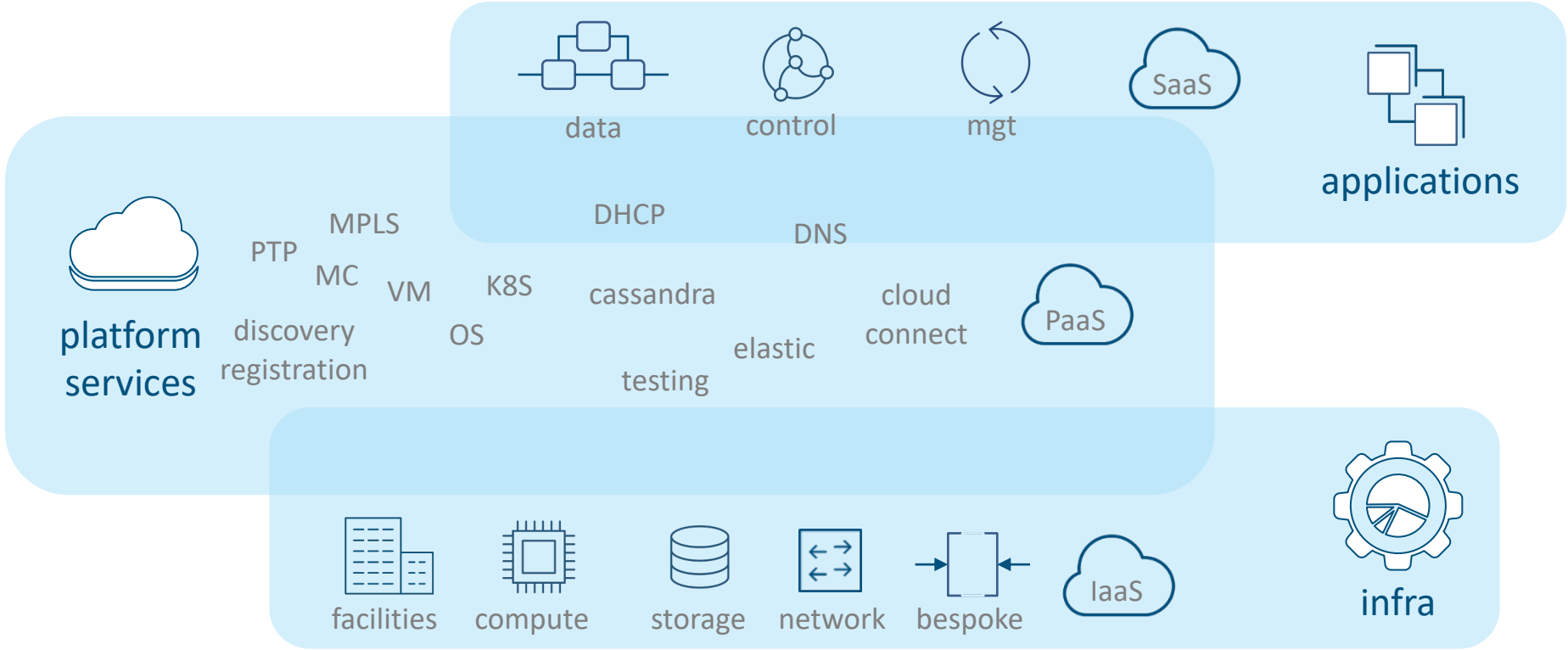
media services platform – eco system

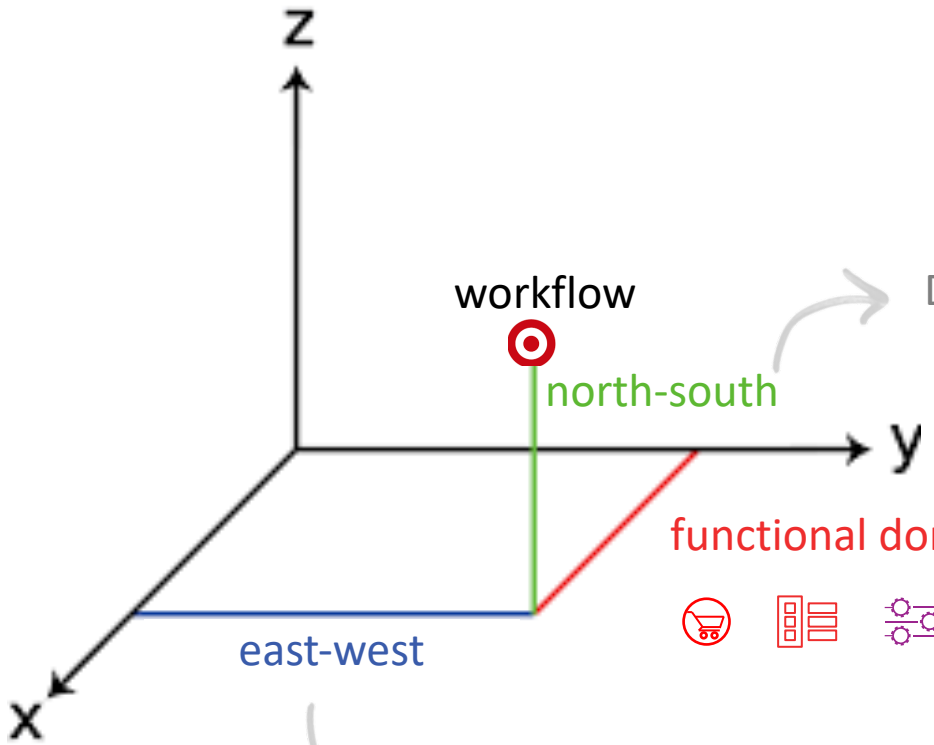
appliances - data – control – management planes

OS - VNI – network services – data bases

facilities – edges – compute – network – store - IaaS



media platform automation



Deployment – ‘Full stack’

