

TSB VAN AWS NAAR AZURE

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DEMO

TSB DEPLOYMENT FROM AZURE PORTAL

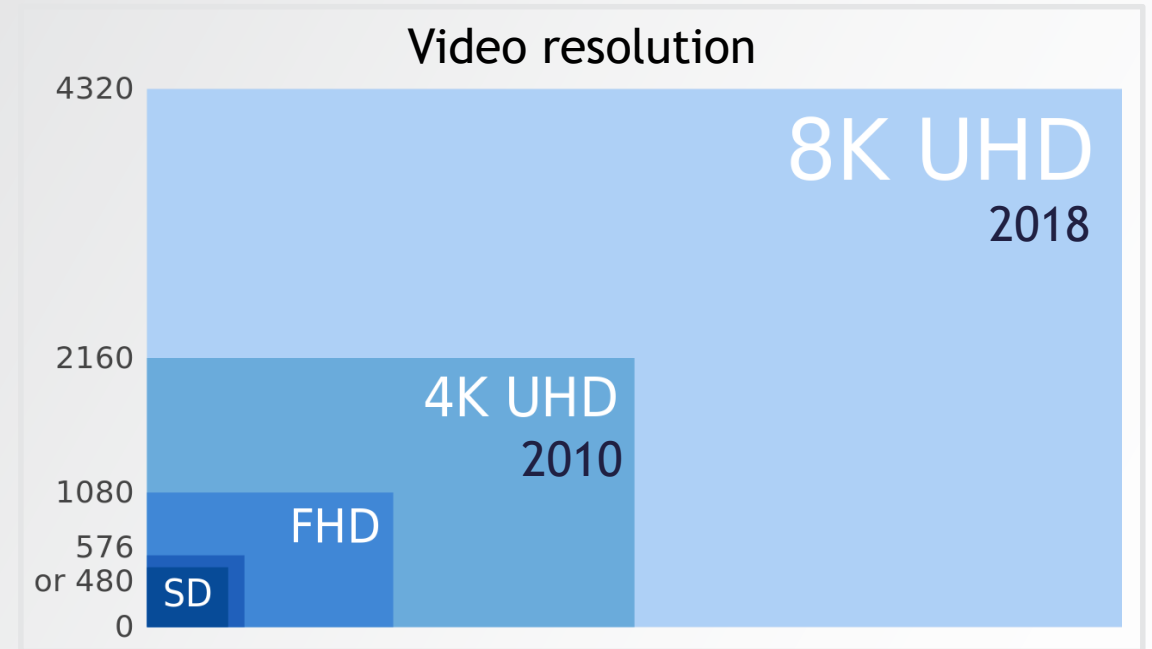
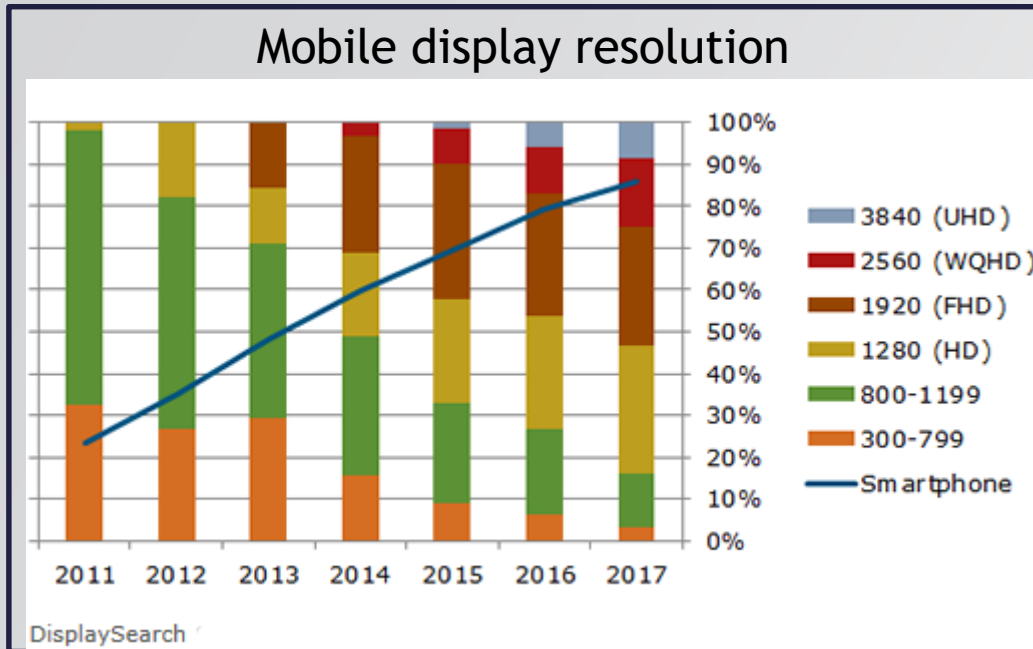
PROJECTTEAM

- TNO
 - Omar Niamut (PM)
 - Arjen Veenhuizen (Applicatie Beheerder)
 - Aschwin Brandt (Junior Scientist)
 - Johan van der Geest (Scientist)
- Inspark (Inovativ)
 - Tom Klaver (Azure Consultant)
- Microsoft
 - Marc van Houten (Cloud Solution Architect)

DOEL VAN HET PROJECT

- TNO oplossing Tilestreaming geautomatiseerd uitrollen naar Azure
 - 11 Virtuele Machines
 - Docker / Rancher containers
 - Content Delivery Network (Azure Media Services)

