

AWS AppStream vs Azure RemoteApp: A Technical Smackdown

Mike Nelson

Benny Tritsch

The Conversations

Why are we having this discussion?

Why would you want to do this?

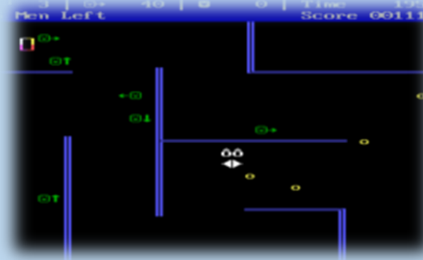
Who's in the space?

Under the hoods

Let's deploy something

-VS-

Mike Nelson



Benny Tritsch



Why...?

What Drives It?

What Does It Solve?

Is It Real?

The Players



DaaS

RDS



Google Cloud Platform

The Players

Code: BRI100



history

clients

STX protocol

compute

pricing



amazon WorkSpaces

AWS re:Invent 2014

GDC 14

AWS AppStream

history

clients

STX protocol

compute

pricing

Roll your own with the sdk & api



(welcome to colorado)



AWS AppStream

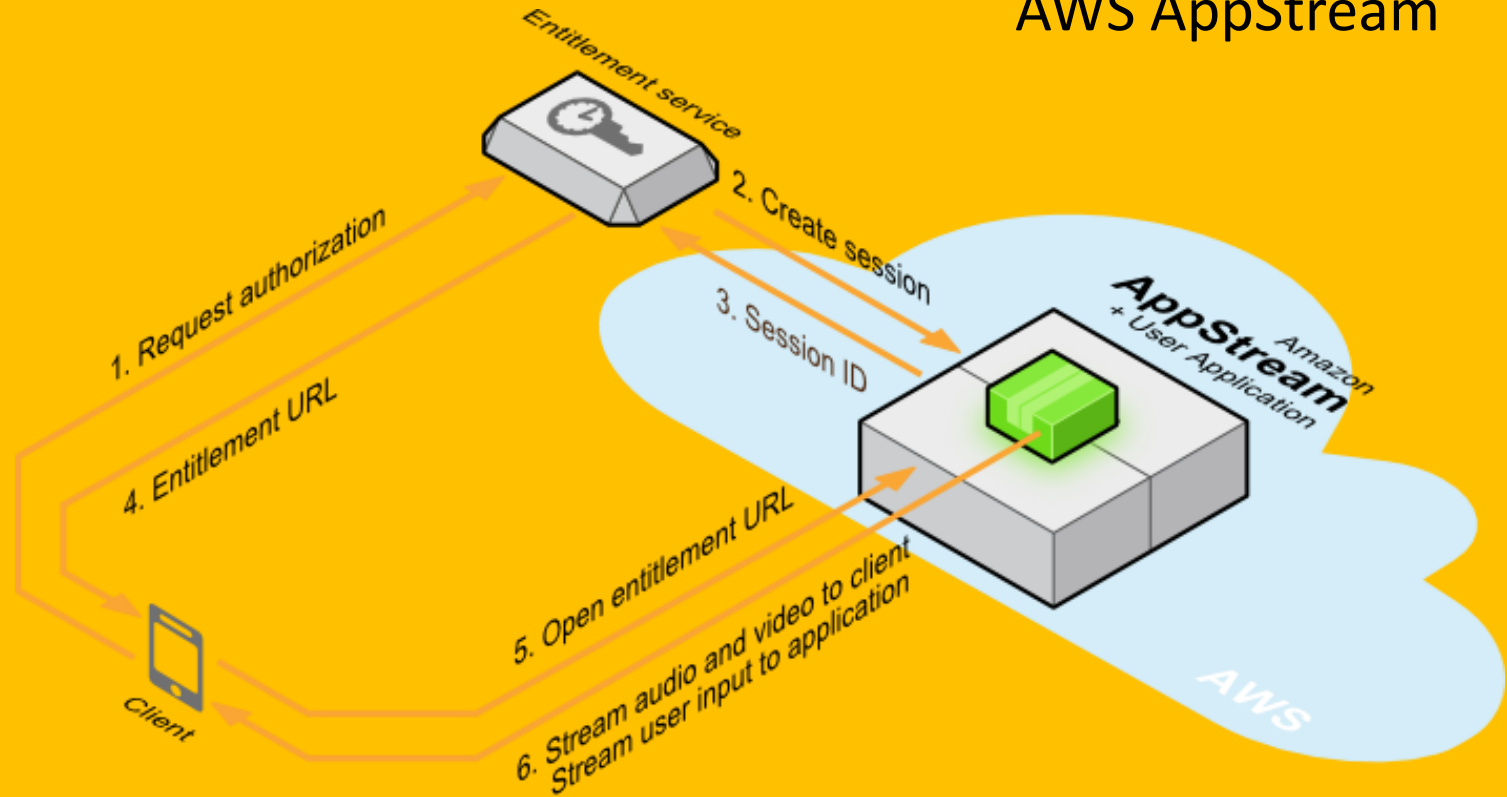
history

clients

STX protocol

compute

pricing



hybrid apps

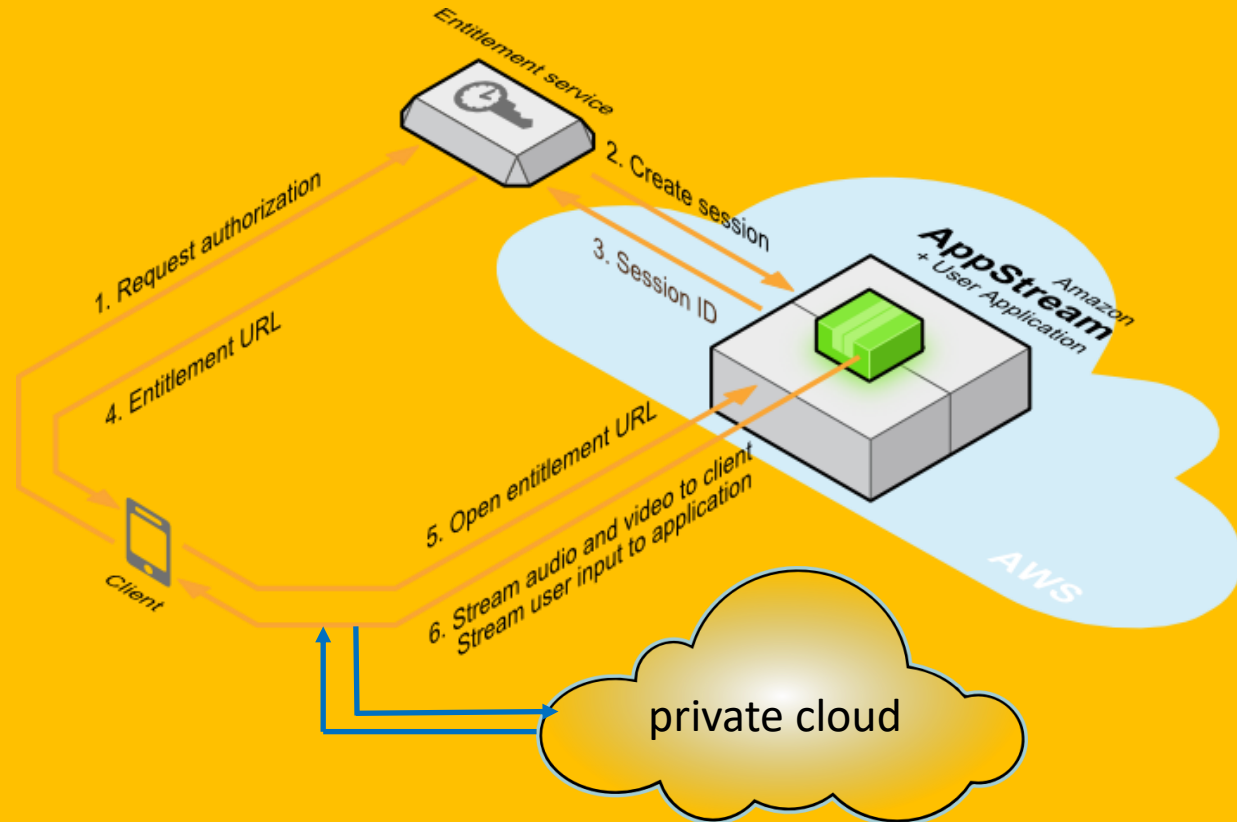
history

clients

protocols

compute

pricing



history

clients

protocols

compute