Devops

- jobs
- Resources
- Orchestration
- Security
- Assurance
- Augment

media workflow

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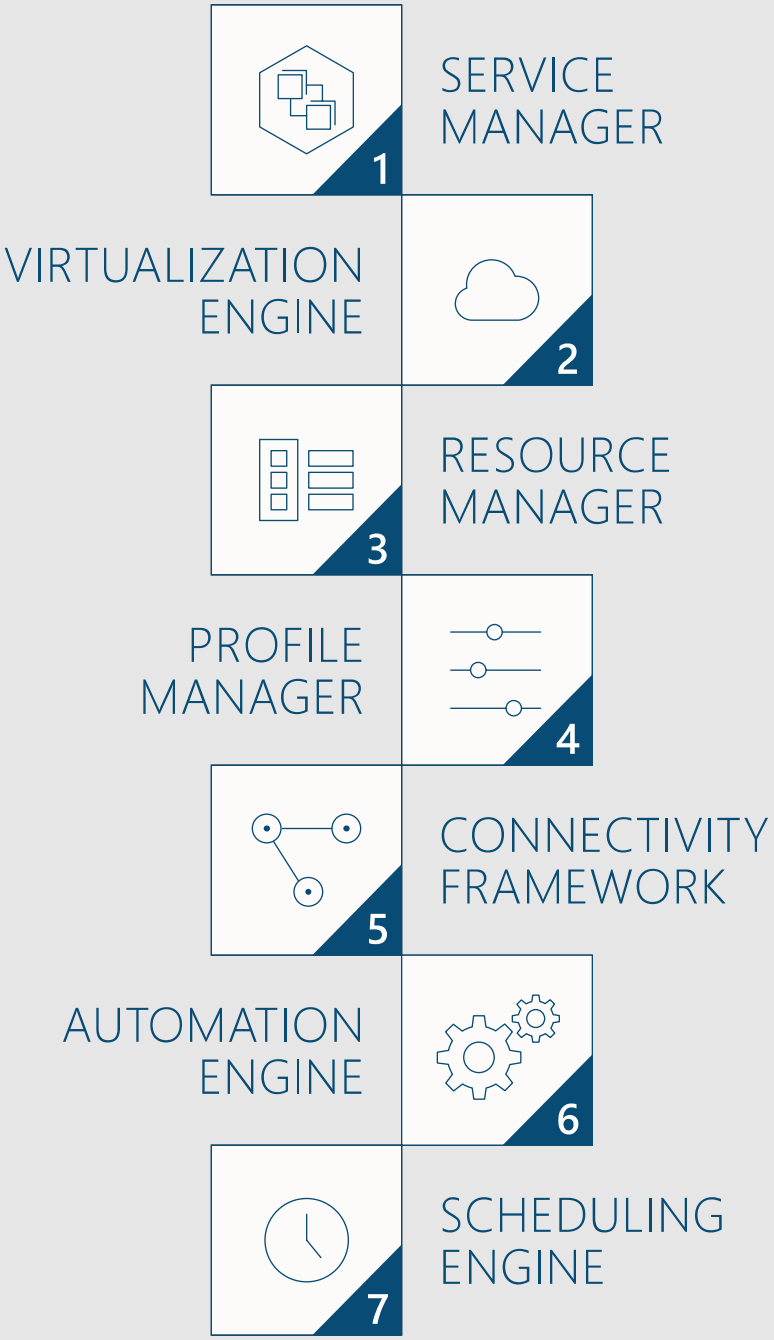

(deterministic) orchestration - technology -

1. Service catalog with LSO lifecycle definitions
2. Virtualization of management API (!) – proprietary / industry std
   - Across all technology suppliers and models
3. Resource management
   - PNI, VNI, public, virtual pools (IP addresses, VLAN tags, licenses, …)
   - **Identified with availabilty, capacity, capability** ← dynamic & custom
4. Templated LSO using state-profiles ← dynamic & custom
   - Templated configuration by reference or by value
5. Connectivity model
   - Physical connectivity (LLDP, CMDB…)
   - Logical connectivity : actual path E-W and N-S (MC, VLAN, MPLS tag, K8S…)
6. Automation
   - Lifecycle Service Orchestration (LSO) : devops
   - Customized Data Transfer Rules (DTR) @ event setup and during LSO
7. Internal or external scheduling system

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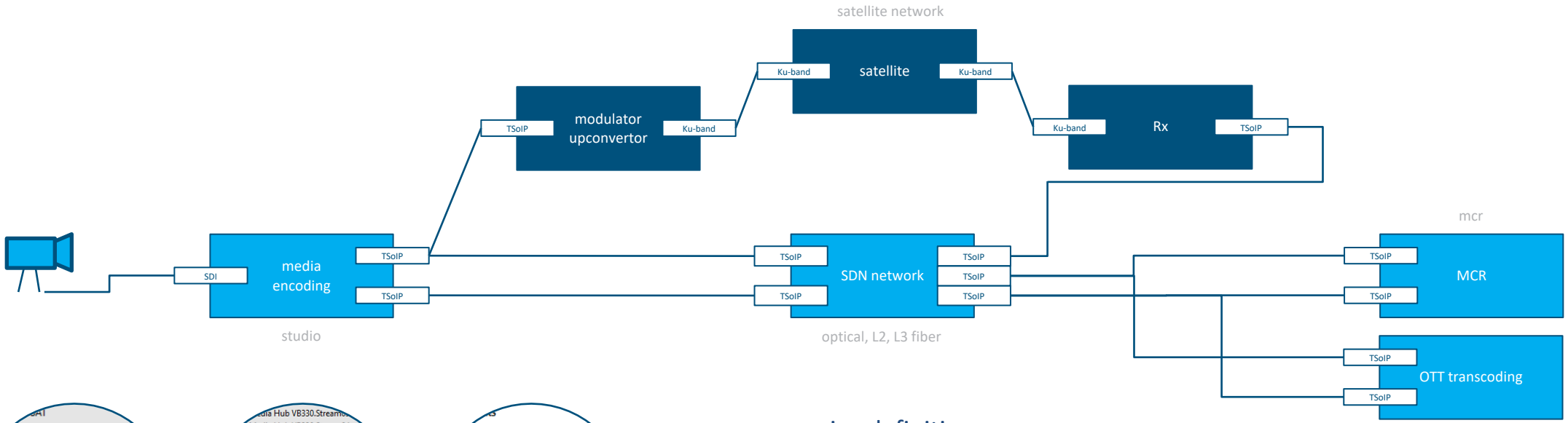
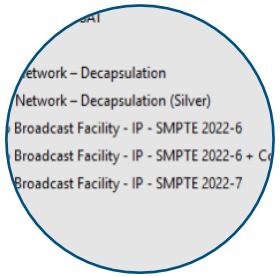
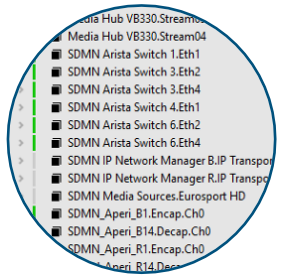
service and resource catalog



