PowerShell & PowerCLI

Starting from Scratch

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- 35+ years in tech
- Technical Evangelist @ Pure Storage
- Experience from Helpdesk to Architect
- Scripter, not a coder
- Passion for community, teaching, learning
- Beer, BBQ, & Gadgets

Microsoft MVP Most Valuable Professional

Citrix Technology Advocate CTA

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/MyPresentations

Why use PowerCLI?

PowerCLI does not exist without PowerShell

PowerShell

aka PoSH

Started as a scripting framework for automation &evolved into a command line interface (CLI) and a scripting language

Native executables, cmdlets, scripts, functions, aliases, modules, help, profiles, parameters, and more

Versions

.Net Framework

<=5.1

Windows

.NET Core

6.x

7.x

Windows
Linux
MacOS

Profiles

- The PowerShell profile is a script that runs when a PowerShell session is started (unless the -noprofile switch is used)
- Basically, it is a logon script for PowerShell containing commands, aliases, variables, drives, functions, modules, etc.
- Profiles can be for all users, the current user, all hosts, and the current host. You can have a mix of none, some, or all of these and there is a precedence order.
- There is no default profile
- Your current user profile is stored in the $profile variable. To edit your current user profile with VSCode, type code $profile at a PowerShell prompt.

Cmdlets

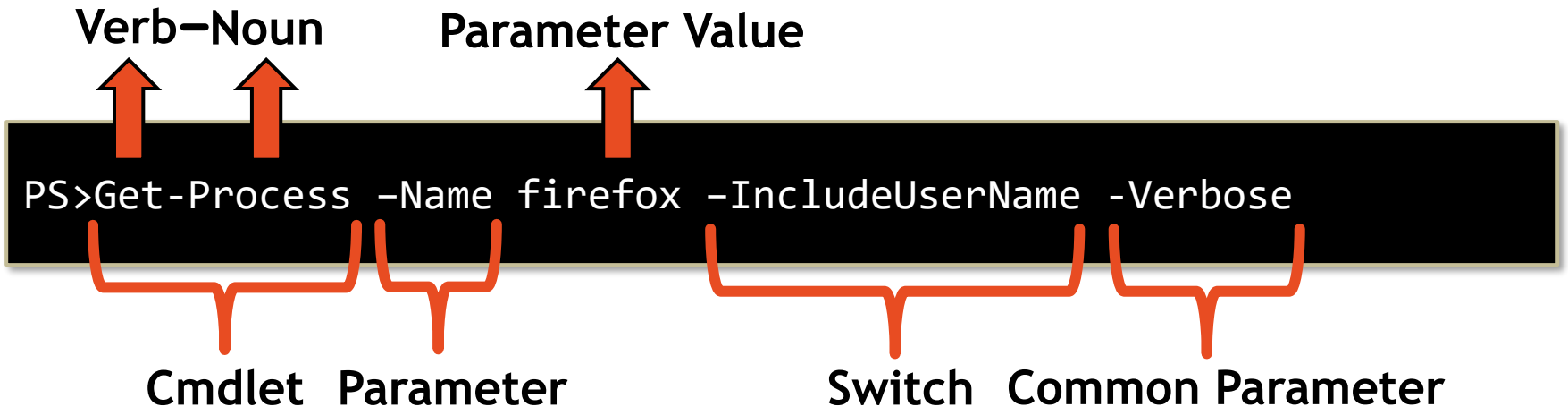
“command-lets”

- The “soul” of PowerShell
- A type of command in PowerShell
- Common syntax & options
- Usually take object input & return objects
- Stored in .ps1 file for scripts

Variables

- A unit of *memory* in which a value is stored
- PowerShell variables are text strings represented by the dollar sign "$"prefix (ex. $a, $my_var, $var1, etc.)
- Although special characters and spaces allowed, variable names should be kept simple
- Types of variables:
  - User – user defined and deleted on exit (add to your PowerShell Profile to sustain)
  - Automatic – defined by Posh & not editable (ex. $PSHOME)
  - Preference – defaults defined & are user editable
- Type `Get-Variable` to show all variables defined in a session