BEGINNING OF TILED STREAMING



Network capacity and display resolutions keeps lagging behind

PROBLEM

6K



2K

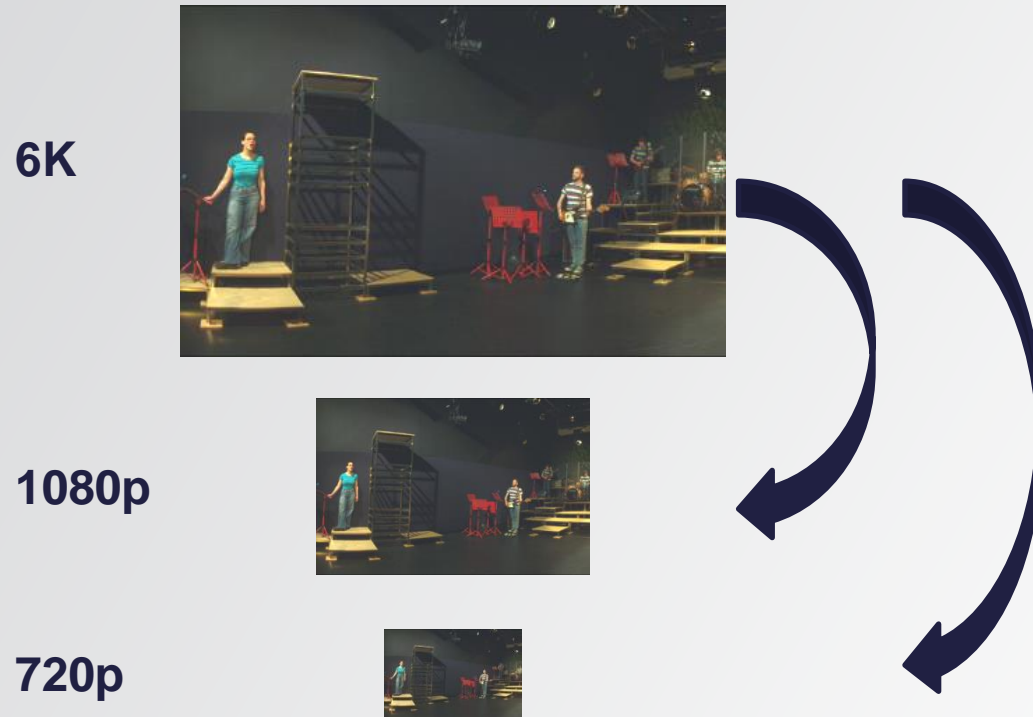
Pictures from live performance of 'Deeper than all roses', a composition from Stephen Davismoon, featuring rockband Bears?Bears! and live performance artists Joseph Lau and Shona Roberts

SOLUTION

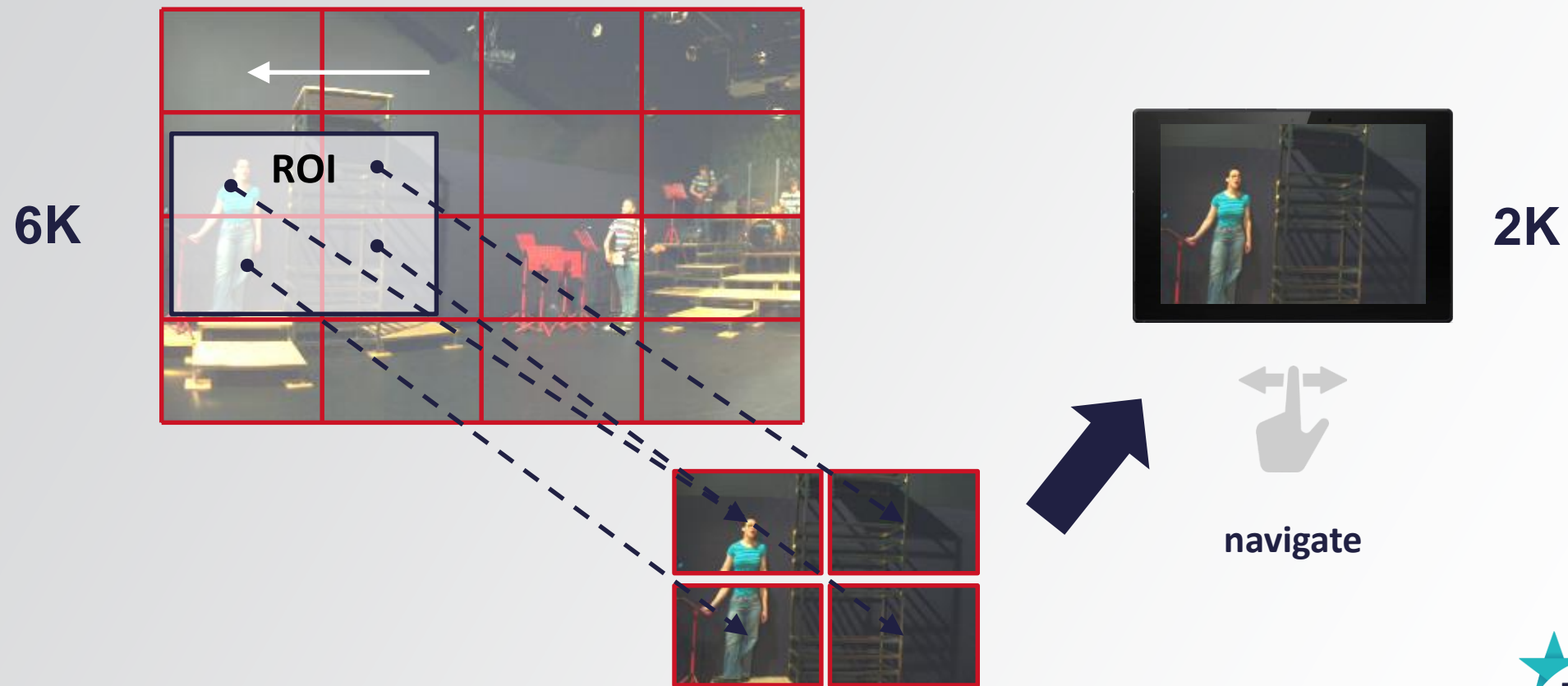
- Mobile devices can still benefit from UHD resolutions if provisioned for spatial random access
- Ability to only receive and decode specific regions of video
- Navigate through video using pan-tilt-zoom commands