pricing



STreaming eXperience

3mb minimum



UDP for streams – TCP for input & control

low latency

Constantly monitors connection

EC2 g2.2xlarge instance

history

clients

protocols

compute

pricing



gk104 Kepler – 1536 CUDA cores, 4GB frame buffer



octacore (8 vCPU) xeon sandy bridge

15GB RAM

60GB SSD

Hardware video encoder – 8 RT HD streams 720p@30fps / 4 RT FHD streams 1080p@30fps

AWS AppStream

history

per hour charge for each client

clients

- \$0.03/hr US East
- \$1.20/hr APAC

protocols

compute

pricing

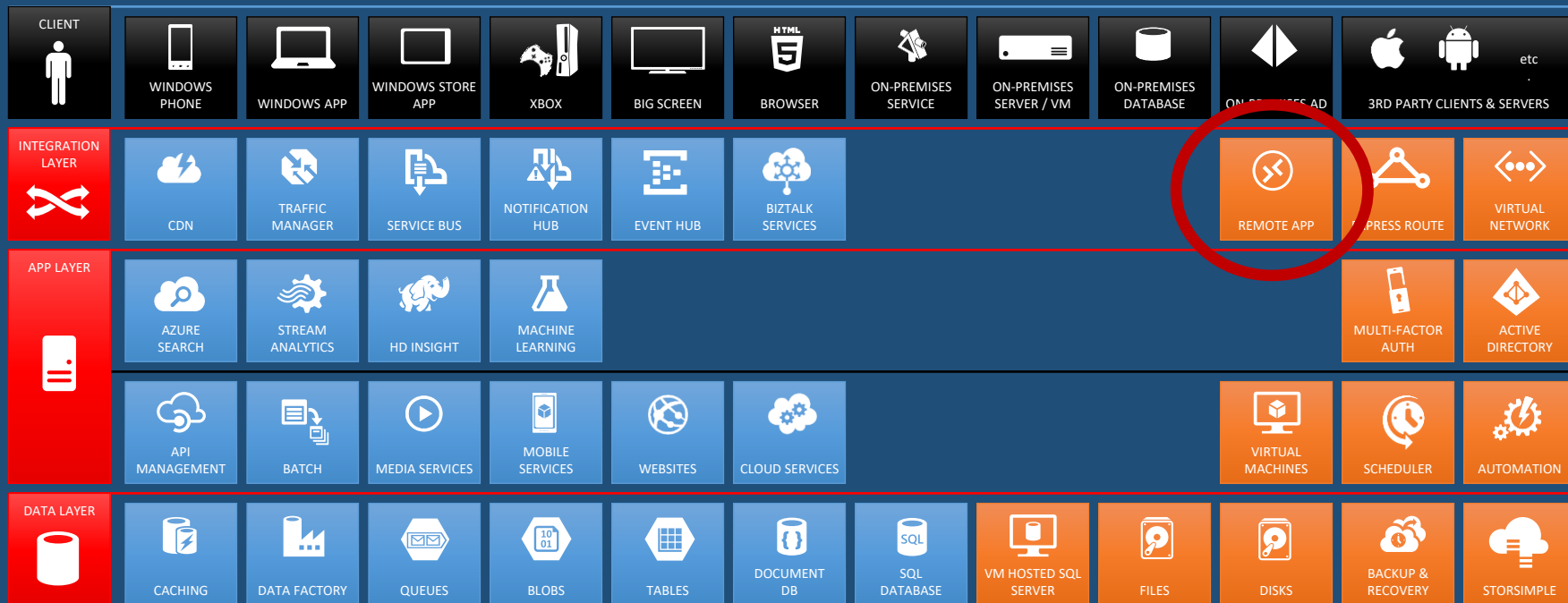
compute is included

reserved streaming sessions

- one time payment

first 20 hours free of any month for one year

The Microsoft Azure Platform Services



Azure RemoteApp

Azure RemoteApp enables your
Windows application anywhere on any device

*"Enable users to be productive on the devices they love,
while protecting the company." Brad Anderson*