Syntax


Verb–Noun
Parameter Value
PS>Get-Process –Name firefox –IncludeUserName -Verbose
Cmdlet
Parameter
Switch
Common Parameter

Parameters

Named

Positional

Dynamic

Common

Sets

- Allow for users to provide input or options
- A pre-hyphen (“-”) is not always necessary (ie. positional)
- Some parameters have default values (dev decision)
- Different Types:
  - Named -> default full name of parameter
  - Positional -> typed in a relative order (caution)
  - Dynamic -> only available under special conditions
  - Common -> built-in parameters
  - Sets -> expose different parameters & return different information

Pipelines

Object returned by first cmdlet sent to second cmdlet

“One-liner”

Pipelines

“One-liner”

Get all Windows VMs that need updated tools, then update all the tools at once

```
PS> Get-VM -Location 'MyDatacenter' | Where-Object { $_.ExtensionData.Guest.ToolsVersionStatus
 -eq 'guestToolsNeedUpgrade' -and $_.PowerState -like 'PoweredOn' } |
Get-VMGuest | Where-Object { $_.GuestFamily -like 'WindowsGuest'} |
Update-Tools -NoReboot -RunAsync
```

Functions

A list of PowerShell statements that run like you had entered them on the command line

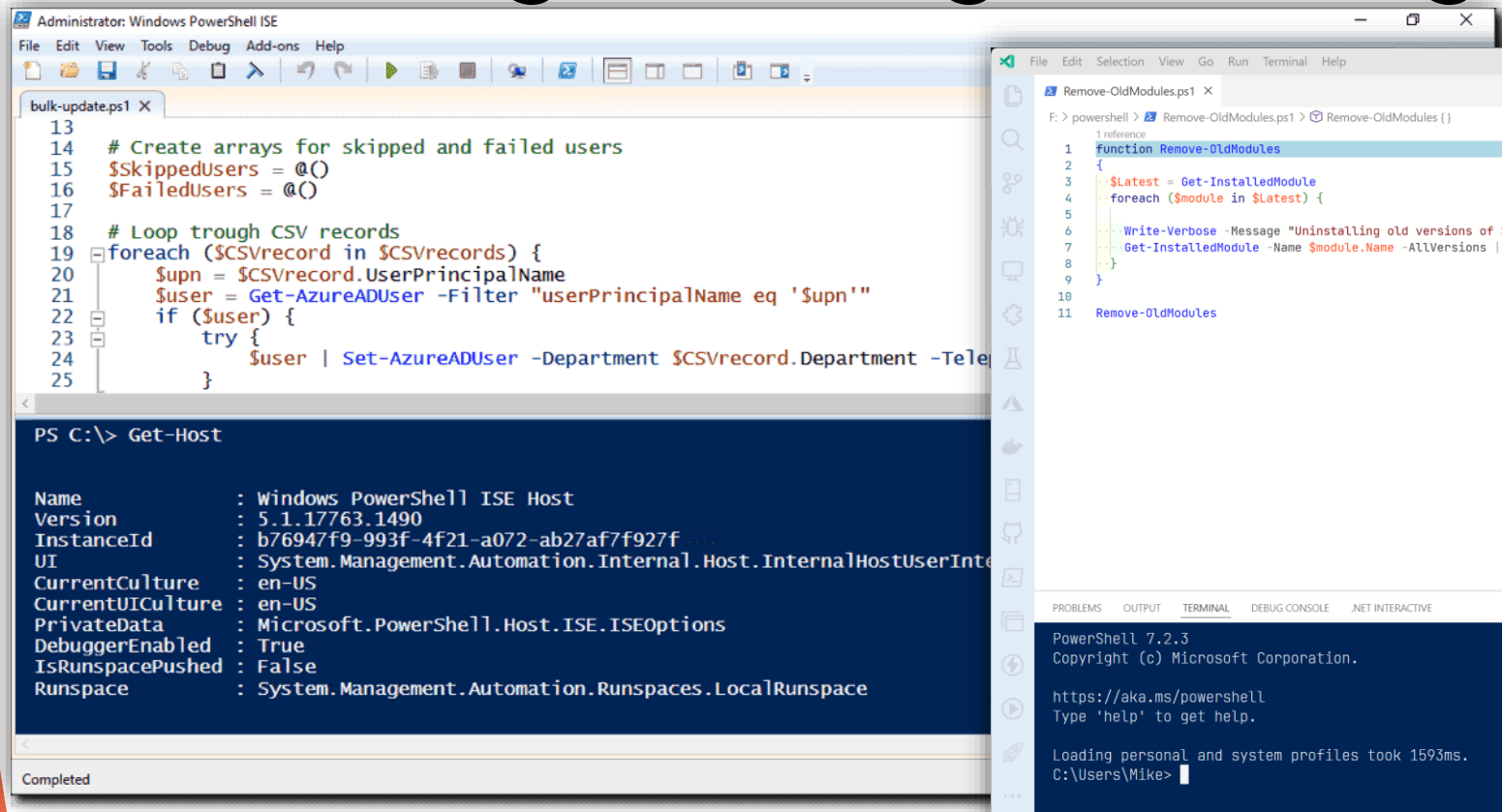
```
function Get-FirefoxProcess { Get-Process firefox }

function Get-FirefoxProcess {
  $a = Get-Process firefox
    if ($a –eq $null) {
      Write-Host “No Firefox process present”}
    return $a
}

Get-FirefoxProcess
```