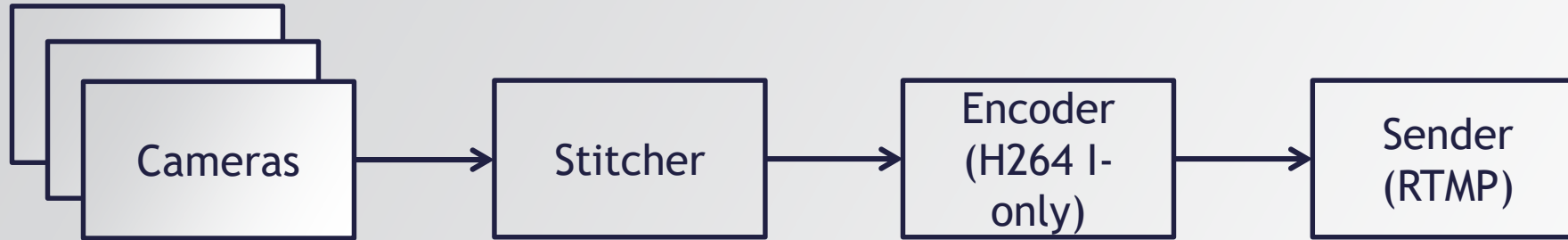
TILED STREAMING IN 3 MIN -LAYERS



TILED STREAMING IN 3 MIN - ROI



ARCHITECTURE BACKEND



On Premise

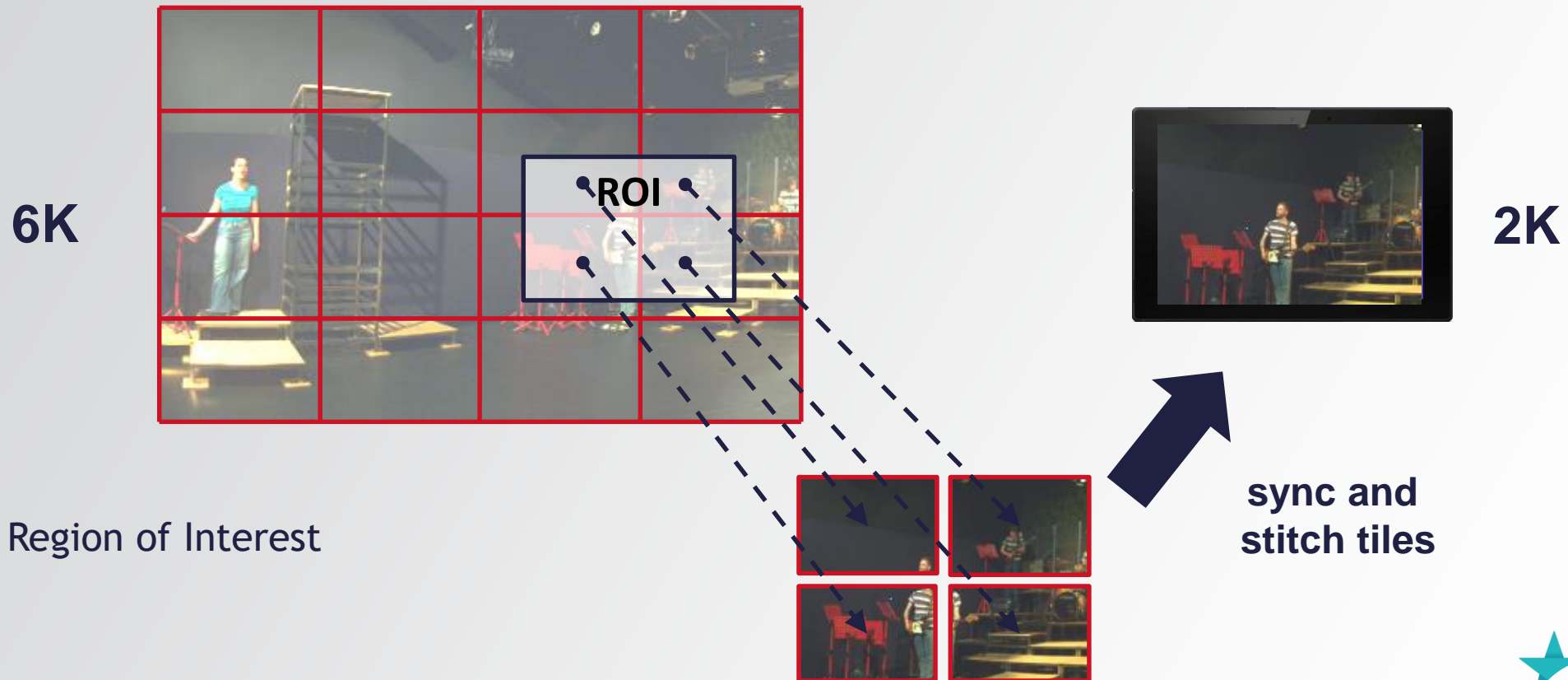
Cloud



OUTPUT

- Proprietary spatial manifest file
- HTTP Live Streaming (HLS) compliant
- H264 + audio
- MPEG2 Transport Stream
- Temporal segmentation (e.g. 3 seconds)
- Spatial segmentation (e.g. tiles)

TILED STREAMING CLIENT



ROI = Region of Interest

CHALLENGES

- If the tile for a specific ROI isn't downloaded quick enough the user experience will suffer
- Mobile hardware decoders aren't quick enough for stitching multiple videos
- A lot of bandwidth is still used when zooming in on the border of a tile

USAGE TILED STREAMING TECHNOLOGY

- Tiled Media (VR)
- Multiple soccer and sports related video distributors



COLLABORATION MICROSOFT

- Azure Store (worldwide deployments)
- Future extension Azure Media Services
- What happens if we deploy on Azure?