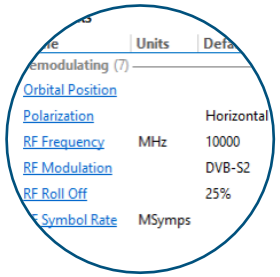
service definition



catalog



resources



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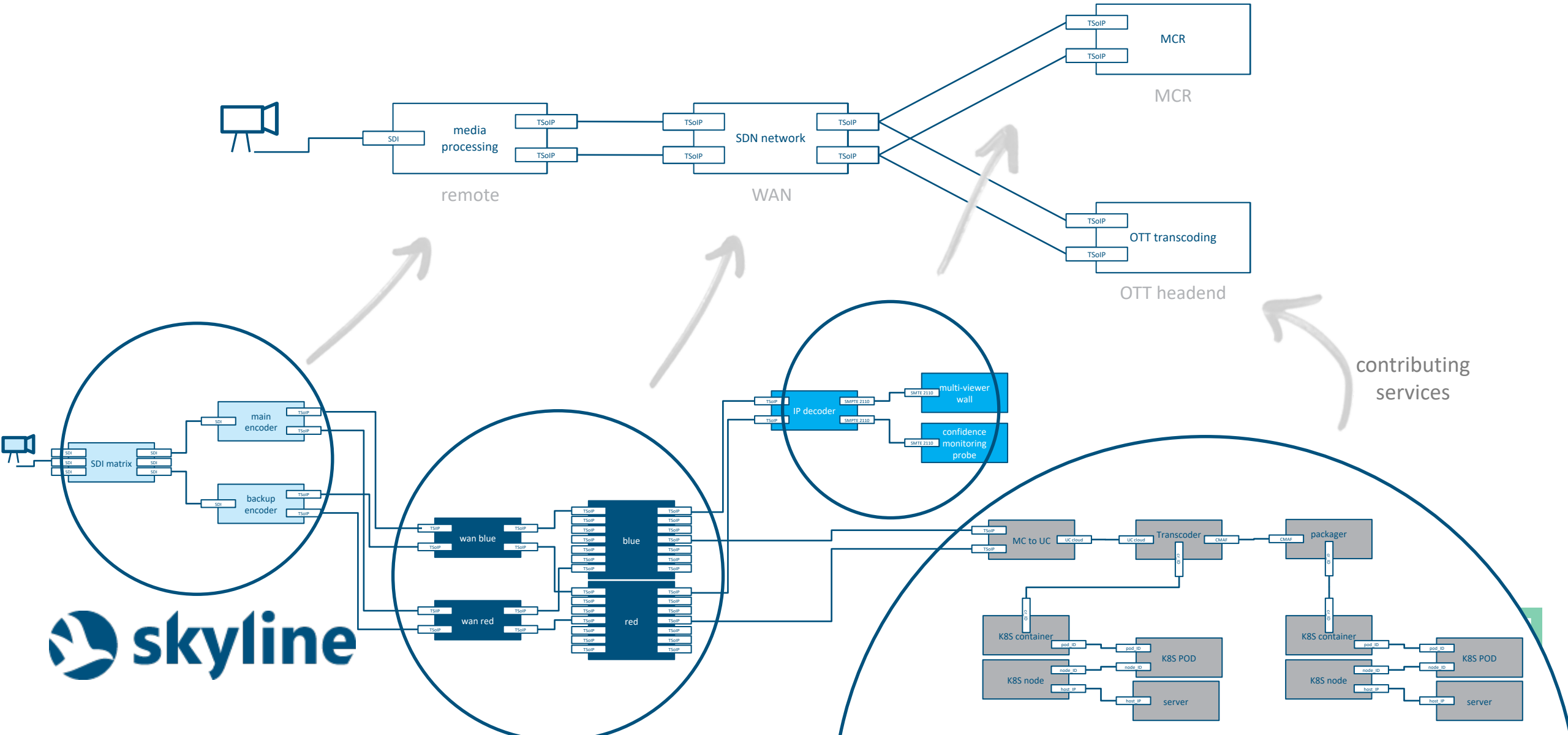
service instantiation



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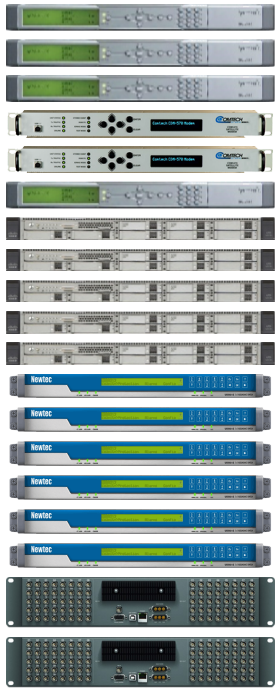
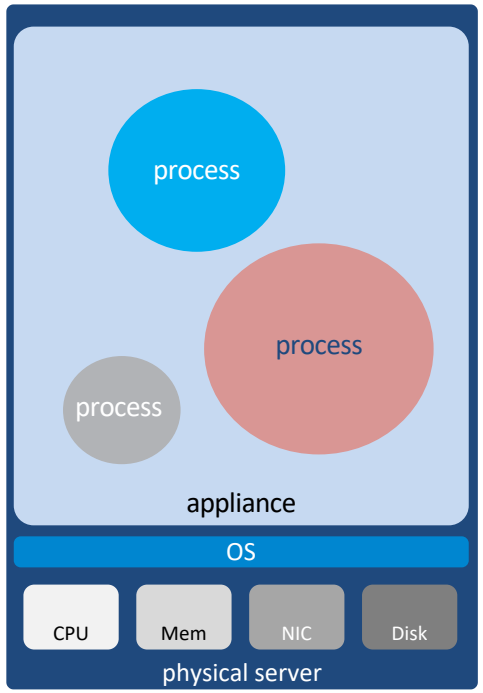
example

