



Chocolatey

The package manager for Windows

Software Deployment Automation with PowerShell and Chocolatey



Rob Reynolds

Founder

Chocolatey Software

@ferventcoder





Rob Reynolds

- Creator and Founder of Chocolatey 
- Enjoys long walks on the beach and designing solutions that make hard things easy
- Co-wrote infrastructure framework known as the Chuck Norris Framework
- Over 12 years experience in infrastructure automation
- Obsesses over user experience
- Microsoft MVP for both Cloud and Datacenter Management and Visual Studio and Development Technologies





Agenda

- The Story of Windows Automation
- Chocolatey
- Demo?





**Let's talk about a story...
possibly your story**





The Story of Modern Automation for Windows







You probably use or have
used traditional tools





Traditional Tools

- Manual Configuration
- Golden Images
- Endpoint management tools
- Not necessarily bad, just are harder to fit into modern automation approaches





Modern Automation

- Feature-Rich
- Infrastructure as Code (IaC)
- Source Control
- Testable Infrastructure
- Reporting
- Centralized Management





So you modernized your Windows automation





DevOps == Rainbows and Unicorns

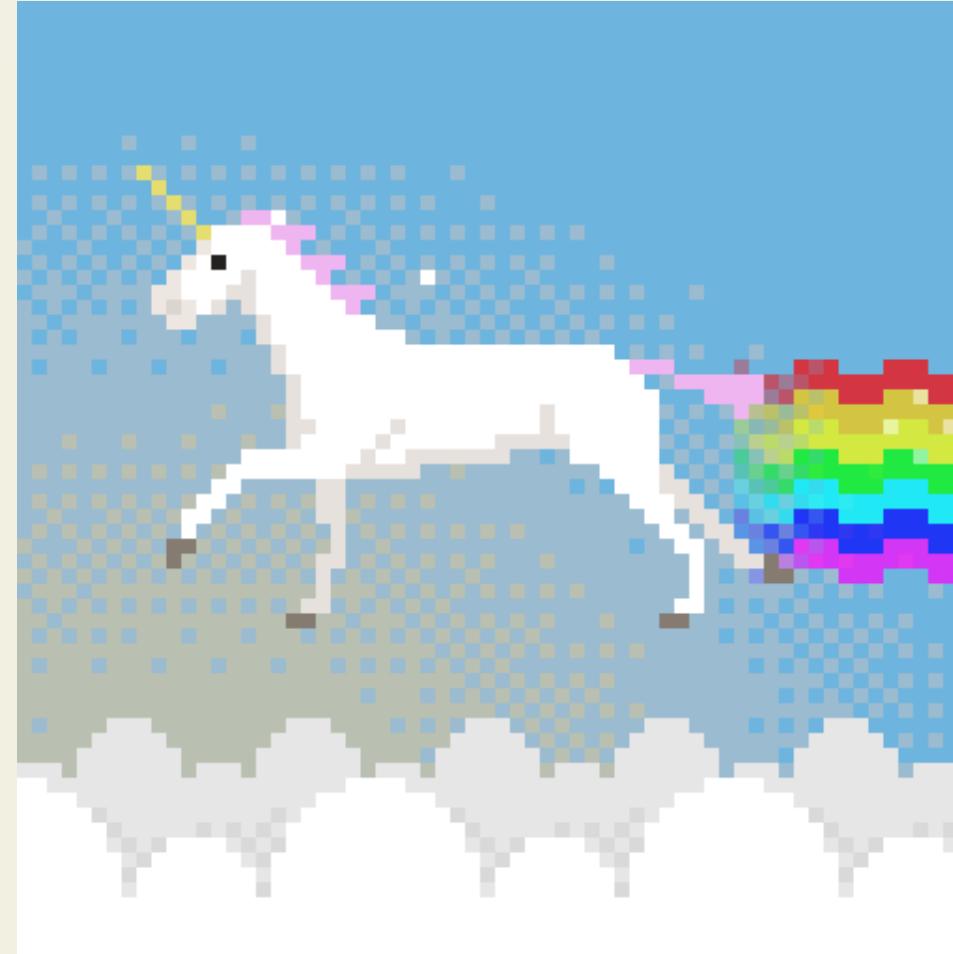
“Umm...”