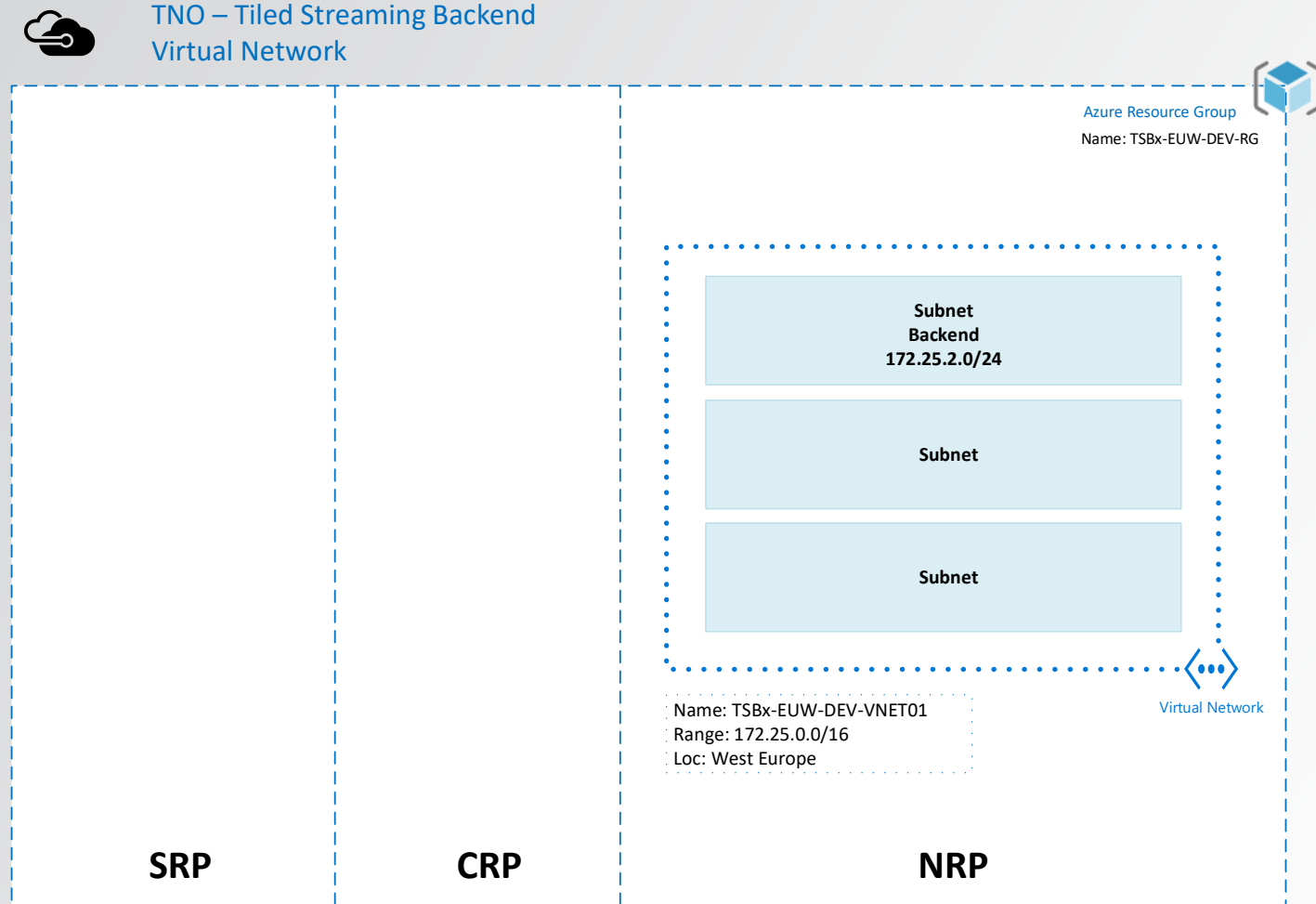
SERVICES OVERVIEW

- TS Master (1)
 - Distributes workload across workers, schedules jobs
- TS Worker (N)
 - Do the heavy lifting
- Docker Rancher
 - Central control point for managing the nodes
- InfluxDb
 - Time series database which is used by the TS Master to store performance logs
- Grafana
 - Web front end for InfluxDb which is used to visualize the performance characteristics
- Rtmp server
 - An end-point server to which a venue can broadcast its high quality source.