Launched December 2014

history

clients

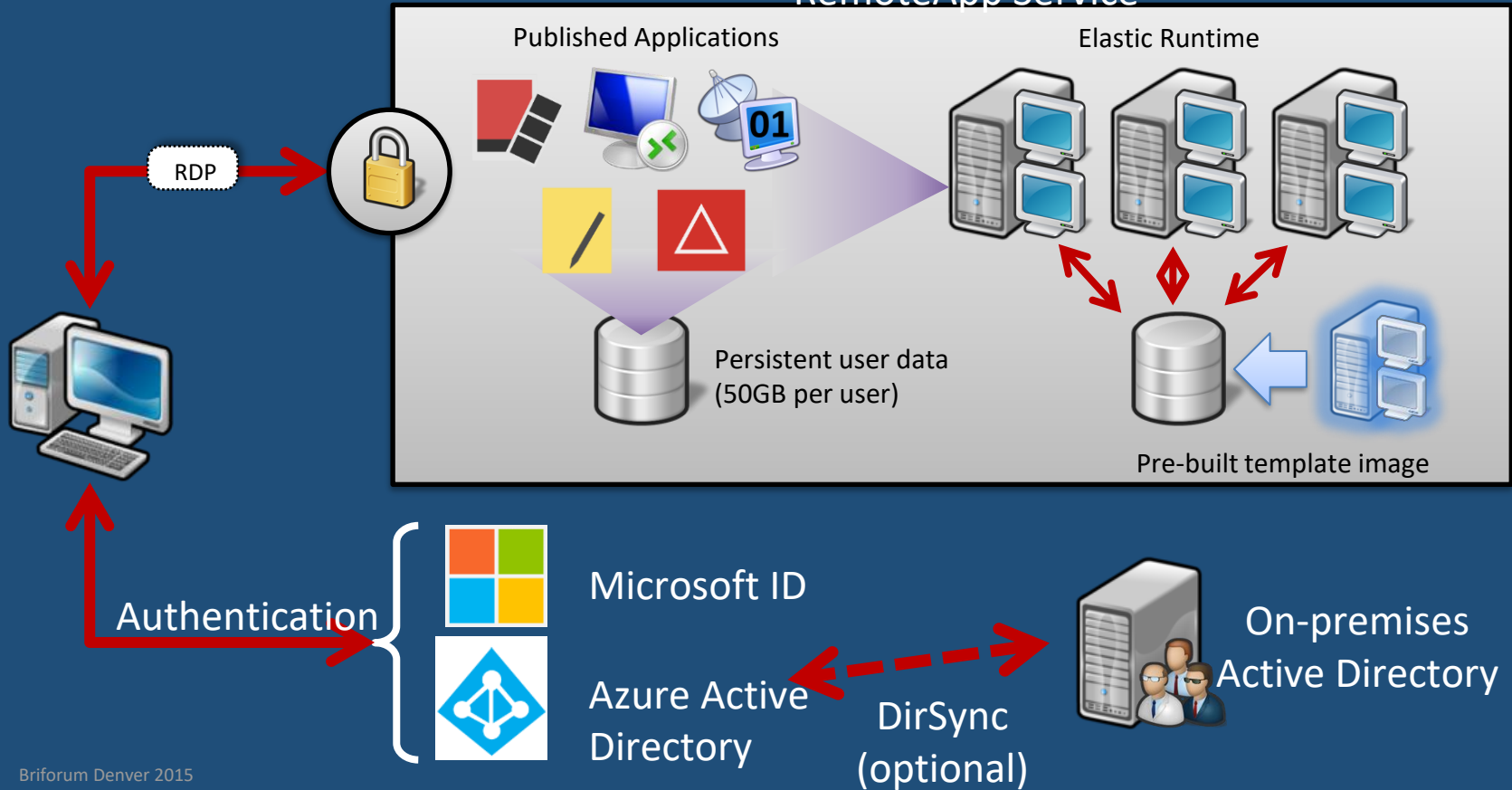
protocols

compute

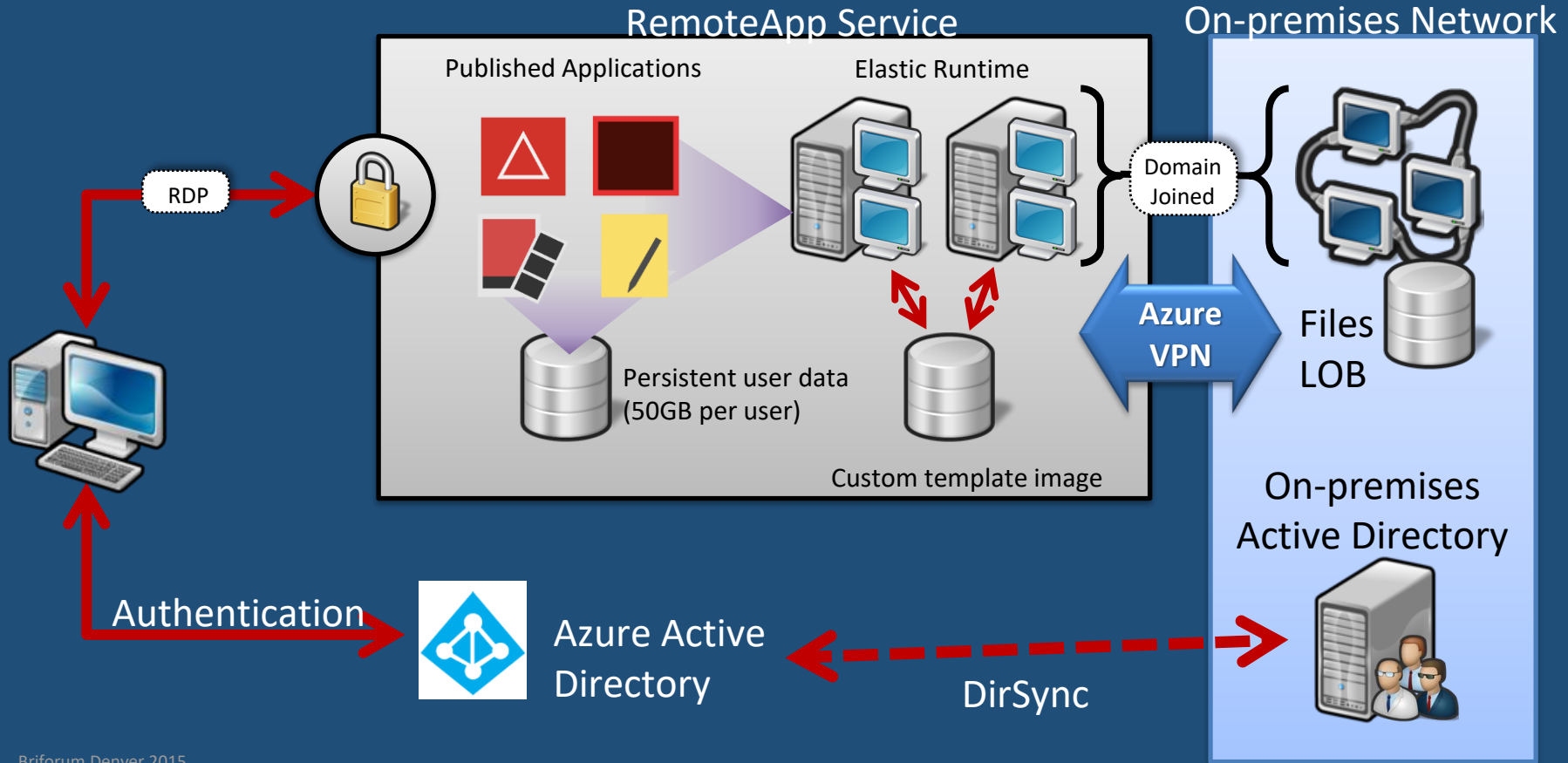
pricing

Azure RemoteApp

RemoteApp Service

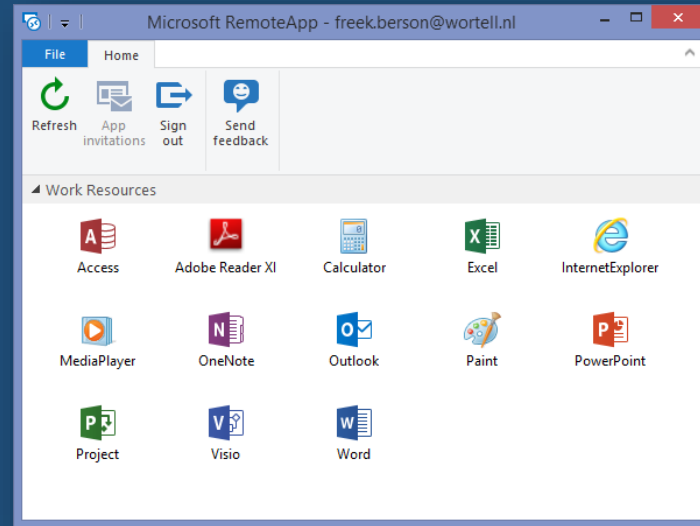


Azure RemoteApp



Azure RemoteApp

- Separate client to install and run
- Leveraging RDP 8.1 (RemoteFX)