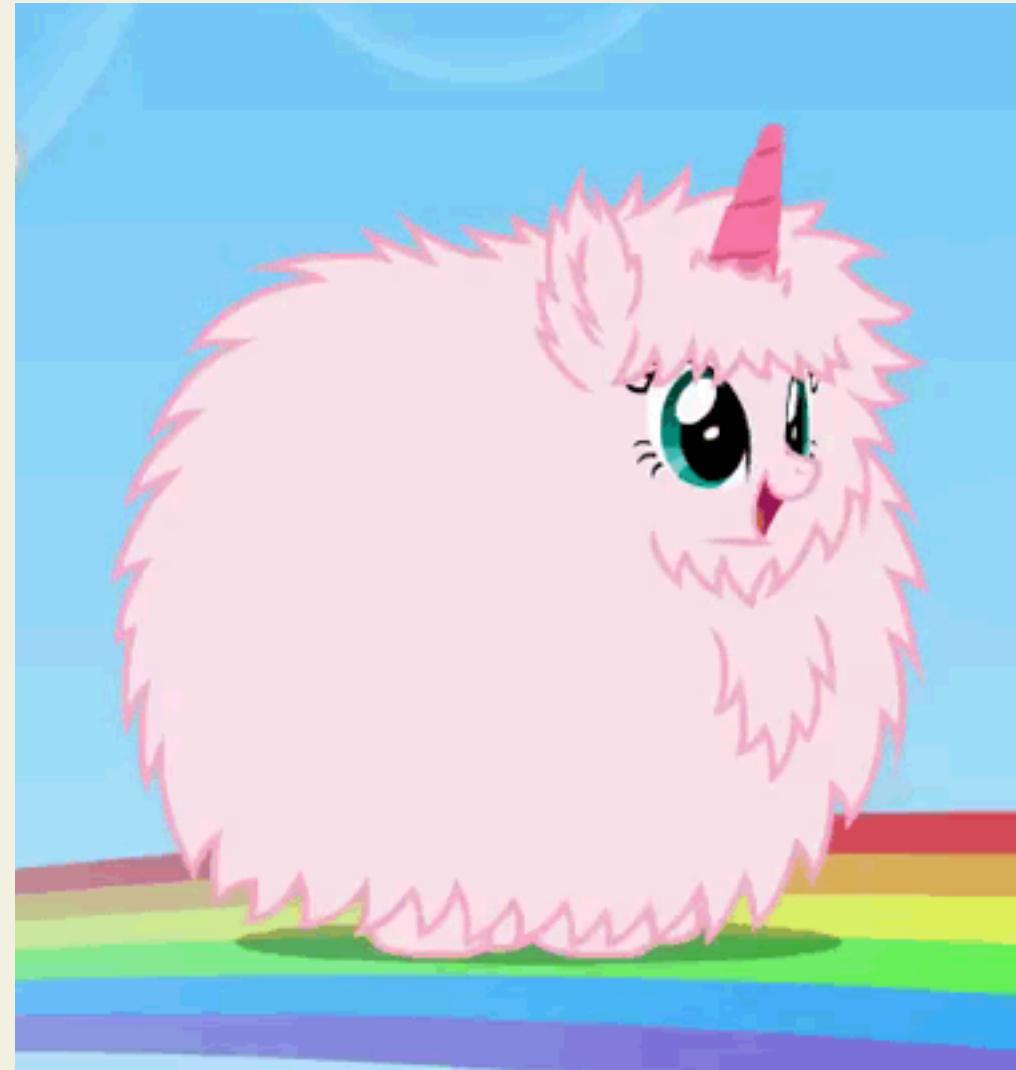


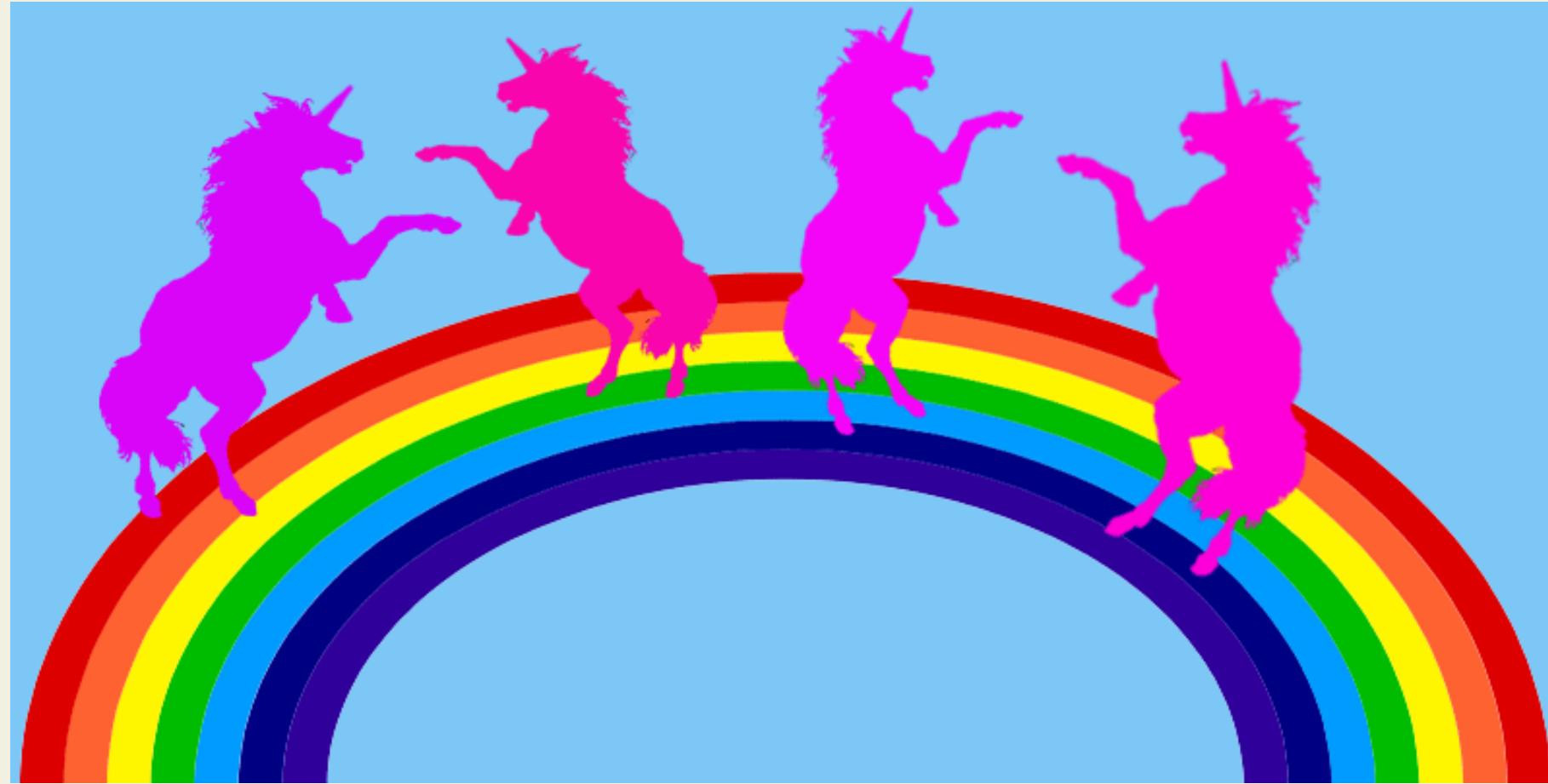
Rainbows and Unicorns

“Just go with it...”











Something was not quite right...





Configuration Management alone is missing something





Software Management / Package Management is necessary for great Configuration Management





Software management may account for 50-90% of your automation



Windows Software Ecosystem

- Over 20 installer formats and thousands of installers in the wild
- Zips and other archive formats
- Internal software
- Traditionally installers, zips and internal software are deployed in different ways





Chocolatey - Sane Software Management

Universal packaging format for managing all Windows software (native installers, zips, scripts, binaries) as 1st class citizens.

Write a software deployment one time (with PowerShell), deploy it anywhere you have Windows with everything (Puppet, Chef, SCCM, MDT, etc), then manage and track that software over time (even without installers).