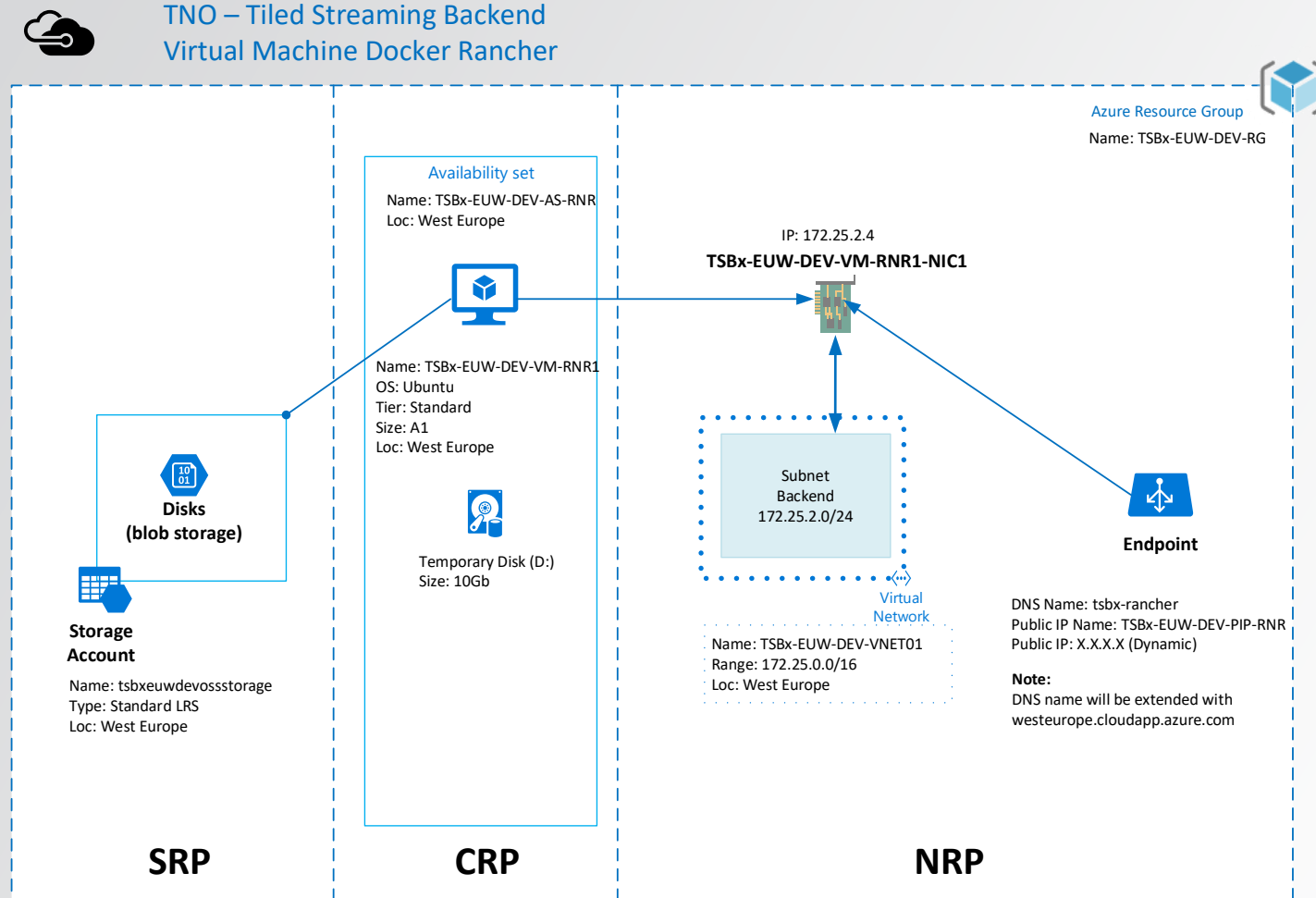
Notes

- Each service is packaged in a Docker container, allowing for easy deployment.
- InfluxDB, Grafana and Rtmp server are running on TS Master