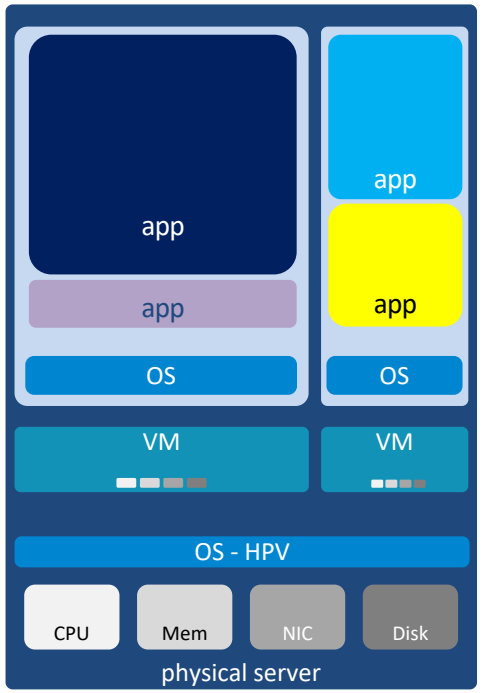
bespoke



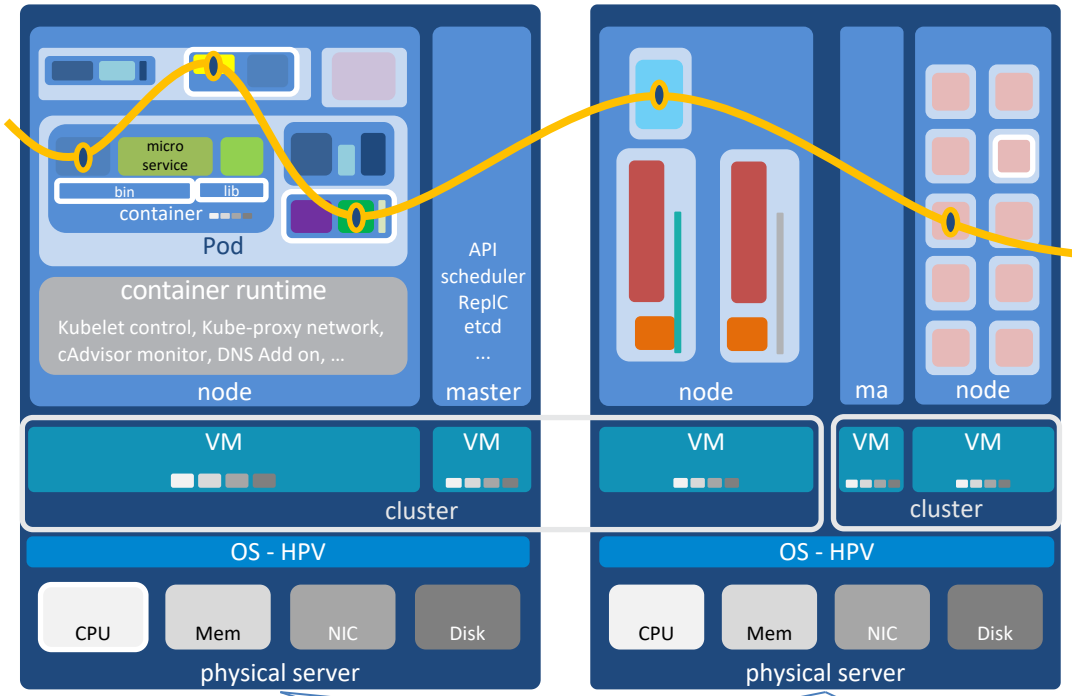
appliances

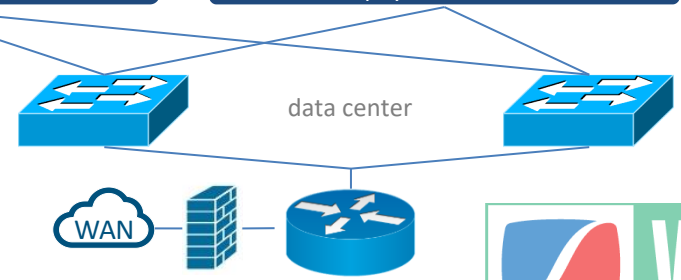


virtual machines



containers





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challenges in a multi-vendor environment

WHERE IS MY …

- specification
- application SW
- service configuration
- service routing
- capacity management
- capability management
- licenses
- service monitoring
- hardware monitoring
- redundancy
- support contract
- etc.

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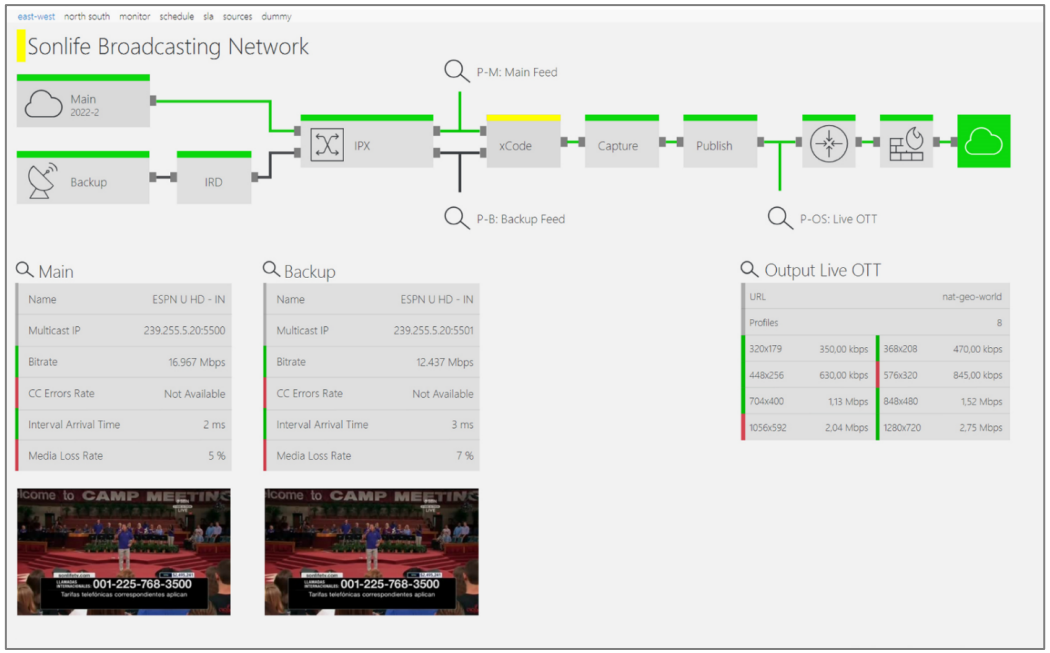
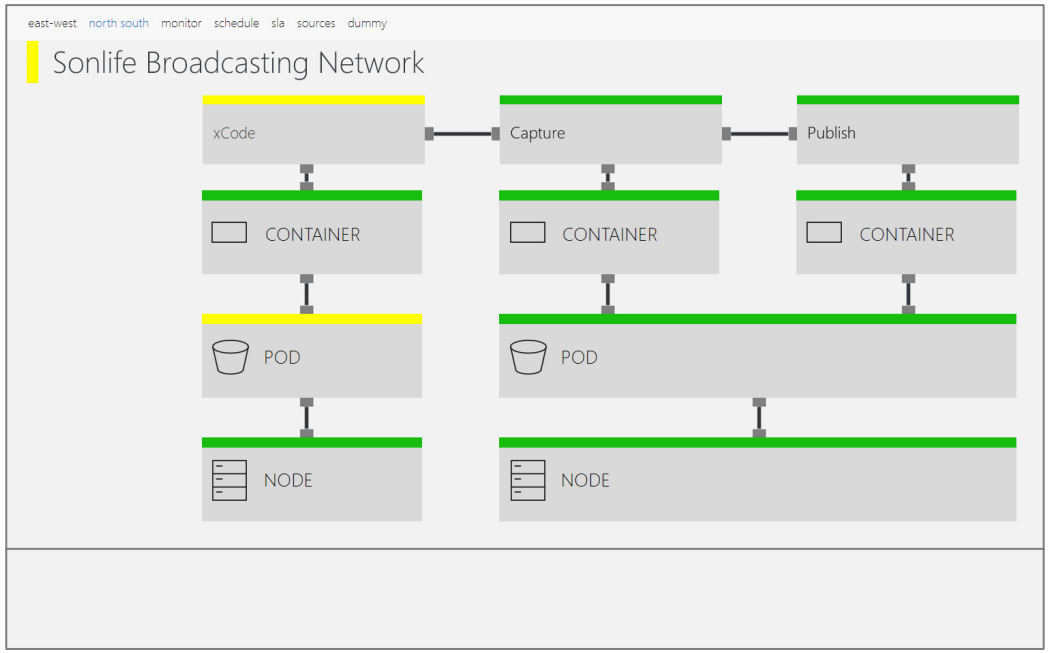
e2e orchestration / full stack