Chocolatey - Sane Software Management

- Write PowerShell - not locked in, technology you already need to know
- One interface to manage all aspects of Windows Software are managed - this makes Chocolatey unique
- Tight Integration with Configuration Managers (DevOps)
- Integration w/everything else through PowerShell/Batch scripts





Chocolatey - Sane Software Management

- Completely offline - zero call home, zero need for internet access
- Super flexible - bring your own PowerShell Modules as extensions, Package Parameters, etc.
- Deploy on prem, cloud, Docker, anywhere you have Windows
- Open source is great, amazing features and support when you need commercial editions





FOSS vs Chocolatey for Business (C4B)



- **Chocolatey open source (FOSS) == package management**
 - Works well in organizational use
 - Build your own world
- **C4B == complete software management**
 - Smoother experience
 - Builds on top of FOSS
 - Better system integration, endpoint management, etc
 - Better visual interfaces (GUIs)
 - Features geared specifically towards organizational use





Command Line / Chocolatey GUI

```
PS C:\packages> choco install git.install --source . -y
chocolatey 0.9.10-beta1-426-g3c8b16e Business
Installing the following packages:
git.install
By installing you accept licenses for the packages.

git.install v2.8.4
Loading 'chocolatey.licensed' extension.
Copying git.install
  from 'C:\ProgramData\chocolatey\lib\git.install\tools\files\Git-2.8.4-64-bit.exe'
Virus checking skipped/turned off. Not verifying 'Git-2.8.4-64-bit.exe'
Installing Git-2.8.4-64-bit.exe...

Git-2.8.4-64-bit.exe has been installed.
WARNING: Git installed - You may need to close and reopen your shell for PATH change
          to take effect.
Environment vars (like PATH) have changed. Close/reopen your shell to
see the changes (or in powershell/cmd.exe just type 'refreshenv').
The install of git.install was successful.
Software installed to 'C:\Program Files\Git'

Chocolatey installed 1/1 package(s). 0 package(s) failed.
See the log for details (C:\ProgramData\chocolatey\logs\chocolatey.log).
PS C:\packages> git
git : The term 'git' is not recognized as the name of a cmdlet, function, script
file, or operable program. Check the spelling of the name, or if a path was
included, verify that the path is correct and try again.
At line:1 char:1
+ git
+ ~~~~ CategoryInfo          : ObjectNotFound: (git:String) [], CommandNotFoundException
+ FullyQualifiedErrorId : CommandNotFoundException