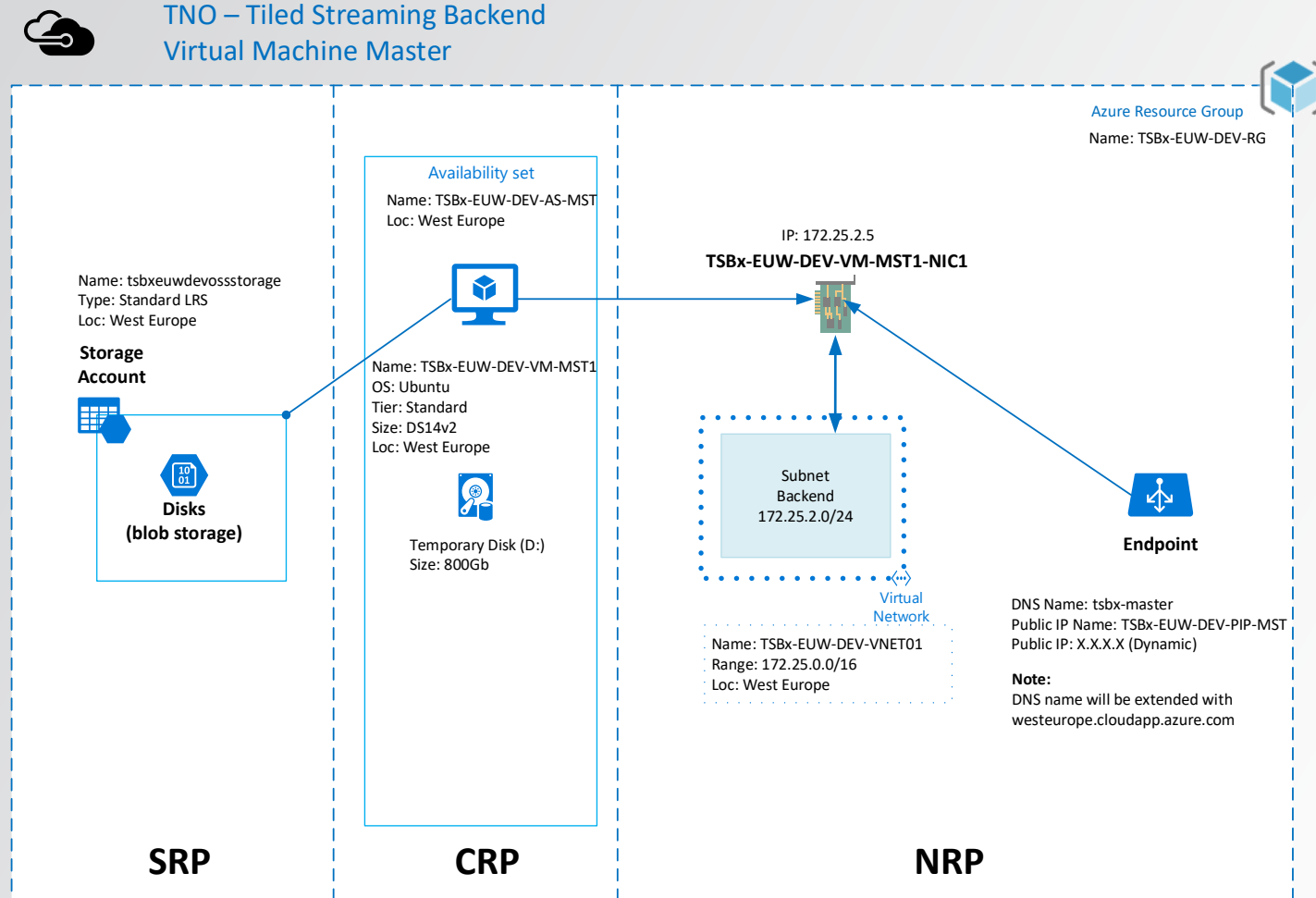
AZURE ARCHITECTURE



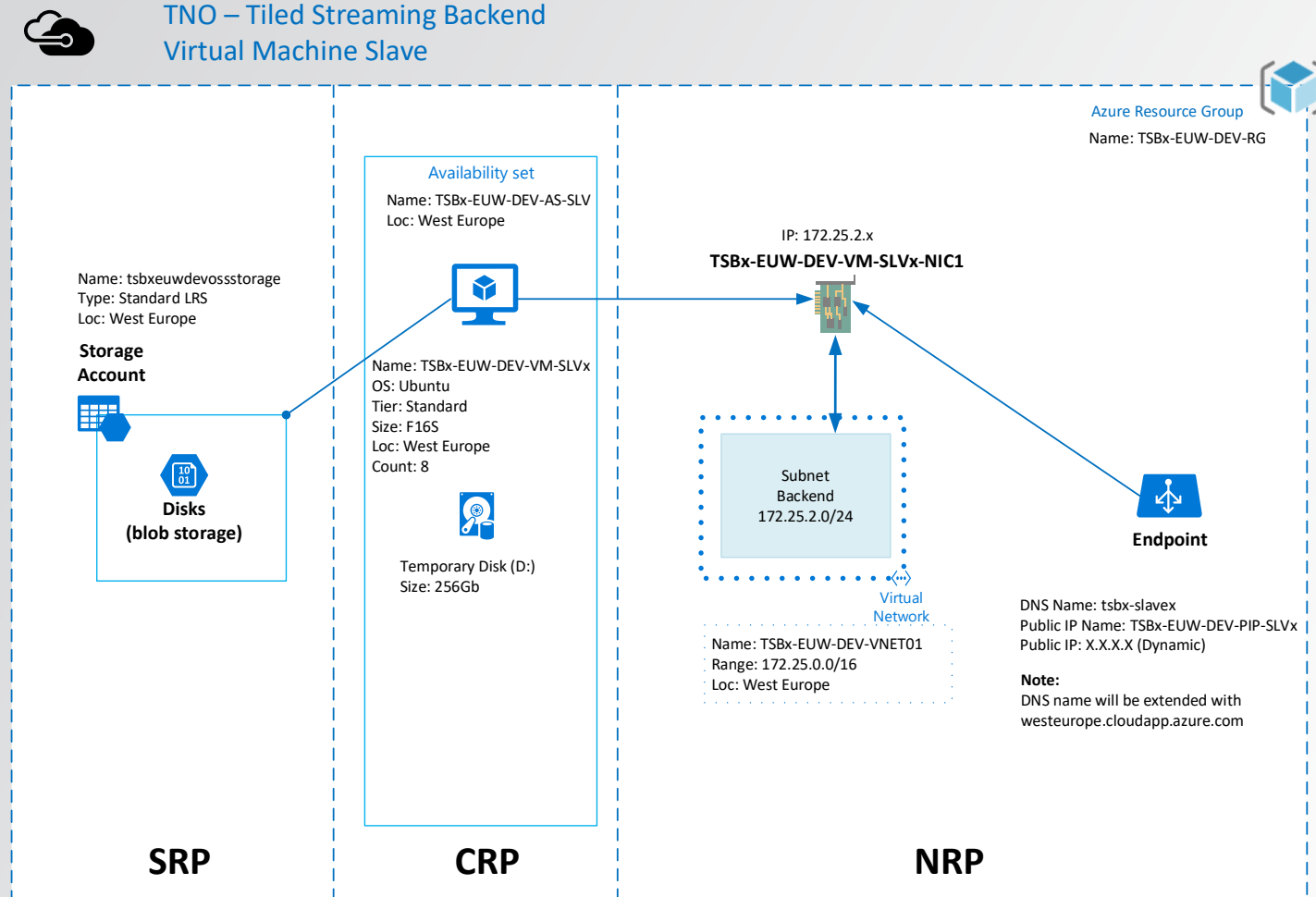
AZURE ARCHITECTURE



AZURE ARCHITECTURE



AZURE ARCHITECTURE



ARM TEMPLATE STRUCTURE

- Template Elements
 - \$Schema
 - contentVersion
 - parameters
 - variables
 - resources
 - outputs

```
JSON
{
  "$schema": "http://schema.management.azure.com/schemas/2015-01-01/deploymentTemplate.json#",
  "contentVersion": "",
  "parameters": { },
  "variables": { },
  "resources": [ ],
  "outputs": { }
}
```

DEMO

VISUAL STUDIO COMMUNITY 2017

TNO PARAMETERS

- tsbEnvironment (allowedValues A,B,C and D)
- typeDeployment (allowedValues DEV and PRD)
- sshKeyData
- numberOfSlaves
- vmSizeSlave
- addressPrefix
- subnetPrefix
- subnetName
- allocationPublicIP (allowedValues Dynamic, Static)

TNO VARIABLES

- `"apiVersion": "2015-06-15",`
- `"tsbEnvironment": "[concat('TSB',parameters('tsbEnvironment'))]",`
- `"nameconventionLocation": "EUW",`
- `"nameconventionResources": "[concat(variables('tsbEnvironment'),'-',variables('nameconventionLocation'),'-',parameters('typeDeployment'),'')]",`
- `"storageAccountNameOS":`
`"[concat(uniqueString(resourceGroup().id),toLower(variables('tsbEnvironment')),toLower(variables('nameconventionLocation')),toLower(parameters('typeDeployment')))]",`
- `"storageAccountNameData": "tsbzeuwdevdatasstorage",`
- `"storageAccountNameDataKey": "*****",`
- `"rancherkey": "*****",`
- `"ranchersecret": "*****",`

TNO VARIABLES

- **"nameNSG"**: "[concat(variables('nameconventionResources'),'NSG-',toUpper(parameters('subnetName')))]",
- **"availabilitysetRNR"**: "[concat(variables('nameconventionResources'),'AS-RNR')]",
- **"availabilitysetMST"**: "[concat(variables('nameconventionResources'),'AS-MST')]",
- **"availabilitysetSLV"**: "[concat(variables('nameconventionResources'),'AS-SLV')]",
- **"adminUserName"**: "Admin-TNO",
- **"vmNameRancher"**: "[concat(toUpper(variables('nameconventionResources')), 'VM-RNR1')]",
- **"vmNameMaster"**: "[concat(toUpper(variables('nameconventionResources')), 'VM-MST1')]",
- **"vmNameSlave"**: "[concat(toUpper(variables('nameconventionResources')), 'VM-SLV')]",
- **"vmSizeRancher"**: "Standard_A1_v2",
- **"vmSizeMaster"**: "Standard_DS2_v2",
- **"sshKeyPath"**: "[concat('/home/',variables('adminUserName'),'/.ssh/authorized_keys')]",
- **"imagePublisher"**: "Canonical",