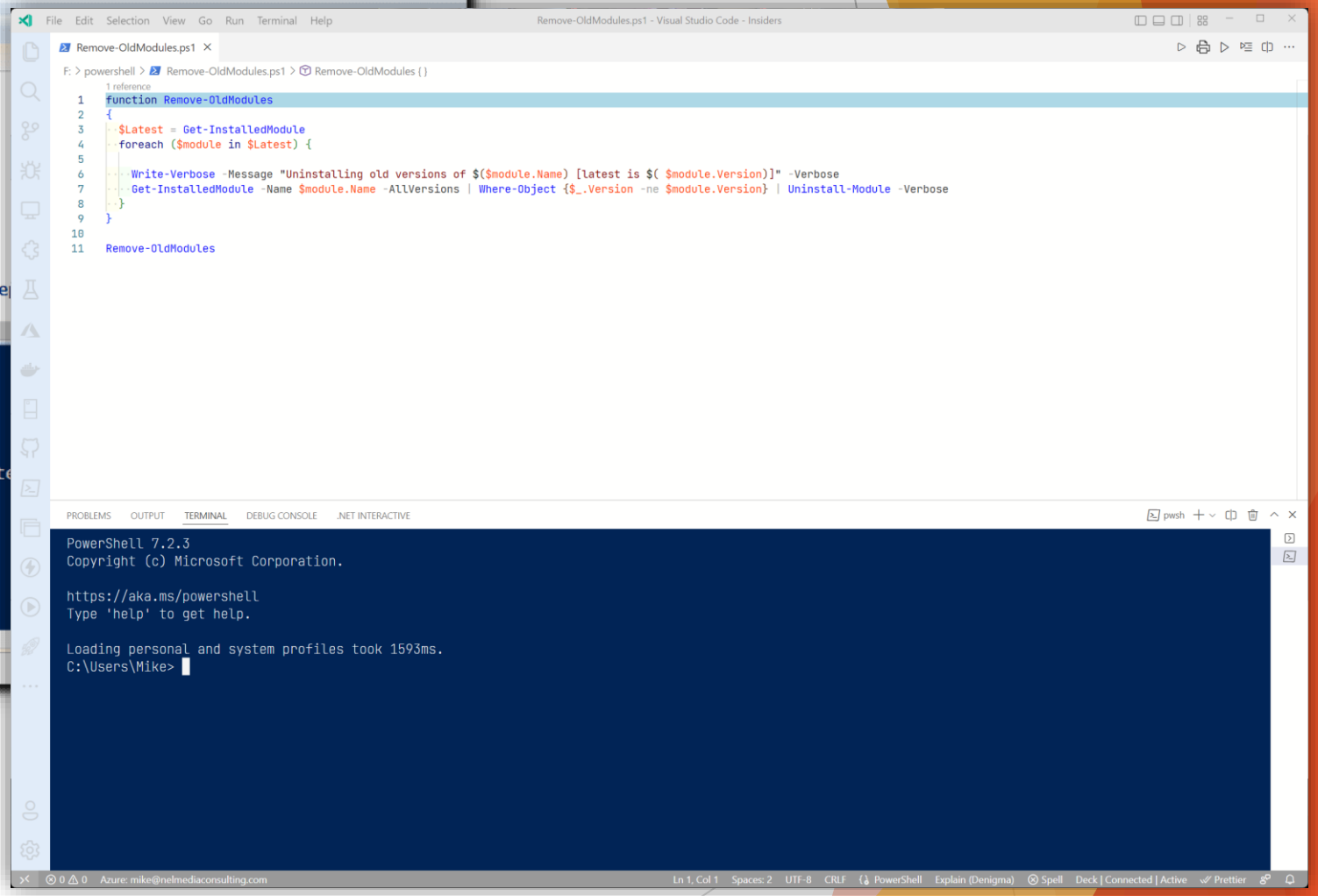
To run a function, simply “call” it.