- Available for Windows 8.1, Windows 8, Windows 7 Service Pack 1, iOS, Mac OS X, Android devices, Windows Phone and Windows RT



history

clients

protocols

compute

pricing

Azure RemoteApp

Service Plans

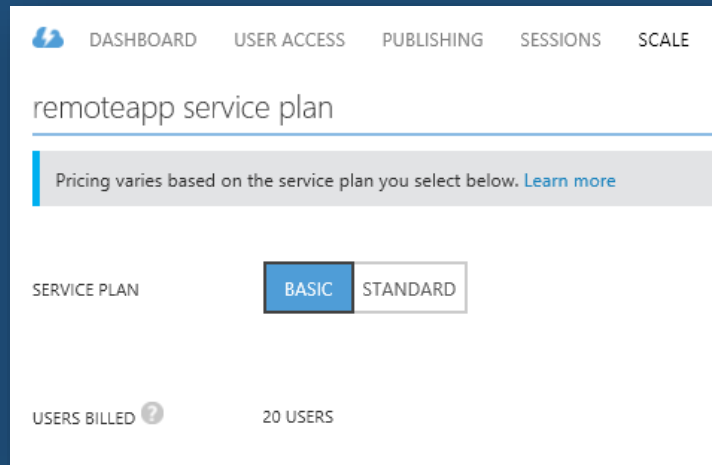
Basic

- Task Worker
- Lightweight LOB applications
- Max 16 users per RD Session Host

Standard

- Information worker
- Productivity applications
- Max 10 users per RD Session Host