EAST-WEST SERVICE VIEW



NORTH-SOUTH SERVICE VIEW



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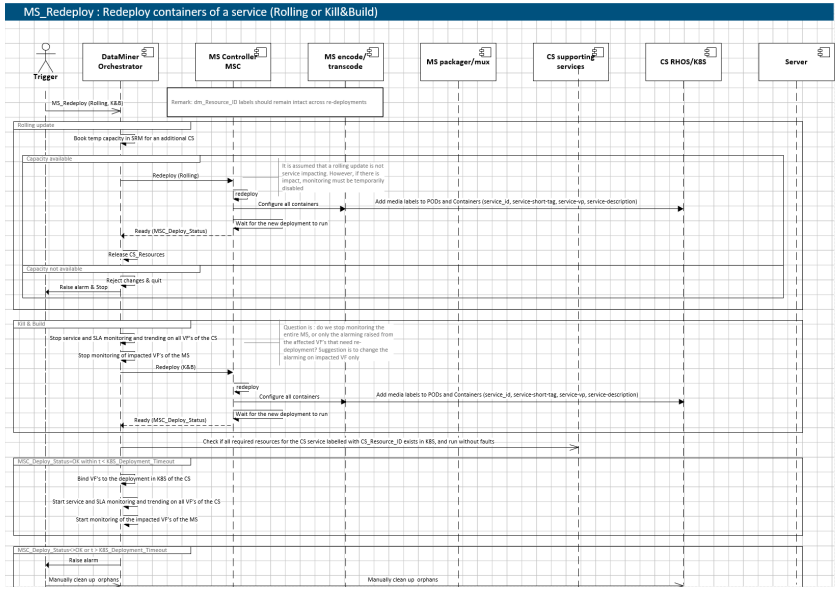
CS_Pre-roll
CS_Start
CS_Post-roll
CS_Stop
MS_Configure
MS-Pre-roll
MS_Start
MS_Redeploy
MS_Redeploy_MSC
MS_Update_Image
MS-Pause
MS-Monitor
MS_Post-roll
MS_Stop
MS_Red_1+1
MS_Red_N+M+X
MS_Pre_roll_Deploy
MS_Post-roll_Undeploy
MS_Stop_Undeploy
MS_Deploy_all_Channels
CL_Greenfield_Deploy
CL_Node_Evacuation
CL_Node_Reactivation
CL_Evacuation
CL-Resource_Change
ENG_Profile_Change
ENG_Service_Definition_Change
ENG_Protocol_Version_Update
OP_Book_Service

new set of multi-vendor workflows new monitoring strategies

- new workflows for
  - “staging”, canary upgrades, roll back
  - redundancy : N+M+X
  - technology redundancy
  - platform service management (deployment)
  - confidence monitoring
  - image management – system release management
  - cluster management
  - capacity management
  - maintenance workflows (hybrid cloud)
  - … and others yet unknown
- remember that a container environment has high availability by nature … but if it fails, if fails big time!
- defining and monitoring dependencies across deployment layers and technologies is a critical to operations



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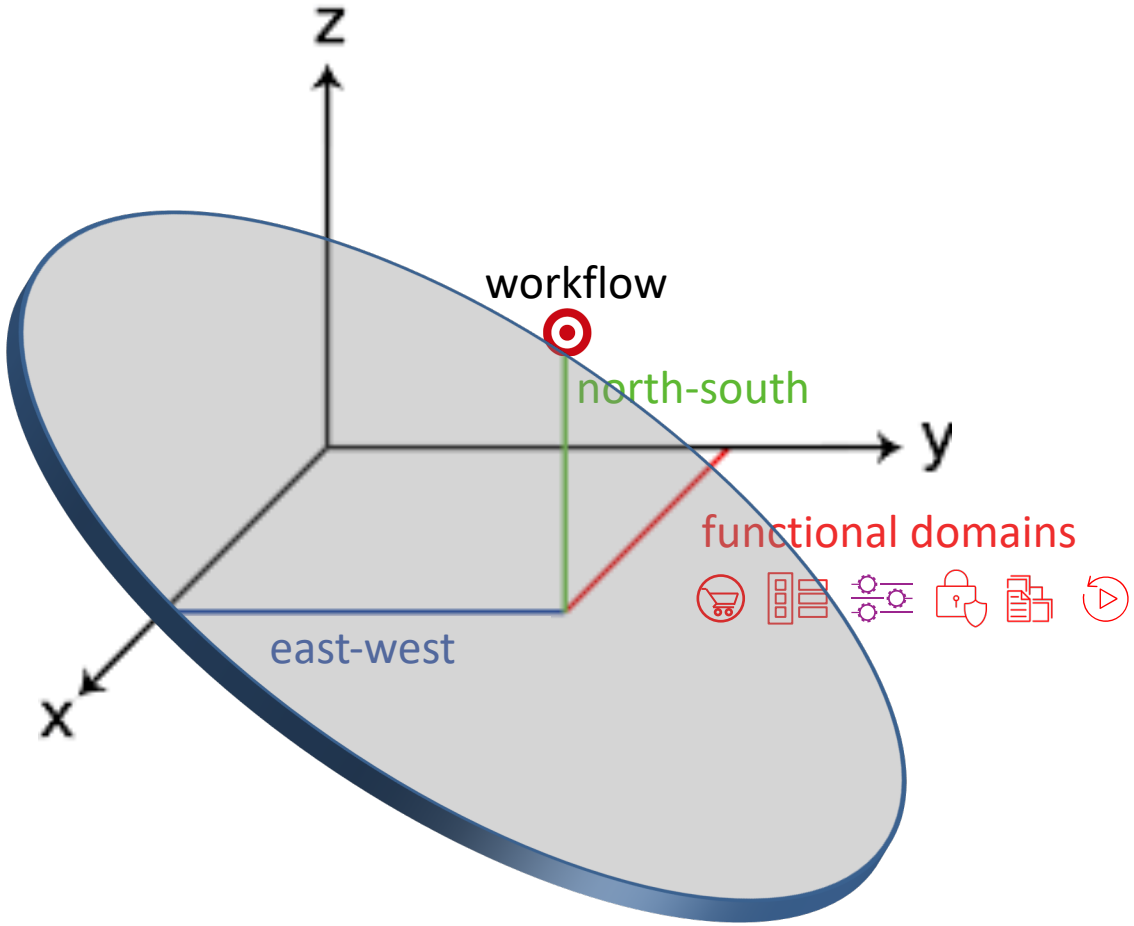
importance of metadata in automation