TNO VARIABLES

- "imageOffer": "UbuntuServer",
- "ubuntuOSVersion": "14.04.2-LTS",
- "uniqueDnsLabelPrefixRancher": "[concat(toLower(variables('tsbEnvironment')),'-rancher')]",
- "uniqueDnsLabelPrefixMaster": "[concat(toLower(variables('tsbEnvironment')),'-master')]",
- "uniqueDnsLabelPrefixSlave": "[concat(toLower(variables('tsbEnvironment')),'-slave')]",
- "publicIPAddressNameRancher": "[concat(variables('nameconventionResources'),'PIP-RNR1')]",
- "publicIPAddressNameMaster": "[concat(variables('nameconventionResources'),'PIP-MST1')]",
- "publicIPAddressNameSlave": "[concat(variables('nameconventionResources'),'PIP-SLV')]",
- "virtualNetworkName": "[concat(variables('nameconventionResources'),'VNET01')]",
- "vnetID": "[resourceId('Microsoft.Network/virtualNetworks', variables('virtualNetworkName'))]",
- "subnetRef": "[concat(variables('vnetID'),' /subnets/', parameters('subnetName'))]",

TNO VARIABLES

- **"commandLineRancher"**: "sh install_tsb_rancher.sh",
- **"commandLineMaster"**: "[concat('sh install_tsb_master_and_slave.sh --rancher_url ',
'http://',variables('uniqueDnsLabelPrefixRancher'),'.westeurope.cloudapp.azure.com:8080 ', '--rancher_ip ',
parameters('FixedIPRancher'), ' --rancher_key ', variables('rancherkey'), ' --rancher_secret ',
variables('ranchersecret'), ' --ts_master_host ',
variables('uniqueDnsLabelPrefixMaster'),'.westeurope.cloudapp.azure.com', ' --rancher_labels ',
'ts_node=master'))]",
- **"commandLineSlaves"**: "[concat('sh install_tsb_master_and_slave.sh --rancher_url ',
'http://',variables('uniqueDnsLabelPrefixRancher'),'.westeurope.cloudapp.azure.com:8080 ', '--rancher_ip ',
parameters('FixedIPRancher'), ' --rancher_key ', variables('rancherkey'), ' --rancher_secret ',
variables('ranchersecret'), ' --ts_master_host ',
variables('uniqueDnsLabelPrefixMaster'),'.westeurope.cloudapp.azure.com', ' --rancher_labels ', 'ts_node=slave'))]"

TNO RESOURCES

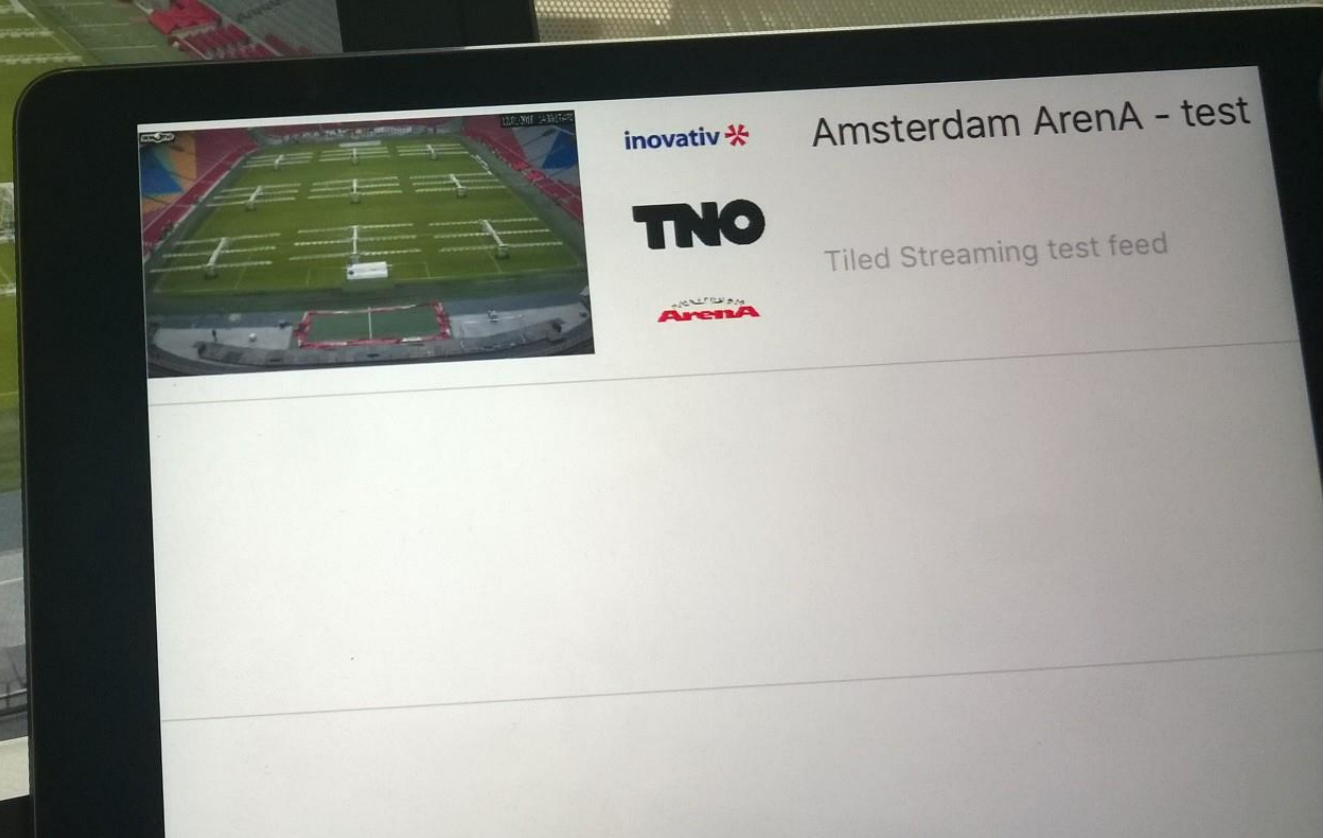
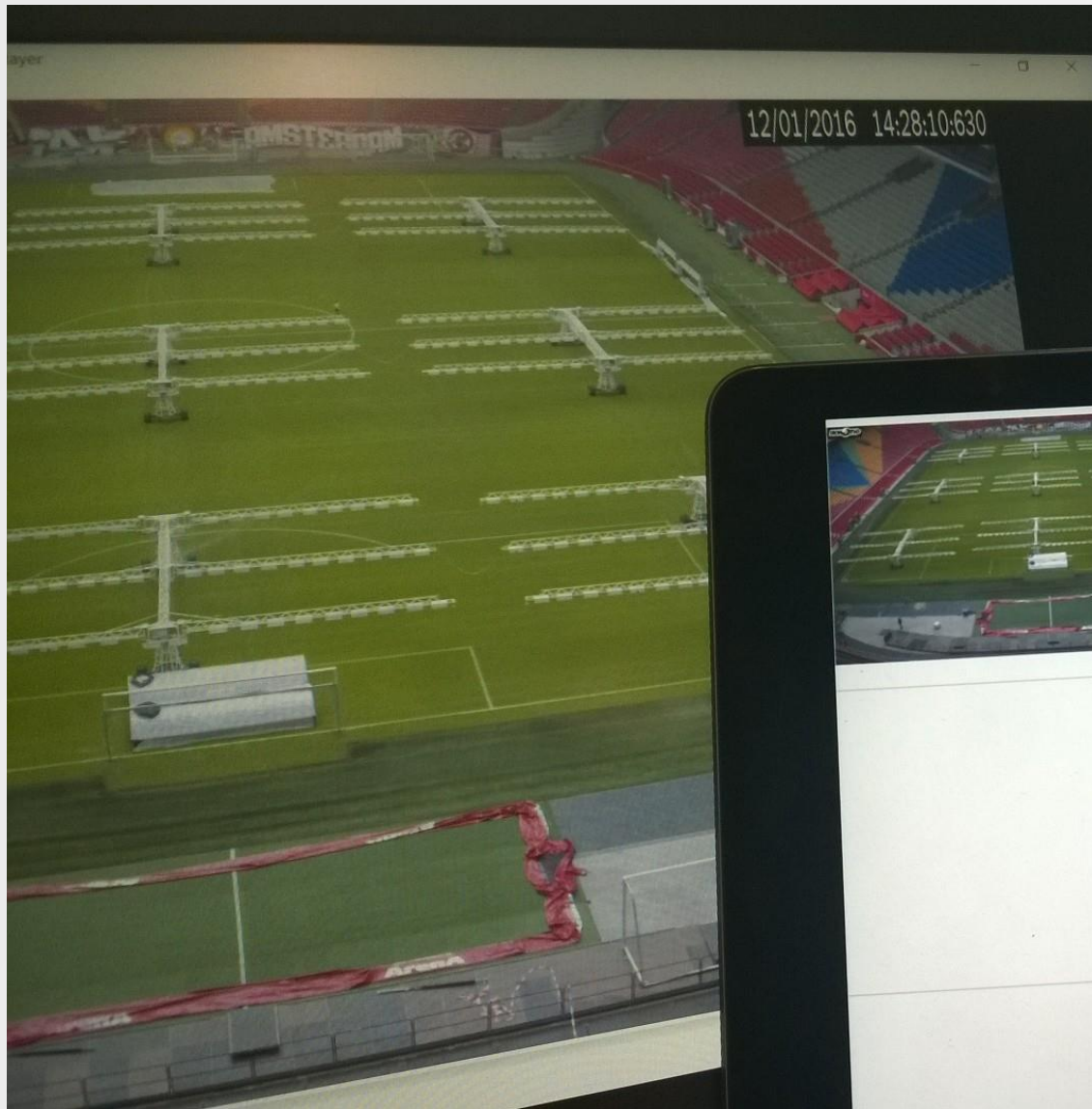
- Network Security Group
- Virtual Network (depends on NSG)
- Storage Account for OS (use Managed Disk now instead)
- Storage Account for Linux Scripts (already available)
- Availability Sets (Docker Rancher, Master and Slaves)
- Public IP addresses (only for troubleshooting)
- Network Interfaces (depends on VNET and PublicIP)
- Virtual Machines
 - Docker Ranger (depends on VNET, NIC and AS)
 - Master (depends on VNET, NIC, AS and VM Docker Rancher)
 - Slaves (depends on VNET, NIC, AS and VM Docker Rancher)
- **Virtual Machine Extension Custom Script For Linux**