Command Line, Scripts, & Modules

- Command line execution – simple, as-is, possibly pipelined
- Scripts are .ps1 files
- Modules are .psm1 files
  - Collection of commands, providers, variables, functions, help context, aliases, workflows, etc.
  - Can be imported from a .psd1 manifest file. Basically a definition file.

Creating / Editing / Running





Integrated Scripting Environment (ISE)

Visual Studio Code (VSCode)

** Use VSCodium for security-minded folks*

Core Commands to Know

Get-Command
Get-Help
Get-Member
Show-Command
Update-Help
Update-Module

PowerCLI

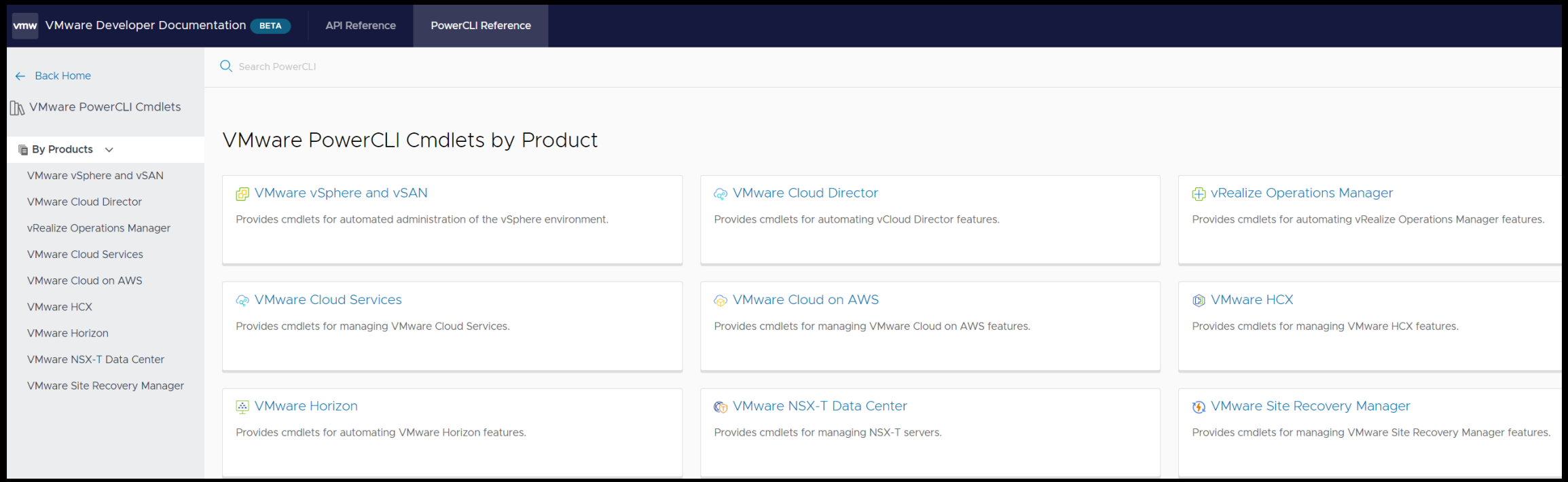
- Install-Module VMware.PowerCLI
  - -Allow-Clobber, -Force & -SkipPublisherCheck may be necessary

```
Install-Package: The following commands are already available on this
system: Export-VM,Get-VM,Get-VMHost,Move-VM,New-VM,Remove-VM,Restart-VM,Set-VM,Set-VMHost,Start-VM,Stop-VM,Suspend-VM'. This module
'VMware.VimAutomation.Core' may override the existing commands. If you still want to install this module 'VMware.VimAutomation.Core', use
-AllowClobber parameter.
```