- creates virtual and dynamic “objects”
  - e-w : connections and x-pts
  - n-s : service – application- IT platform services – infra
  - domains : service to jobs, bookings, SLA’s, resources, security
- producers can be
  - part of any layer and management domain
  - static data sources : name, router port labels, confg files …
  - dynamic : schedules, profiles, UMD tags, virtual sources …
  - ad-hoc: PODs, UID’s, cloud capacity cost, …
- system master / slave role to be defined for each use case
- metadata can represent resource capabilites and capacity
- volatile or non-volatile
- orchestrator enriches, uses, shares and attaches metadata
  - inherently part of LSO
  - attaching <> sharing
- consumers can be : anyone !
  - even specialist tools should make use of those
- makes AI so much more powerful



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K8S Naming and label conventions - objectives

- What
  a. enable operations teams to easily identify what kind of functions are deployed in a K8S cluster
  b. enable operations teams to easily identify the supplier of those microservices
  c. enable operators to relate microservices to media services
  d. enable teams to keep on using specific tools for each domain
  e. multi-vendor support : technology redundancy

- How
  - create a multi-vendor convention for identifying PODS, CONTAINERS and NODES in a media data center
  - use human readable strings where appropriate
  - use standard K8S constructs
  - ensure that the identification remains intact even after re-deployment

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K8S Naming and label conventions - Proposal

- Semantics : VENDOR.FUNCTION.DETAIL
  - the expression needs to follow the K8S rules
  - orchestrator will interpret dots as separating character
  - It is preferred but not obliged not to use dashes in the naming
  - be aware that in the cluster, additional identifiers will be added to the names by K8S, starting with a dash
  - to be created by orchestrator (optionally using extended vendor deployment scripts)

- Example configuration
  - POD : myvendor.transcoder.pod1
  - CONTAINER : myvendor.transcoder.worker1
- Example deployment
  - POD : myvendor.transcoder.pod1-767dc7d4d-ltbl4/…
  - CONTAINER : myvendor.transcoder.worker-867dc7d4d-ltbl4/…

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K8S Naming and label conventions - Proposal

- Labels added during deploy (non-volatile)
  - dm_contr_resource_id : unique identifier generated by DataMiner and added by the vendor deployment scripts
  - To be applied only to those PODs and Containers that are relevant in the media service context, e.g. workers. Only those PODs and containers that have a dm_contr_resource_id will be mapped by DataMiner into the media service topology
- Media service labels added during orchestration (volatile)
  - By orchestrator (and optional vendor script)
  - service_id : unique SP service identifier, e.g. “123456”
  - service-short-tag, e.g. “ZDF”. Service- other-tags (platform, regional variant, etc.)
  - service-virtual platform, e.g. “OTT”
  - service-description, e.g. “playout 1”
- In the event of redeployment, orchestrator will detect missing labels, and add them again using the dm_contr_resource_id key.
  - This may take some time to do though, so there will be cases during which operations will not see labels

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Enhance insights with synthetic tests (ASV) : check what is there … and not supposed to be there

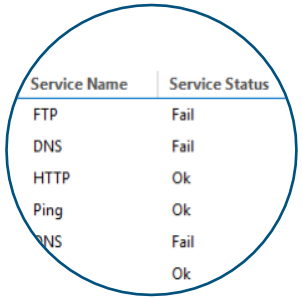
devops
- create/edit tests at runtime
- configure tests at runtime
- set up test intervals at runtime

end to end
- from OSI L3 up to L7
- pre-configured tests
- customized verification scripts

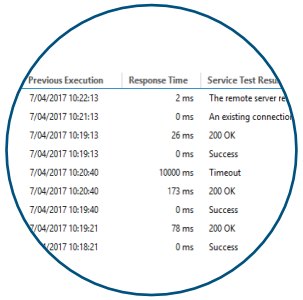
full stack
- any OS
- any virtualization manager
- any container controller
- any daemon
- any app and service

non-intrusive
- single shot synthetic testing
- round-robin tests
- scheduled tests
- no additional daemons nor SDKs
- integrates with existing APM tools
- triggers recording to external tools

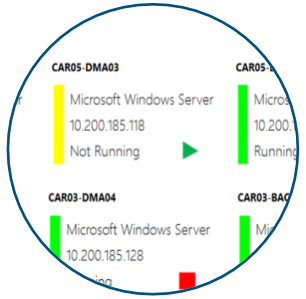
e.g. WIRESHARK



availability



performance



operational status

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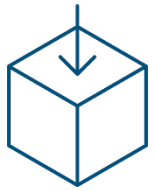
PTP – common sources of error



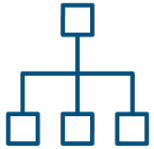
configuration issues (ordinary clock, grandmaster clock, slave only clock, boundary clock, transparent clock)

- PTP parameters & BMCA settings (domain, priority1, priority2, profiles, delay mechanism, etc.)
- messaging rate intervals (announce message, announce timeout, sync message, delay request, delay response, etc.)
- communication mode (unicast, multicast, mixed)

→ automate PTP configuration

product issues

- grandmaster, boundary clock failure
- loss of external reference
- badly implemented BMCA or PTP master election process



network issues

- missing or corrupted event messages
- increased packet delay variations (PDV)
- multicast issues