TNO RESOURCES

```
738 {
739   "apiVersion": "[variables('apiVersion')]",
740   "type": "Microsoft.Compute/virtualMachines/extensions",
741   "comments": "Custom Script for Master",
742   "location": "[resourceGroup().location]",
743   "name": "[concat(variables('vmNameMaster'), '/CustomScriptForLinux')]",
744   "dependsOn": [
745     "[concat('Microsoft.Compute/virtualMachines/', variables('vmNameMaster'))]"
746   ],
747   "properties": {
748     "publisher": "Microsoft.Azure.Extensions",
749     "type": "CustomScript",
750     "typeHandlerVersion": "2.0",
751     "autoUpgradeMinorVersion": true,
752     "settings": {
753       "fileUris": [
754         "https://tsbzeuwdevdatasstorage.blob.core.windows.net/scripts/install\_tsb\_master\_and\_slave.sh",
755         "https://tsbzeuwdevdatasstorage.blob.core.windows.net/scripts/docker-tnomedialab-io.crt",
756         "https://tsbzeuwdevdatasstorage.blob.core.windows.net/scripts/AddHostToRancherServerAzure.py"
757       ]
758     },
759     "protectedSettings": {
760       "commandToExecute": "[variables('commandLineMaster')]",
761       "storageAccountName": "[variables('storageAccountNameData')]",
762       "storageAccountKey": "[variables('storageAccountNameDataKey')]"
763     }
764   }
765 }
```

DEMO

CONNECT TO DOCKER RANCHER



› CLOUDS, CONTAINERIZATION, CI/CD

Current & future research

Johan van der Geest, TNO

31 May 2017

TNO innovation
for life

RESOURCES

- Channel9

Tuesdays with Corey: Classic vs ARM - what up with that?

<http://bit.ly/2qwmwTY>

Tuesdays With Corey: More Depth on Azure Resource Manager Templates

<http://bit.ly/2pLdCoD>

Tuesdays with Corey: Migrating from Service Manager to Azure Resource Manager

<http://bit.ly/2qwqjRk>

Inside the Azure Resource Manager

<http://bit.ly/2qwqLPr>

RESOURCES

- Azure Resource Explorer (<https://resources.azure.com>)
- Azure Resource Visualizer (<http://armviz.io/#/>)
- Azure Resource Manager Documentation (<http://bit.ly/2qwrS1E>)

Q & A