- If certificate error, Update-Module will not work
- Cmdlet collisions such as Get-VM
- 800+ cmdlets in 15+ modules

```
# Modules that must be imported into the global environment prior to importing this module
RequiredModules = @(
@{"ModuleName"="VMware.VimAutomation.Sdk";"ModuleVersion"="12.5.0.19093564"}
@{"ModuleName"="VMware.VimAutomation.Common";"ModuleVersion"="12.6.0.19600917"}
@{"ModuleName"="VMware.Vim";"ModuleVersion"="7.0.3.19601056"}
@{"ModuleName"="VMware.VimAutomation.Core";"ModuleVersion"="12.6.0.19601570"}
@{"ModuleName"="VMware.VimAutomation.Srm";"ModuleVersion"="12.6.0.19609133"}
@{"ModuleName"="VMware.VimAutomation.License";"ModuleVersion"="12.0.0.15939670"}
@{"ModuleName"="VMware.VimAutomation.Vds";"ModuleVersion"="12.5.0.19167830"}
@{"ModuleName"="VMware.CloudServices";"ModuleVersion"="12.6.0.19606210"}
@{"ModuleName"="VMware.VimAutomation.Vmc";"ModuleVersion"="12.6.0.19609014"}
@{"ModuleName"="VMware.VimAutomation.Nsxt";"ModuleVersion"="12.5.0.19168180"}
@{"ModuleName"="VMware.VimAutomation.vROps";"ModuleVersion"="12.5.0.19167825"}
@{"ModuleName"="VMware.VimAutomation.Cis.Core";"ModuleVersion"="12.6.0.19601368"}
@{"ModuleName"="VMware.VimAutomation.HorizonView";"ModuleVersion"="12.5.0.19033914"}
@{"ModuleName"="VMware.VimAutomation.Cloud";"ModuleVersion"="12.0.0.15940183"}
@{"ModuleName"="VMware.DeployAutomation";"ModuleVersion"="7.0.3.19599828"}
@{"ModuleName"="VMware.ImageBuilder";"ModuleVersion"="7.0.3.19599828"}
@{"ModuleName"="VMware.VimAutomation.Storage";"ModuleVersion"="12.6.0.19609013"}
@{"ModuleName"="VMware.VimAutomation.StorageUtility";"ModuleVersion"="1.6.0.0"}
@{"ModuleName"="VMware.VumAutomation";"ModuleVersion"="12.1.0.16941488"}
@{"ModuleName"="VMware.VimAutomation.Security";"ModuleVersion"="12.3.0.17833870"}
@{"ModuleName"="VMware.VimAutomation.Hcx";"ModuleVersion"="12.6.0.19606303"}
@{"ModuleName"="VMware.VimAutomation.WorkloadManagement";"ModuleVersion"="12.4.0.18627055"}
@{"ModuleName"="VMware.Sdk.Runtime";"ModuleVersion"="1.0.106.18628394"}
@{"ModuleName"="VMware.Sdk.vSphere";"ModuleVersion"="1.0.104.18678708"}
@{"ModuleName"="VMware.PowerCLI.VCenter";"ModuleVersion"="12.6.0.19600125"}
@{"ModuleName"="VMware.Sdk.Nsx.Policy";"ModuleVersion"="3.2.0.19610335"}
)
```

https://developer.vmware.com/docs/powercli/latest/products/



https://www.powershellgallery.com/packages?q=Tags%3A%22Powercli%22

Demos

Thank you!

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