Both Service Plans use A3 VM (4 cores, 7GB RAM)



history

clients

protocols

compute

pricing

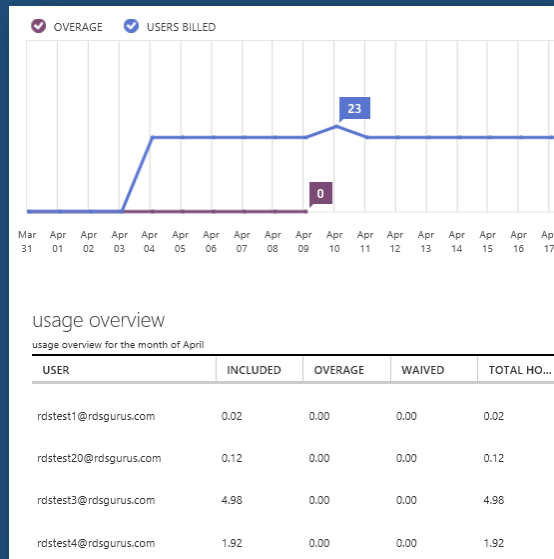
Azure RemoteApp

Pricing Basic Plan

- Starting at \$10 per user per month
- 40 Hours included
- Hourly overage rate \$0.175
- Cap price \$17, including RDS CAL
- Minimum of 20 users, maximum of 800 users

Pricing Standard Plan

- Starting at \$15 per user per month
- 40 Hours included
- Hourly overage rate \$0.20
- Cap price \$23, including RDS CAL
- Minimum of 20 users, maximum of 500 users



history

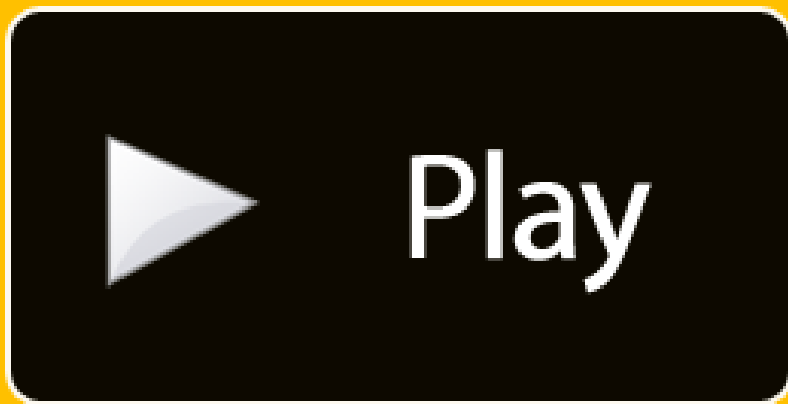
clients

protocols

compute

pricing

Let's Deploy an App, Shall We?





Menu



[AWS re:Invent](#)

[Products](#)

[Solutions](#)

[Pricing](#)

[More ▾](#)

[English ▾](#)

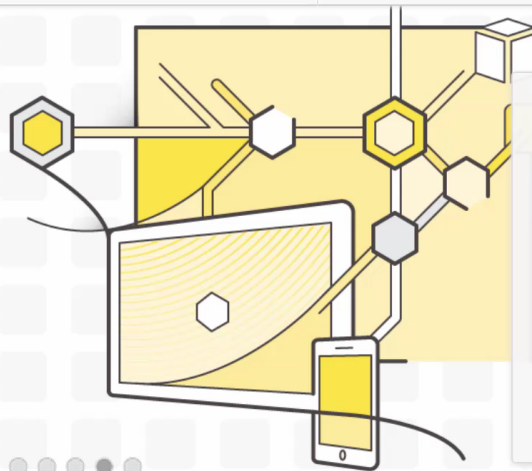
[My Account ▾](#)

[Sign In to the Console](#)

Introducing Amazon API Gateway

Easily build and run your APIs at AWS scale

[Learn more and try it for free »](#)



Manage Your Resources

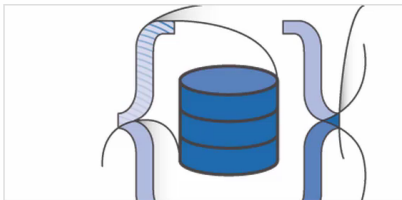
[Sign In to the Console](#)

AWS Console Mobile App

View your resources on iOS
and Android devices

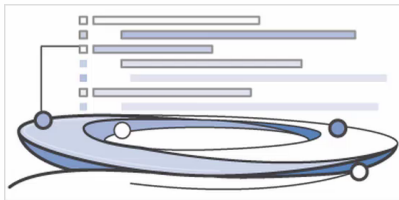
[Download the Mobile App »](#)