PS C:\packages> refreshenv
Refreshing environment variables from the registry...
Finished
PS C:\packages> git
usage: git [--version] [--help] [-C <path>] [-c name=value]
          [--exec-path=<path>] [--html-path] [--man-path] [--info-path]
```

- 7+ Years Old
- Familiar tool name command UX
- PowerShell tab completion!

The screenshot shows the Chocolatey GUI interface. On the left, the 'Settings' window is open, displaying options like 'Show Console Output' (On), 'checksumFiles' (On), 'autoUninstaller' (On), 'allowGlobalConfig' (Off), and 'failOnAutoUninstall' (Off). On the right, the main application window displays a grid of installed packages. Packages shown include Chocolatey (0.10.8), Flash Player Plugin (27.0.0.183), Google Chrome (62.0.3202.75), Adobe Reader DC (2015.007.20033.02), Java SE Runtime Enviro... (8.0.151), Mozilla Firefox (56.0.2), Flash Player ActiveX (27.0.0.183), WinRAR (5.50), Adobe AIR Runtime (27.0.0.124), 7-Zip (Install) (16.4.0.20170506), and Java Runtime (JRE) (8.0.151). Some packages like Flash Player ActiveX and 7-Zip are marked as 'out-of-date'. A search bar at the top right allows filtering by package name, version, and status.

- GUI is great for non-technical users (big, clickable icons!)
- Self-Service Management (C4B) for non-admins



Chocolatey Central Management (C4B)

The screenshot displays two main views of the Chocolatey Central Management application.

Left View (Computers): Shows a list of managed computers. The table includes columns for Name, Friendly Name, IP Address, and Last check in date time. The list contains numerous entries, mostly starting with 'i-' followed by a unique identifier and ending with a timestamp like '10/22/2018'.

Name	Friendly Name	IP Address	Last check in date time
ccmserver		172.30.0.232	10/18/2018
i-0903275e0ef62e0f98		172.30.0.160	10/21/2018
i-03b067693ecbd0e002		172.30.0.50	10/22/2018
i-025db246406f20fb1		172.30.0.135	10/22/2018
i-095d02cd882d0e0fe		172.30.0.182	10/19/2018
i-034f27f14fd98bf7		172.30.0.252	10/22/2018
i-0c193c0f241de030b		172.30.0.177	10/22/2018
i-0cb4c4973dc1c386		172.30.0.33	10/22/2018
i-03350bc2a40f6c285		172.30.0.98	10/22/2018
i-080397fb04d3ebbd		172.30.0.151	10/22/2018
i-039f2e23e09df9b42		172.30.0.227	10/22/2018
i-0354e0e70e686099		172.30.0.241	10/22/2018
i-04627f9cab03076		172.30.0.20	10/22/2018
i-0b3800d3340ce10b		172.30.0.27	10/18/2018
i-0bafe7e249aa807ae		172.30.0.121	10/21/2018
i-00a7813cde2aac81		172.30.0.245	10/22/2018
i-030bb69691554d72d		172.30.0.118	10/22/2018
i-08bd49df2d099388		172.30.0.125	10/21/2018
i-045973c7cbfd38f7		172.30.0.102	10/22/2018
i-08bccb1634e0bb8		172.30.0.64	10/22/2018
i-03f6a0ae072996754		172.30.0.103	10/22/2018

Right View (Computer Details): Shows detailed information for a selected computer named 'i-0b0fe7e249aa807ae'. It displays the friendly name (''), IP address ('172.30.0.121'), and last check-in date ('10/21/2018'). Below this, it lists the installed software packages:

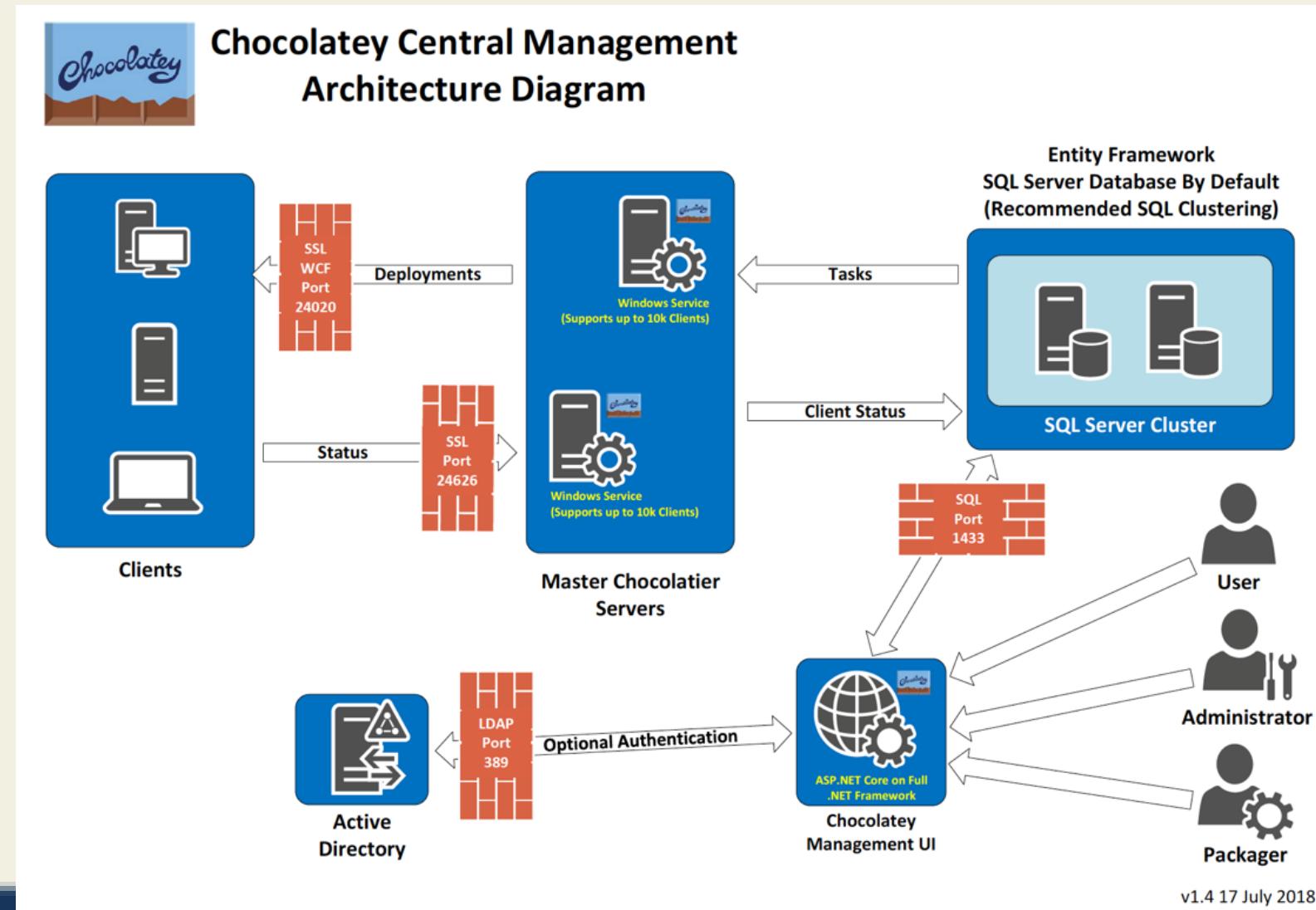
Is outdated	Name	Package Id	Package Version
Yes	1Password (Install)	1password	4.6.0.598
No	7-Zip (Install)	7-zip	18.1.0
No	BareTail	baretail	3.50.20120226
No	Charles (install)	charles	4.2.6.3
No	Chocolatey	chocolatey	0.10.12-beta-20181011
No	Chocolatey Licensed Extension	chocolatey.extension	2.0.0-beta-20181009
No	Chocolatey Agent Service (Install)	chocolatey-agent	0.9.0-beta-20181009
No	Chocolatey Core Extensions	chocolatey-core.extension	13.3
No	Chocolatey GUI	ChocolateyGUI	0.16.0
No	Dot Net 4.5.2	DotNet4.5.2	4.5.2.20140902
No	Git	git	2.18.0
No	Git (install)	git.install	2.18.0
No	Launchy	launchy	2.5.0.20140301
No	NotePad++	notepadplusplus	7.5.8

- See reports / information across the org
- Modules / plugins coming
- Deployments





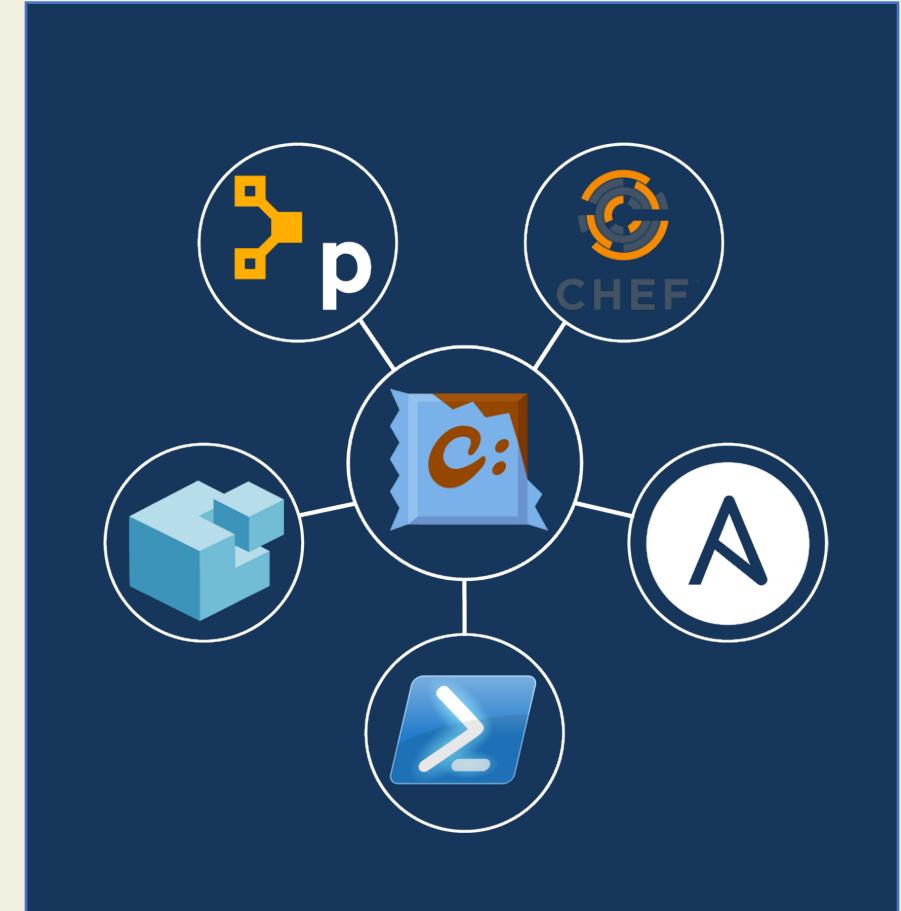
Central Management Architecture (C4B)





Integrates with Everything

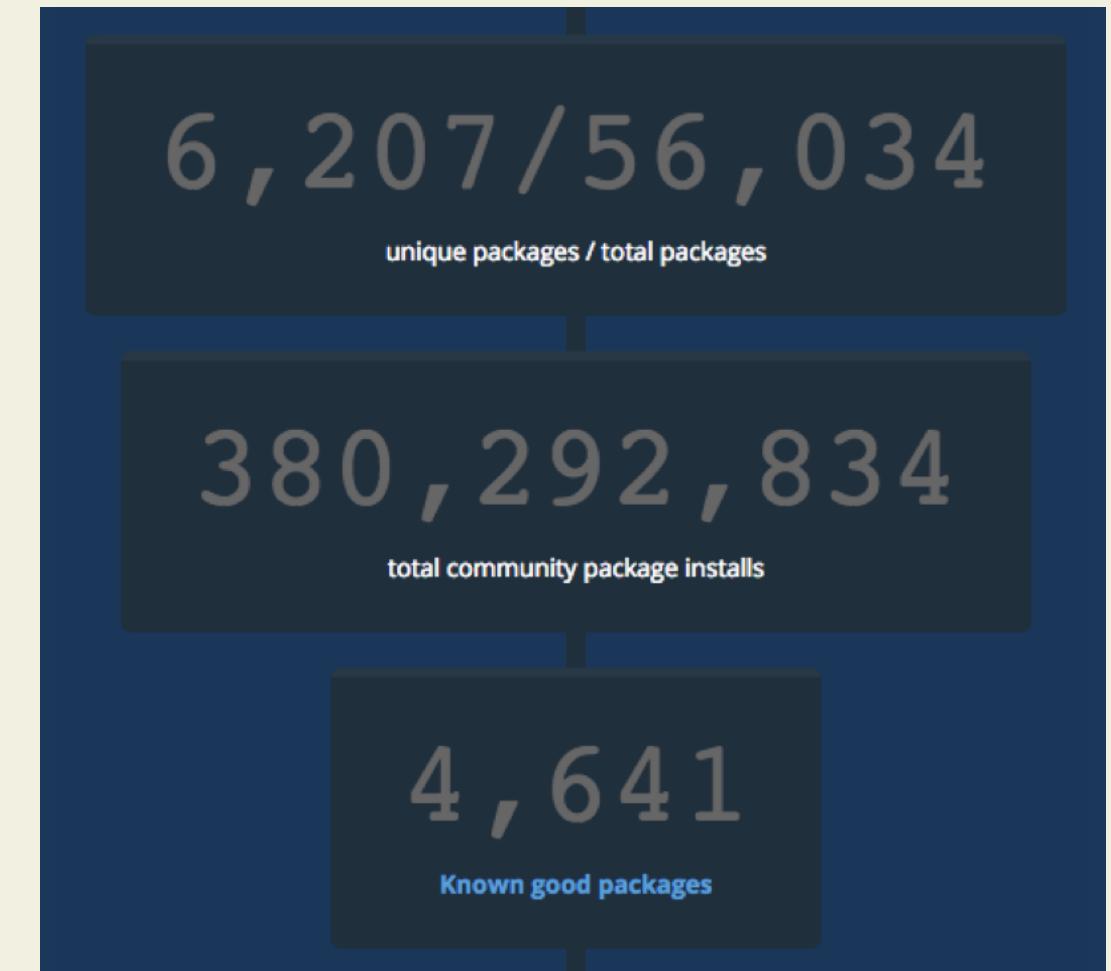
- <https://chocolatey.org/docs/features-infrastructure-automation>
- **Tight - provider-based**
 - Chef (built-in), cookbook
 - Puppet
 - PowerShell DSC
 - Ansible
 - Saltstack
- **Script-based**
 - Octopus Deploy
 - Boxstarter
 - SCCM
 - RMM, or really anything that can run scripts





Community Package Repository

- <https://chocolatey.org/packages>
- Community Feed / Community Maintained
- Moderated as of October 2014
- Everything goes through VirusTotal
- **Organizations Should Avoid**
 - **Not Fully Reliable - public repo means subject to distribution rights (download CDN cache feature helps)**
 - **Trust and Control**





Package Internalizer (C4B) - “Convert existing packages to 100% offline and reliable”

- Take advantage of existing packages without dependency on the internet
- Downloads existing package and all remote resources
- Recompiles package to use those internal resources
- Option to download and point to other locations
- Ability to host packages on private internal repositories
- Visual Interface coming