→ monitor & control PTP environment

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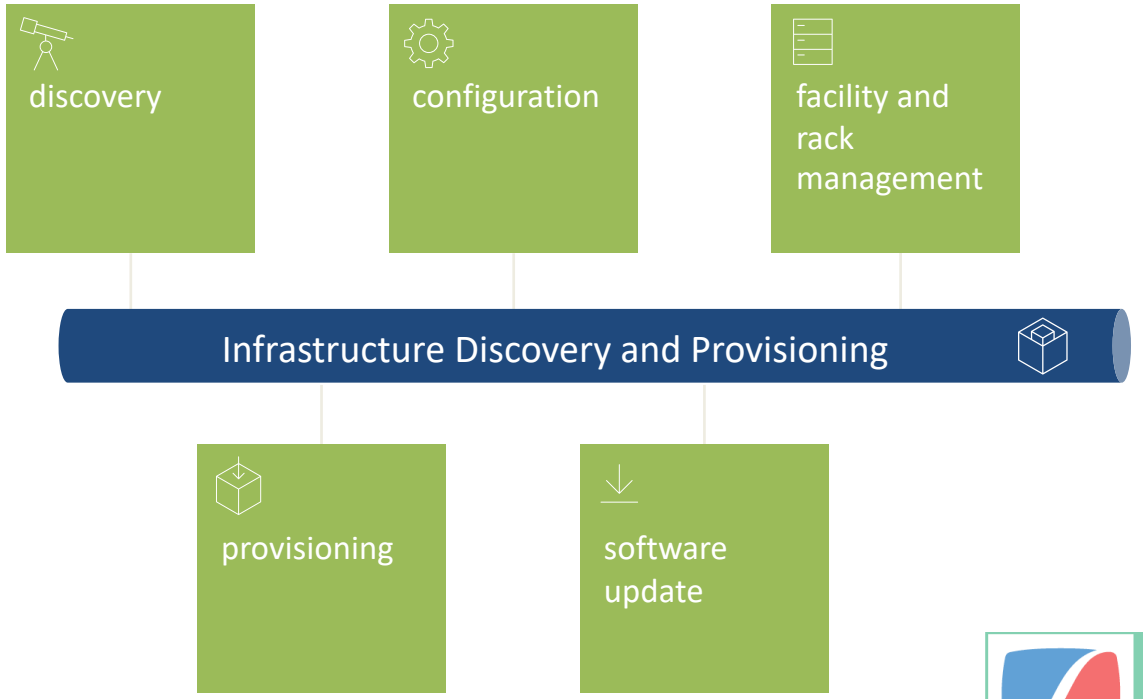
automate PTP provisioning

- automatically detect ANY new PTP-aware devices (IS-04 / proprietary protocols) – FUTURE PROOF
- automatically extract e2e PTP topology (LLDP)
- apply standard PTP settings/profiles to ANY grandmaster, switch, slave device
- compare PTP configurations (and detect changes made under the hood)
- avoids conflicting configurations



automate workflows :

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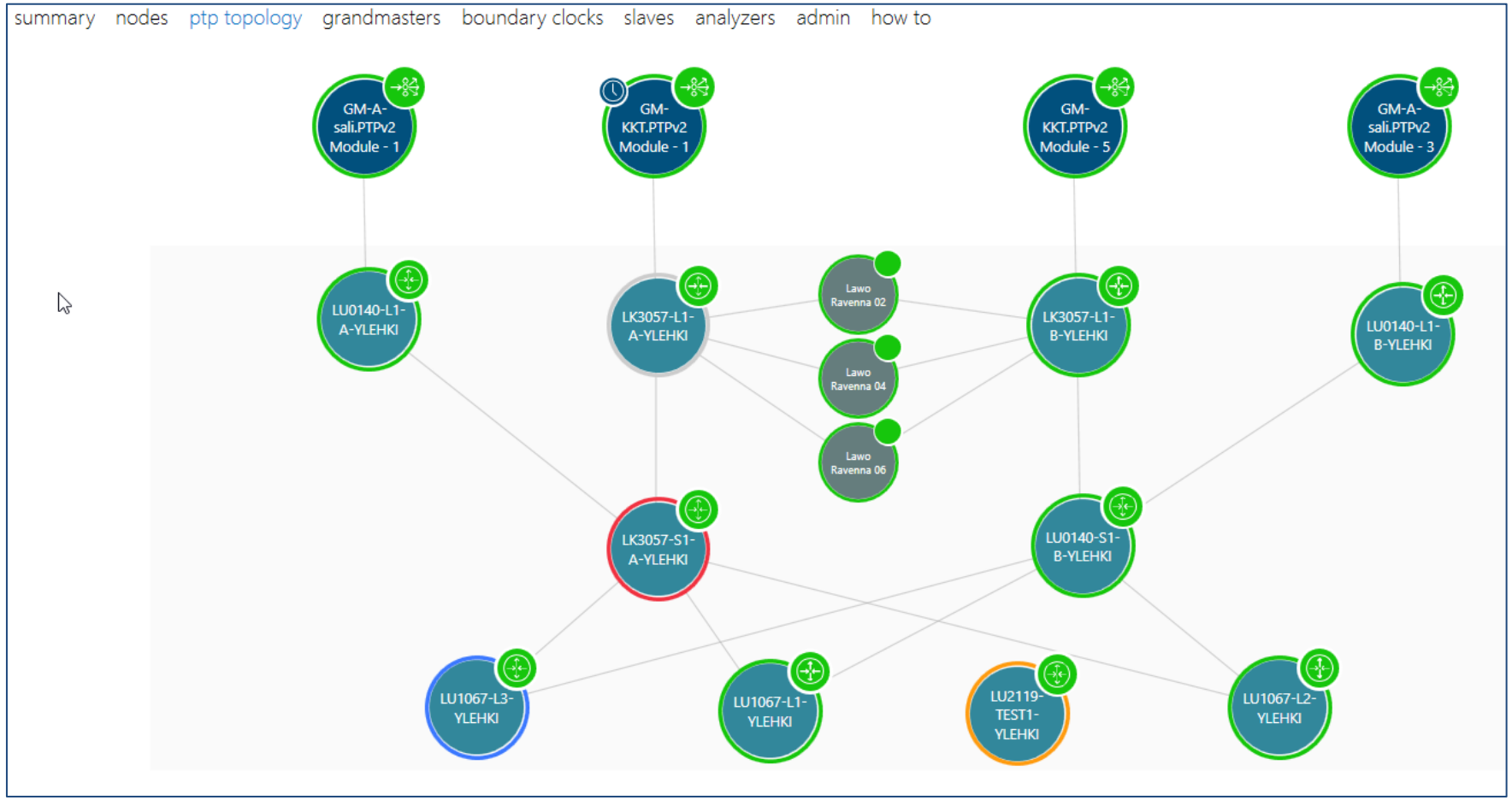
PTP automated topology mgt