What's New from Amazon Web Services



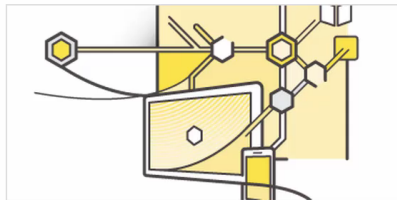
JULY 16 | AMAZON DYNAMODB

Amazon DynamoDB introduces cross-region replication, Triggers & Streams



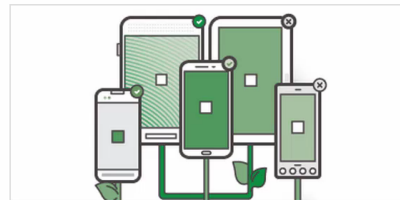
JULY 9 | AWS DEVELOPER TOOLS

AWS Developer Tools: Rapidly deliver quality software features and updates



JULY 9 | AMAZON API GATEWAY

Amazon API Gateway: Easily build and run your APIs at AWS scale



JULY 9 | AWS DEVICE FARM

AWS Device Farm: Test your apps on real devices in the AWS Cloud



Amazon Web Services

Compute



EC2
Virtual Servers in the Cloud



Lambda
Run Code in Response to Events



EC2 Container Service
Run and Manage Docker Containers

Storage & Content Delivery



S3
Scalable Storage in the Cloud



Elastic File System **PREVIEW**
Fully Managed File System for EC2



Storage Gateway
Integrates On-Premises IT Environments with Cloud Storage



Glacier
Archive Storage in the Cloud



CloudFront
Global Content Delivery Network

Database



RDS
MySQL, Postgres, Oracle, SQL Server, and Amazon Aurora



DynamoDB
Predictable and Scalable NoSQL Data Store



ElastiCache
In-Memory Cache



Redshift
Managed Petabyte-Scale Data Warehouse Service

Networking



VPC
Isolated Cloud Resources



Direct Connect
Dedicated Network Connection to AWS

Administration & Security



Directory Service
Managed Directories in the Cloud



Identity & Access Management
Access Control and Key Management



Trusted Advisor
AWS Cloud Optimization Expert



CloudTrail
User Activity and Change Tracking



Config
Resource Configurations and Inventory



CloudWatch
Resource and Application Monitoring



Service Catalog
Personalized Catalog of AWS Resources

Deployment & Management



Elastic Beanstalk
AWS Application Container



OpsWorks
DevOps Application Management Service



CloudFormation
Templated AWS Resource Creation



CodeDeploy
Automated Deployments



CodeCommit
Managed Git Repositories



CodePipeline
Continuous Delivery

Analytics



EMR
Managed Hadoop Framework



Kinesis
Real-time Processing of Streaming Big Data



Data Pipeline
Orchestration for Data-Driven Workflows

Application Services



SQS
Message Queue Service



SWF
Workflow Service for Coordinating Application Components



AppStream
Low Latency Application Streaming



Elastic Transcoder
Easy-to-use Scalable Media Transcoding



SES
Email Sending Service



CloudSearch
Managed Search Service



API Gateway
Build, Deploy and Manage APIs

Mobile Services



Cognito
User Identity and App Data Synchronization



Device Farm
Test Android and Fire OS apps on real devices in the Cloud



Mobile Analytics
Understand App Usage Data at Scale



SNS
Push Notification Service

Enterprise Applications



WorkSpaces
Desktops in the Cloud



WorkDocs
Secure Enterprise Storage and Sharing Service



WorkMail **PREVIEW**
Secure Email and Calendaring Service

Resource Groups

A resource group is a collection of resources that share one or more tags. Create a group for each project, application, or environment in your account.

[Create a Group](#)[Tag Editor](#)

Additional Resources

Getting Started

See our documentation to get started and learn more about how to use our services.

AWS Console Mobile App

View your resources on the go with our AWS Console mobile app, available from [Amazon Appstore](#), [Google Play](#), or [iTunes](#).

AWS Marketplace

Find and buy software, launch with 1-Click and pay by the hour.

AWS re:Invent - Register Now

Join us for keynote announcements, technical sessions, bootcamps and more.

Service Health

All services operating normally.

Updated: Jul 20 2015 17:43:00 GMT-0600



Welcome

Applications

Resources

Your account supports streaming up to 10 simultaneous sessions at the same time. [Learn more about service limits](#) or [request a limit increase](#).

[Deploy an application](#)

Name	Active sessions	Status
Flight Simulator Demo	0	Running
Gimp Demo	0	Running

Now Let's Check Out Azure RemoteApp

The screenshot displays the Azure RemoteApp console interface. On the left is a blue sidebar with various icons for navigation. The main area shows the 'aratest3' application details. At the top, there are tabs for 'DASHBOARD', 'USER ACCESS', 'PUBLISHING', 'SESSIONS', and 'SCALE'. Below these is a table listing the application's components. The table has three columns: 'NAME', 'STATUS', and 'PATH'. All listed items have a 'Published' status, indicated by a green checkmark. At the bottom of the console, there is a dark grey bar with buttons for '+ NEW', 'PUBLISH', 'EDIT', 'UNPUBLISH', and a help icon.

aratest3

DASHBOARD USER ACCESS PUBLISHING SESSIONS SCALE

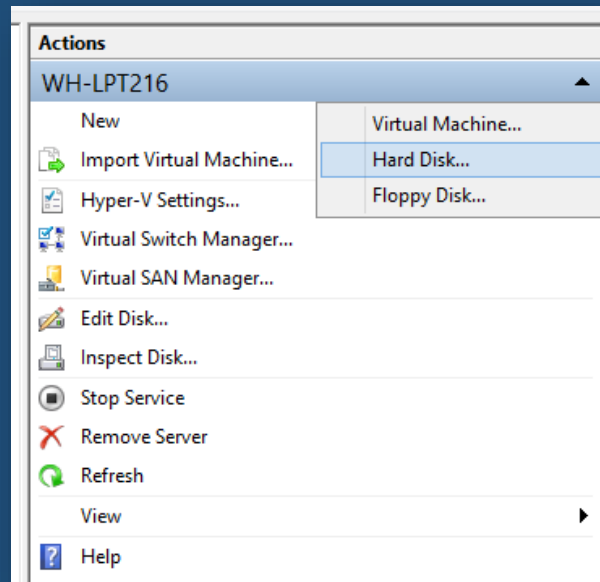
NAME	STATUS	PATH
21 DX9 Rollercoaster	✓ Published	%SYSTEMDRIVE%\RunTests\21-DX9-Rollercoaster.exe
22 DX10 PowerPoint 2013 Animati...	✓ Published	%SYSTEMDRIVE%\RunTests\22-DX10-PowerPoint2013DXAnimation...
30 OpenGL Seascooter Dolphin	✓ Published	%SYSTEMDRIVE%\RunTests\30-OpenGL-SeascooterDolphin.exe
ARA Explorer	✓ Published	c:\windows\explorer.exe
ARA3 PerfMon	✓ Published	c:\windows\system32\perfmon.exe
Passmark AppTimer	✓ Published	%SYSTEMDRIVE%\RunTests\Demos\PassMark\AppTimer.exe
Workload Basic	✓ Published	%SYSTEMDRIVE%\RunTests\WL-Basic.exe
Workload Knowledge	✓ Published	%SYSTEMDRIVE%\RunTests\WL-Knowledge.exe

1 2 ← →

+ NEW PUBLISH EDIT UNPUBLISH ?