```
PS C:\packages\createpackages> choco download visualstudio2017enterprise --internalize
Chocolatey v0.10.8 Business
Downloading existing package(s) to C:\packages\createpackages\download
Progress: Downloading chocolatey-visualstudio.extension 1.4.1... 100%
Progress: Downloading visualstudio2017enterprise 15.2.26430.20170605... 100%
Progress: Downloading KB3033929 1.0.3... 100%
Progress: Downloading chocolatey-windowsupdate.extension 1.0.2... 100%
Progress: Downloading KB3035131 1.0.1... 100%
Progress: Downloading KB2919355 1.0.20160915... 100%
Progress: Downloading KB2919442 1.0.20160915... 100%
Progress: Downloading KB2999226 1.0.20170509... 100%
Progress: Downloading DotNet4.6.1 4.6.01055.20170308... 100%
Progress: Downloading visualstudio2017-installer 1.0.0... 100%

KB3035131 v1.0.1 [Approved]
Automatic recompile may not be necessary.
The package either uses incompatible methods (currently) or there is
no call for a download. Inspect the chocolateyInstall.ps1 at
'c:\packages\createpackages\download\KB3035131\Tools\ChocolateyInstall.ps1' to be sure.
If you determine things are good, use the nupkg as is at
'C:\packages\createpackages\KB3035131.1.0.1.nupkg'

KB3033929 v1.0.3 [Approved]
Automatic recompile may not be necessary.
The package either uses incompatible methods (currently) or there is
no call for a download. Inspect the chocolateyInstall.ps1 at
'c:\packages\createpackages\download\KB3033929\Tools\ChocolateyInstall.ps1' to be sure.
If you determine things are good, use the nupkg as is at
'C:\packages\createpackages\KB3033929.1.0.3.nupkg'