extract and display PTP topology

indicate current GrandMaster

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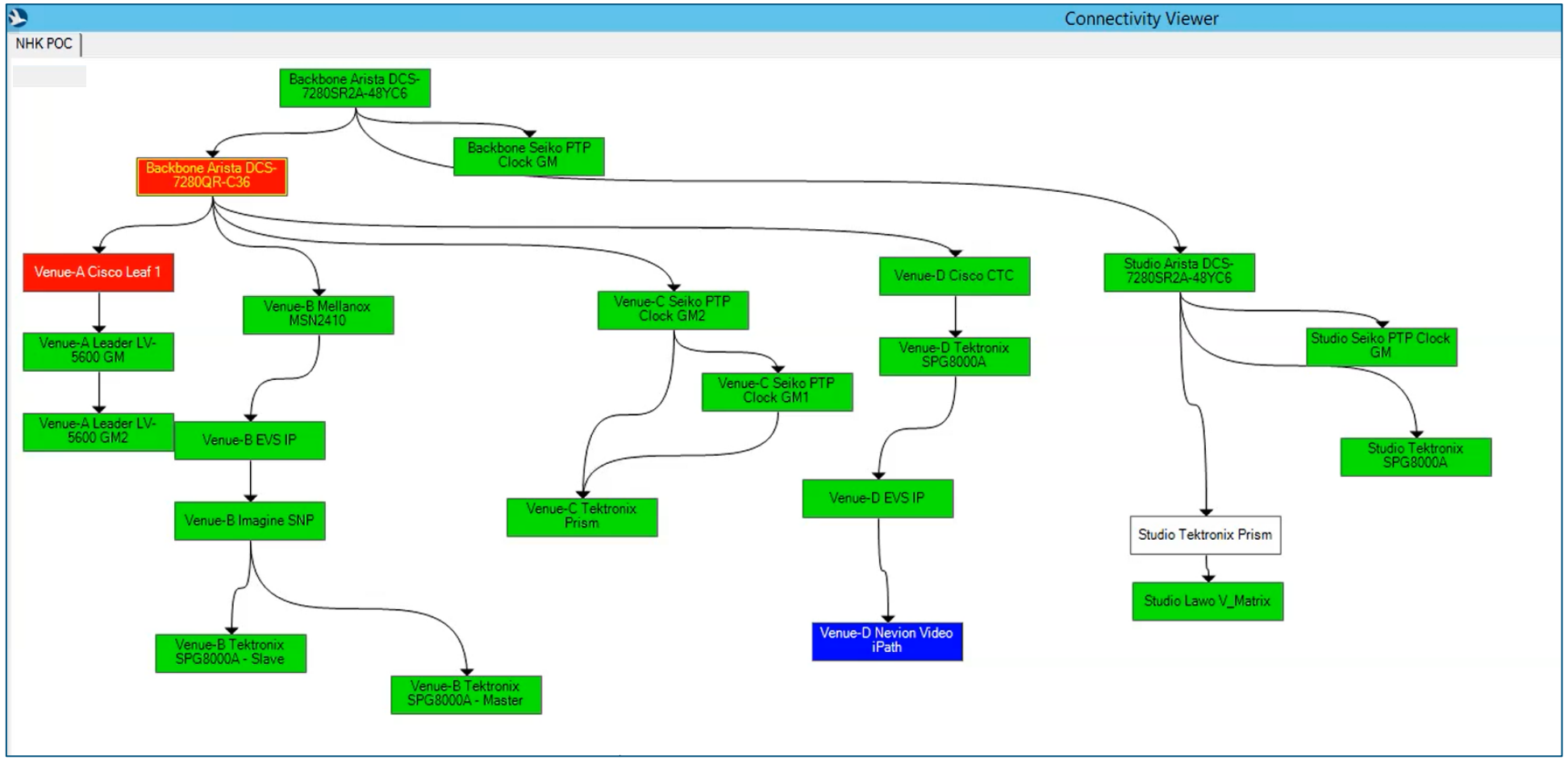
automated PTP root cause analysis



DataMiner tracks down to the root cause of a PTP issue

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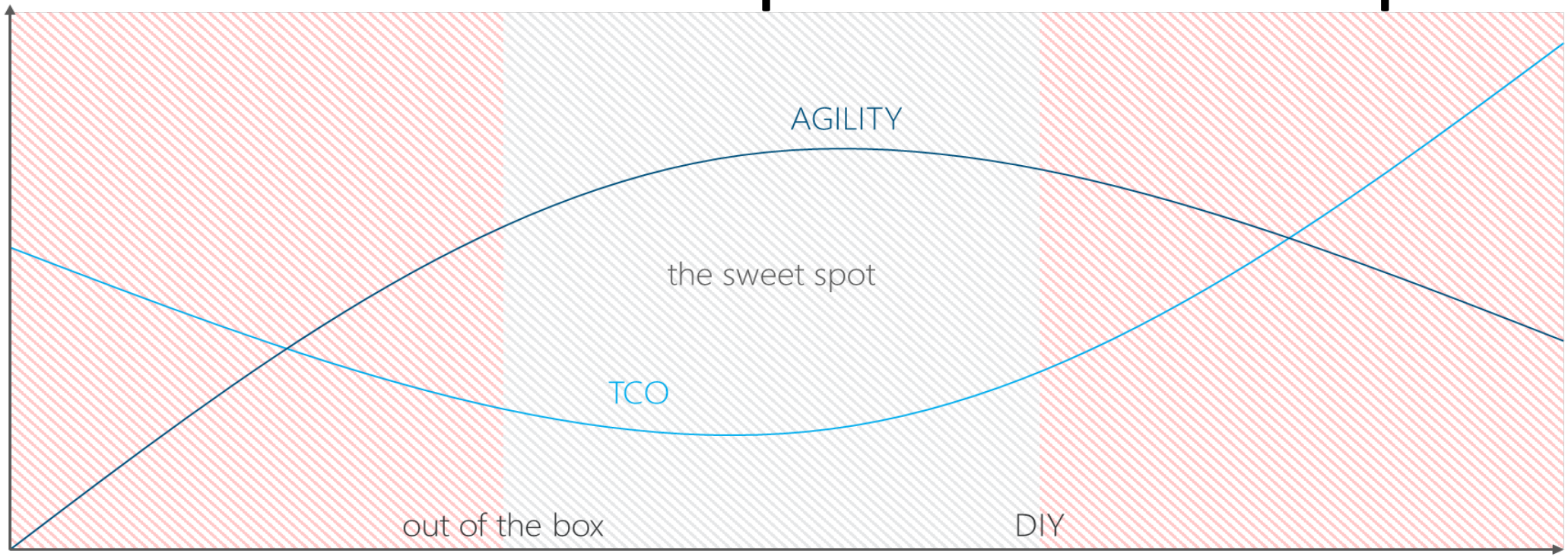
orchestration platform : the options



POINT ARCHITECTURES

bespoke tools
vendor & domain specific controllers
siloed deployments
point architectures

quick & easy
not agile
increased TCO

INTEGRATED E2E MANAGEMENT

open architecture
vendor & domain agnostic
monitoring & orchestration

maintain freedom & flexibility
highly integrated solution
focus knowledge on key operation expertise

MAINSTREAM IT

custom software stacks

top-heavy
huge dependency on expertise
extremely expensive over time

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THANK YOU

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