ARA Custom Template on Premises

- The image size must be 127 GB or smaller
- VHD file and no generation 2 Hyper-V VM
- Dynamically expanding VHD is recommended
- Master Boot Record (MBR) partitioned
- RD Session Host role & the Desktop Experience feature
- No RD Connection Broker role installed
- Encrypting File System (EFS) disabled
- Single installation of Windows Server 2012 R2
- VHD from a snapshot chain not supported
- SYSPREP /oobe /generalize /shutdown
- **Uploading the complete VHD takes hours!**



Custom ARA Image Templates

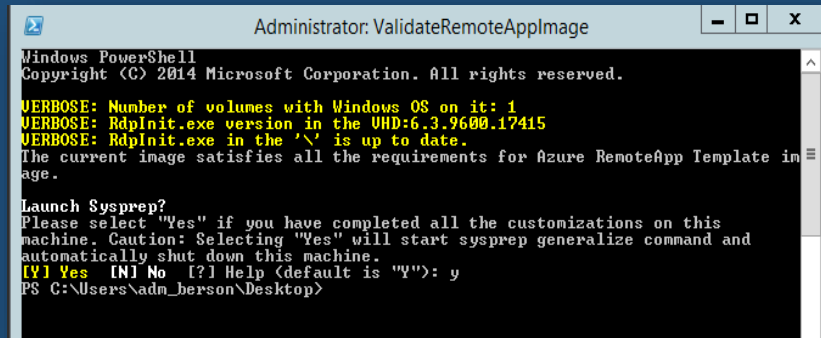
```
Administrator: Windows PowerShell
VERBOSE: Importing alias 'Remove-WAPackWebsite'.
VERBOSE: Importing alias 'Restart-WAPackWebsite'.
VERBOSE: Importing alias 'Restore-WAPackWebsiteDeployment'.
VERBOSE: Importing alias 'Save-WAPackWebsiteLog'.
VERBOSE: Importing alias 'Select-WAPackSubscription'.
VERBOSE: Importing alias 'Set-WAPackEnvironment'.
VERBOSE: Importing alias 'Set-WAPackSubscription'.
VERBOSE: Importing alias 'Set-WAPackWebsite'.
VERBOSE: Importing alias 'Show-WAPackPortal'.
VERBOSE: Importing alias 'Show-WAPackWebsite'.
VERBOSE: Importing alias 'Start-CopyAzureStorageBlob'.
VERBOSE: Importing alias 'Start-WAPackWebsite'.
VERBOSE: Importing alias 'Stop-CopyAzureStorageBlob'.
VERBOSE: Importing alias 'Stop-WAPackWebsite'.
VERBOSE: Importing alias 'Test-WAPackName'.
VERBOSE:
VERBOSE: Mounting the VHD.
VERBOSE:
VERBOSE: Successfully mounted the VHD.
VERBOSE: Number of volumes with Windows OS on it: 1
VERBOSE: Template image disk partitioning style is: MBR
VERBOSE: RdpInit.exe version in the VHD: 6.3.9600.17415
VERBOSE: RdpInit.exe in the 'C:\1TeamRGE\ImgTemplate\AraTemplate3.vhd' is up to date.
VERBOSE: Successfully unloaded hive: HKLM:\vhd_sft from the VHD.
VERBOSE: Successfully unloaded hive: HKLM:\vhd_sys from the VHD.
VERBOSE: Successfully detached the VHD.
Starting image upload.
MD5 hash is being calculated for the file C:\1TeamRGE\ImgTemplate\AraTemplate3.vhd.
MD5 hash calculation is completed.
Elapsed time for the operation: 00:03:01
Creating new page blob of size 42949673472...
Elapsed time for upload: 14:25:57

-----
LocalFilePath                                     DestinationUri
-----
C:\1TeamRGE\ImgTemplate\AraTemplate3.vhd         https://cdvwe181204868rdcm.blob.core.windows.net/goldima...
Successfully uploaded template image.

PS C:\1TeamRGE\ImgTemplate>
```

Custom Template in Azure IaaS

- Deploy the Azure RD Session Host template
- Install additional features required by your applications
- Install your applications
- Disable the Encrypting File System (EFS)
- Install all important Windows updates
- SYSPREP the image
- Capture the VM to a Template
- Selecting the IaaS templates takes ~25 min!