KB2919442 v1.0_20160915 [Approved]
Found Install-ChocolateyPackage. Inspecting values for remote resources.
Found 'https://download.microsoft.com/download/9/D/A/9DA6C939-9E65-4681-BBBE-A8F73A5C
116E/Windows8.1-KB2919442-x86.msu' for replacement
```



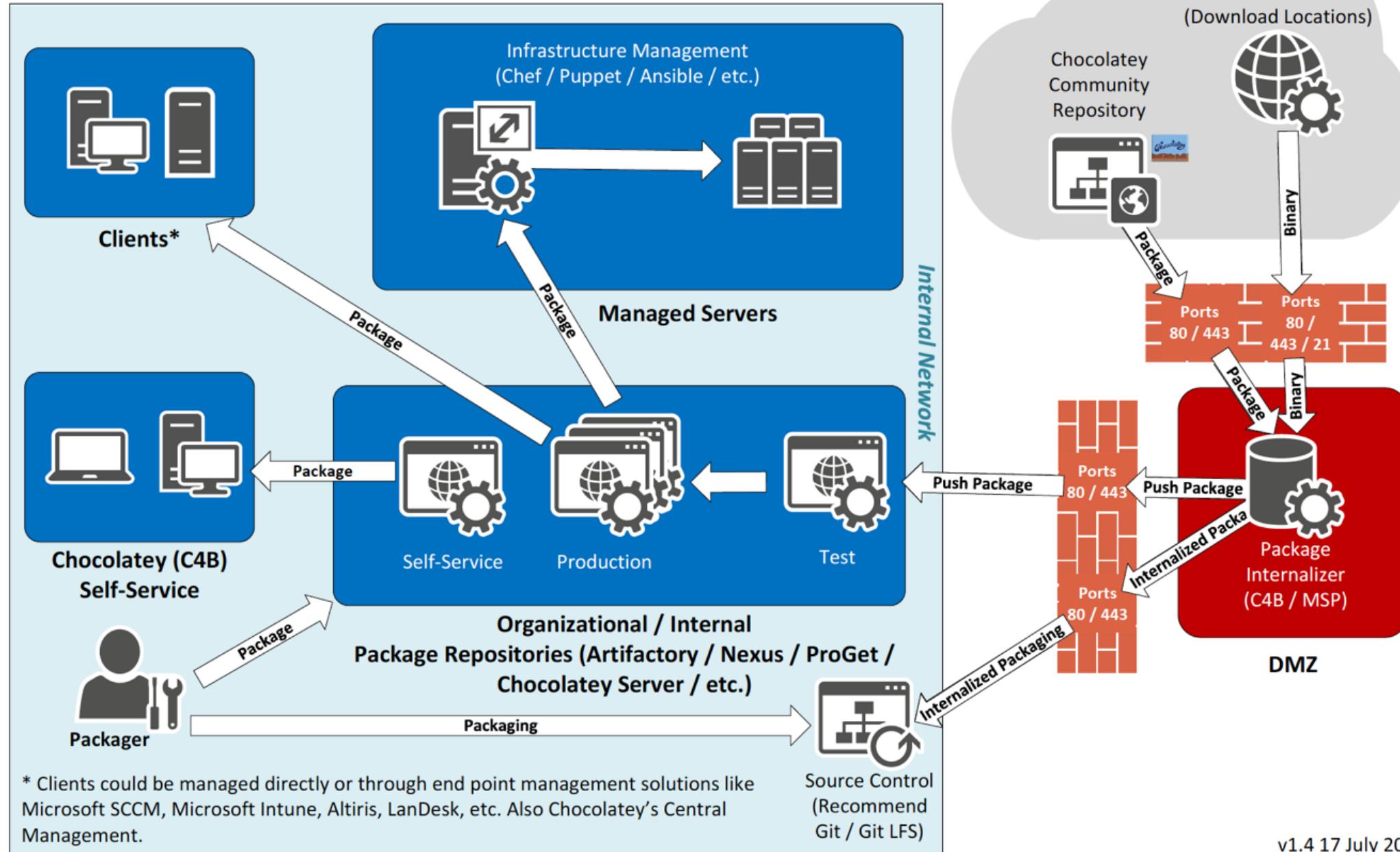


Organizational Architecture





Chocolatey Architecture Diagram





Hosting Your Own Package Server

- <https://chocolatey.org/docs/how-to-host-feed>
- Artifactory Pro  (cross-platform)
- Sonatype Nexus  (cross-platform)
- Inedo's ProGet 
- MyGet  (hosted)
- Chocolatey.Server
- NuGet.Server / NuGet Gallery proper 
- Visual Studio Team Services (v2 endpoints) / TFS
- File Share (DFS, CIFS, SMB) / SCCM Distribution points

Commercial options:

- Web Interface
- One Install / Multiple repositories
- Multiple repository types, not just NuGet/Chocolatey





Reporting / Auditing





Inventory - Comprehensive Software Audit

```
PS C:\> choco list -lo --include-programs
1password 4.6.0.603
chocolatey 0.9.10.3
chocolatey.extension 1.4.0
chocolatey.server 0.1.1
DotNet4.0 4.0.30319.20141222
git 2.7.0.0
GoogleChrome 51.0.2704.106
roundhouse 0.8.5.0
8 packages installed.

7-zip 9.22 (x64 edition)|9.22.00.0
Bitvise SSH Server 5.60 (remove only)|
ChocolateyGUI 0.13.2.0|0.13.2.0
Launchy 2.5|
Notepad++|6.4.2
Oracle VM VirtualBox Guest Additions 4.3.12|4.3.12.0
Puppet (64-bit)|3.8.3
7 applications not managed with chocolatey.
```

Computer Details Additional information about selected Computer

Name: i-0b0fe7e249aa807ae

Friendly Name: IP Address: 172.30.0.121

Last check in date/time: 10/21/2018

Computer currently has the following software installed on it:

Is outdated	Name	Package Id	Package Version
Yes	1Password (Install)	1password	4.6.0.598
No	7-Zip (Install)	7-zip	18.1.0.0

- Exclusive to Chocolatey - Visibility beyond just the software 'installed' in Programs & Features
- Track versions of zip archives & own internal software that is not visible in system installation.
- Get a complete view of your systems. Chocolatey reports applications in systems not directly under its management.
- Package Audit (C4B) adds who, when, and history