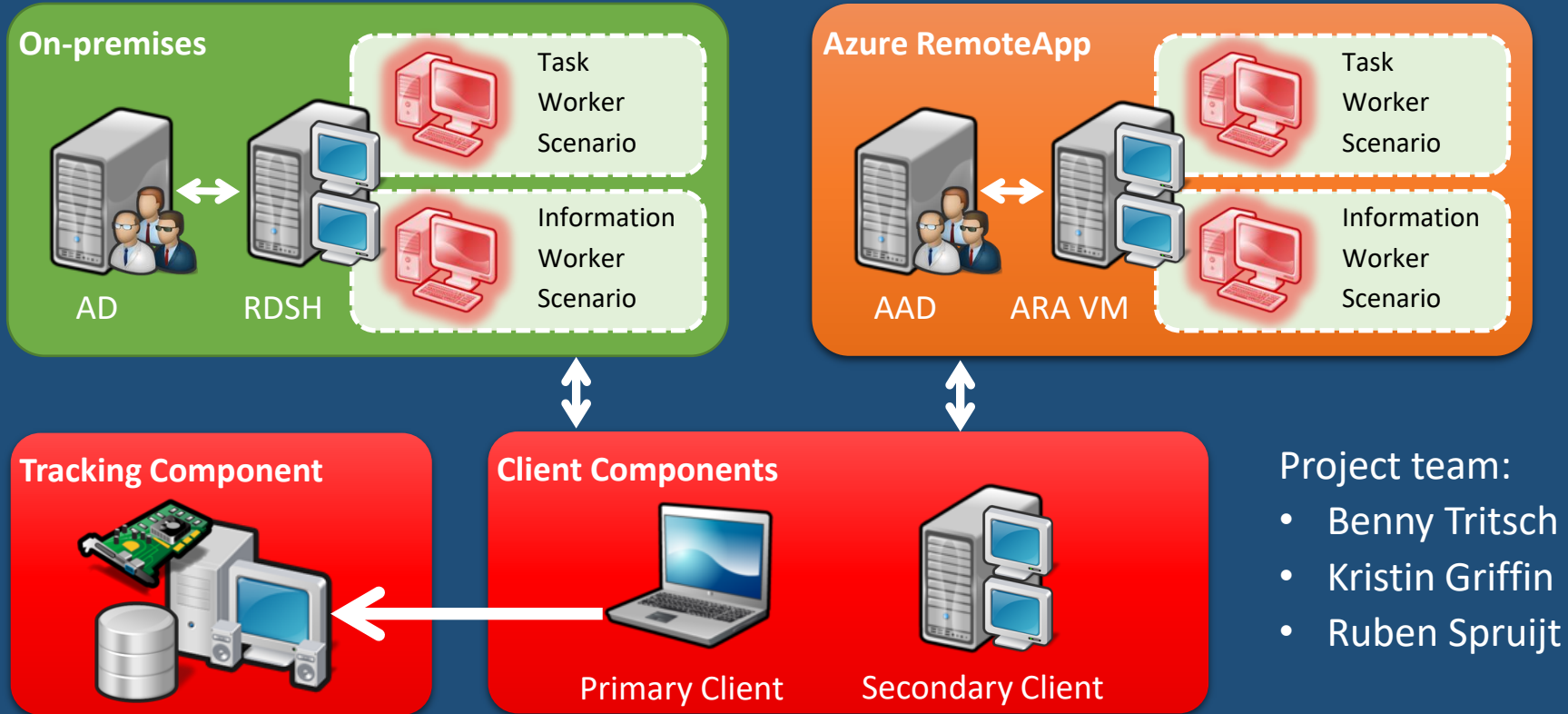
```
Administrator: ValidateRemoteAppImage
Windows PowerShell
Copyright (C) 2014 Microsoft Corporation. All rights reserved.

VERBOSE: Number of volumes with Windows OS on it: 1
VERBOSE: Rdpinit.exe version in the UHD:6.3.9600.17415
VERBOSE: Rdpinit.exe in the '\ ' is up to date.
The current image satisfies all the requirements for Azure RemoteApp Template in
age.

Launch Sysprep?
Please select "Yes" if you have completed all the customizations on this
machine. Caution: Selecting "Yes" will start sysprep generalize command and
automatically shut down this machine.
[Y] Yes [N] No [?] Help (default is "Y"): y
PS C:\Users\adm_berson\Desktop
```

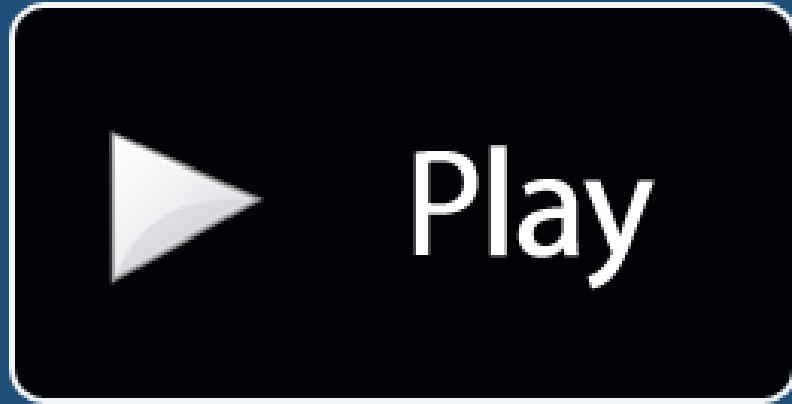


ARA Testing Framework



Project team:

- Benny Tritsch
- Kristin Griffin
- Ruben Spruijt



Moving the apps.... What should we be thinking about?

WAIT!!

What about Hybrid?

Ok, got it. Move on already....

Authentication

UEM/USM

Performance

Monitoring & Alerting

User Experience

Networking

Scalability

Deployment & Lifecycle Management

Administration

Pricing & Licensing

Security & Compliance

Data Management

So, after all that jibber jabber, who wins?

AWS AppStream

- graphic-intensive apps – it's tough to beat
- geared up for DEV's (roll your own)
- deployment is fairly easy, for easy apps
- scales up, but no load balancing
- hybrid client SDK could do the trick
- no LDAP or AD – Entitlement Service can be confusing
- pricing is moderate
- STX protocol is impressive when scaling – fast instance spin-up
- Services are like a bad Chinese restaurant menu – too many options
- AppStream just hasn't caught on, outside of devs and gamers

RemoteApp

- no GPU support, only A3 VMs (4 cores, 7GB RAM)
- geared up for cloudifying “legacy” Windows apps
- deployment is based on sysprep, image templates and unattended install
- scales up, no real load balancing, logon storm issues
- Azure Active Directory and AD federation – but no fine-grained assignment of RemoteApp programs based on AAD groups and no support for multiple domains
- Desktop integration gets better (desktop icons, taskbar)
- pricing is an “all-in” flat rate model
- RDP/RemoteFX protocol – only TCP, UDP not supported yet (on roadmap)
- ARA client for many device types, new integrated client on the roadmap

Thank You

Mike Nelson, mike.nelson@atlantiscomputing.com

Benny Tritsch, benny@drtritsch.com