```
PS C:\packages\createpackages> choco list -lo --audit -r
1password|4.6.0.598|User:vagrant|Domain:WIN2012R2X64|Original User:vagrant|InstallDateUtc:2017-07-09 16:53:17Z
7zip|16.02.0.20160811
baretail|3.50.0.20120226
```





Package Synchronizer (C4B) - Choco Sync Command

```
PS C:\> choco sync -r
Package Id|Display Name|Version|New Package
7zip|7-Zip 16.02 (x64)|16.2|False
oracle-vm-virtualbox-guest-additions|Oracle V
12.0|True
bitvise-ssh-server|Bitvise SSH Server 5.60 (r
PS C:\>
```

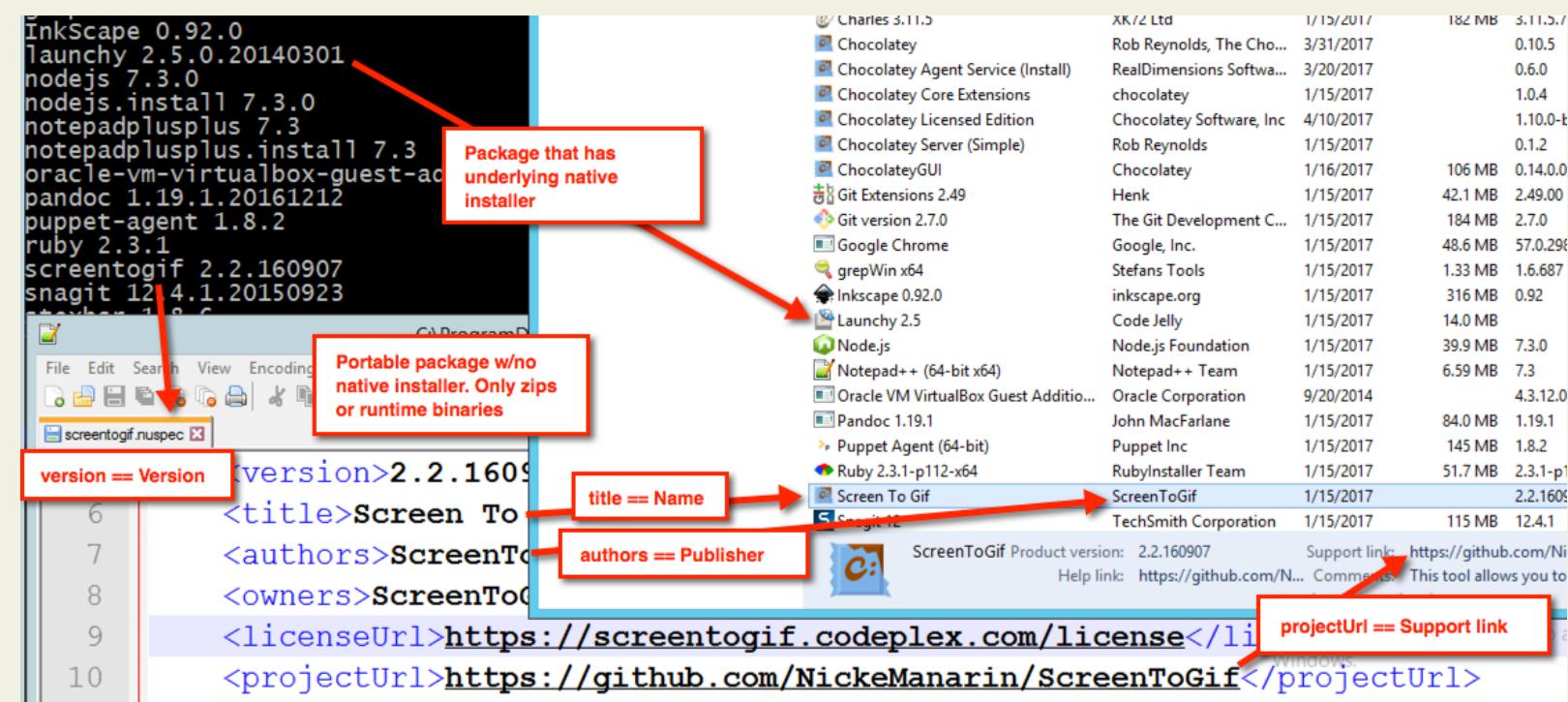
- Brings all software in Programs and Features under Chocolatey management
- Generates packaging and baselines to Chocolatey install
- Provides packaging code to take back to source control





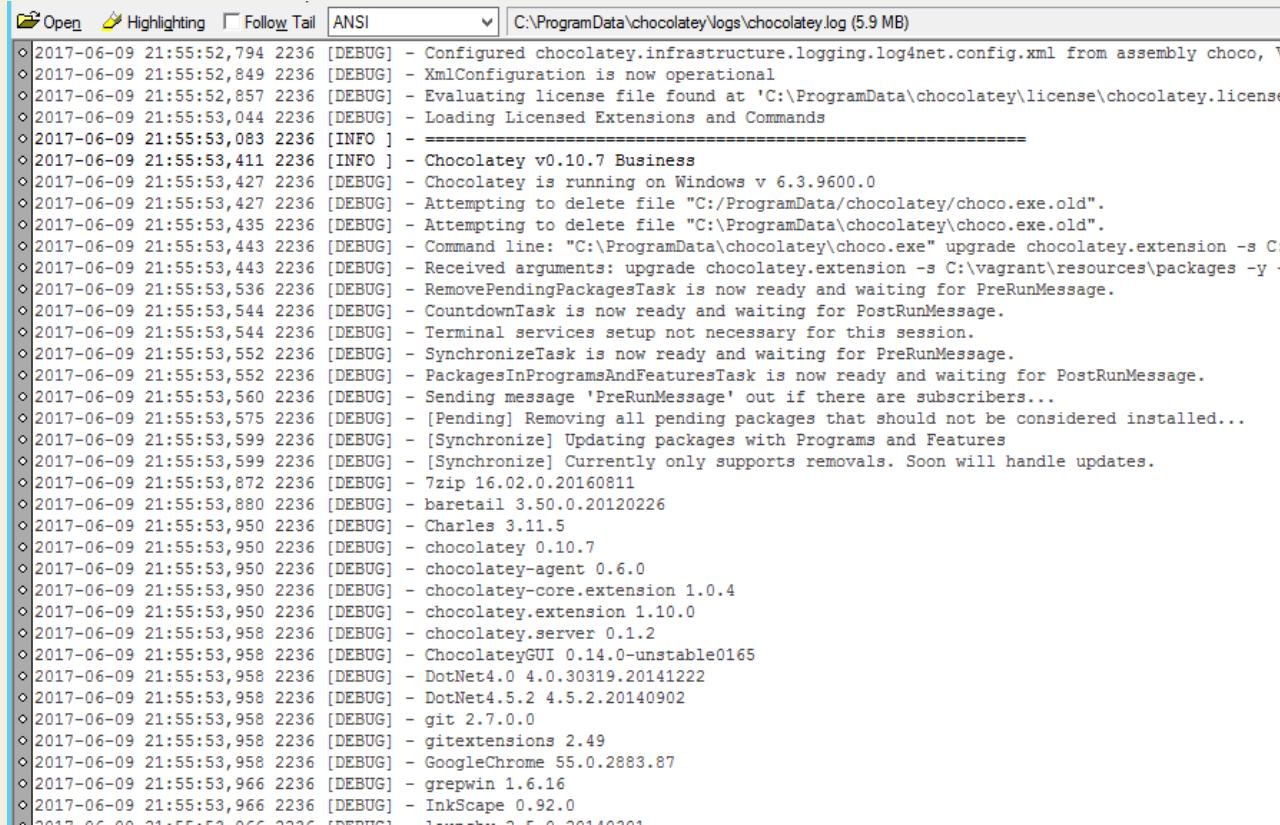
Package Synchronizer (C4B) - All Packages in Programs and Features

- Programs and Features represents only 50-80% of the software on a machine
- Chocolatey brings managed entries for non-installer packages
- Supporting legacy inventory reporting systems is now a snap
- Do not need to build MSIs / Installers for internal use just to support legacy reporting





Logging - Detailed Reporting



A screenshot of a log file viewer window titled "C:\ProgramData\chocolatey\logs\chocolatey.log (5.9 MB)". The window shows a list of log entries from June 9, 2017, at 21:55:52. The log entries are in ANSI format and detail the configuration and execution of Chocolatey scripts. Key entries include:

- [DEBUG] - Configured chocolatey.infrastructure.logging.log4net.config.xml from assembly choco, Version 0.10.7.0
- [DEBUG] - XmlConfiguration is now operational
- [DEBUG] - Evaluating license file found at 'C:\ProgramData\chocolatey\license\chocolatey.license'
- [DEBUG] - Loading Licensed Extensions and Commands
- [INFO] - =====
- [INFO] - Chocolatey v0.10.7 Business
- [DEBUG] - Chocolatey is running on Windows v 6.3.9600.0
- [DEBUG] - Attempting to delete file "C:/ProgramData/chocolatey/choco.exe.old".
- [DEBUG] - Attempting to delete file "C:\ProgramData\chocolatey\choco.exe.old".
- [DEBUG] - Command line: "C:\ProgramData\chocolatey\choco.exe" upgrade chocolatey.extension -s C:\vagrant\resources\packages -y -f
- [DEBUG] - Received arguments: upgrade chocolatey.extension -s C:\vagrant\resources\packages -y -f
- [DEBUG] - RemovePendingPackagesTask is now ready and waiting for PreRunMessage.
- [DEBUG] - CountdownTask is now ready and waiting for PostRunMessage.
- [DEBUG] - Terminal services setup not necessary for this session.
- [DEBUG] - SynchronizeTask is now ready and waiting for PreRunMessage.
- [DEBUG] - PackagesInProgramsAndFeaturesTask is now ready and waiting for PostRunMessage.
- [DEBUG] - Sending message 'PreRunMessage' out if there are subscribers...
- [DEBUG] - [Pending] Removing all pending packages that should not be considered installed...
- [DEBUG] - [Synchronize] Updating packages with Programs and Features
- [DEBUG] - [Synchronize] Currently only supports removals. Soon will handle updates.
- [DEBUG] - 7zip 16.02.0.20160811
- [DEBUG] - baretail 3.50.0.20120226
- [DEBUG] - Charles 3.11.5
- [DEBUG] - chocolatey 0.10.7
- [DEBUG] - chocolatey-agent 0.6.0
- [DEBUG] - chocolatey-core.extension 1.0.4
- [DEBUG] - chocolatey.extension 1.10.0
- [DEBUG] - chocolatey.server 0.1.2
- [DEBUG] - ChocolateyGUI 0.14.0-unstable0165
- [DEBUG] - DotNet4.0 4.0.30319.20141222
- [DEBUG] - DotNet4.5.2 4.5.2.20140902
- [DEBUG] - git 2.7.0.0
- [DEBUG] - gitextensions 2.49
- [DEBUG] - GoogleChrome 55.0.2883.87
- [DEBUG] - grepwin 1.6.16
- [DEBUG] - InkScape 0.92.0

- Log file captures very detailed information - environment and state
- Reduces rollback / recreation necessity





Compliance – Audit Out of Date Software

```
PS C:\> choco outdated
Chocolatey v0.10.8 Business
Outdated Packages
  Output is package name | current version | available version | pinned?
```

```
bitvise-ssh-server|5.60.0|7.34|false
chocolatey-agent|0.8.0|0.8.1|false
chocolatey-core.extension|1.3.1|1.3.3|false
chocolatey.extension|1.12.5|1.12.8|false
git|2.7.0.0|2.15.0|false
GoogleChrome|60.0.3112.113|62.0.3202.75|false
nodejs|8.4.0|9.0.0|false
nodejs.install|8.4.0|9.0.0|false
oracle-vm-virtualbox-guest-additions|4.3.12.0|4.3.12.0|false
ruby|2.4.
```

The screenshot shows the Chocolatey web application interface. The left sidebar has navigation links: Computers, Software (which is selected), and Administration. The main content area is titled "Software" and shows a search bar with placeholder text "Search...". Below the search bar is a table with columns: "Is outdated", "Name", and "Package Id". The table contains five rows, each with a red "Yes" button under "Is outdated". The rows are: Microsoft Visual C++ Redistributable for Visual St... (vcredist40), 1Password (Install) (1password), Charles (Install) (charles), 7-Zip (Install) (7-zip), and 1Password (Install) (1password).

Is outdated	Name	Package Id
Yes	Microsoft Visual C++ Redistributable for Visual St...	vcredist40
Yes	1Password (Install)	1password
No	Charles (Install)	charles
No	7-Zip (Install)	7-zip
No	1Password (Install)	1password

- choco outdated
- Comprehensive reporting on available upgrades
- See what will upgrade on next maintenance window
- Pinned items won't upgrade until pin is remove





Creating Software Deployment “Packages”





Chocolatey Packages

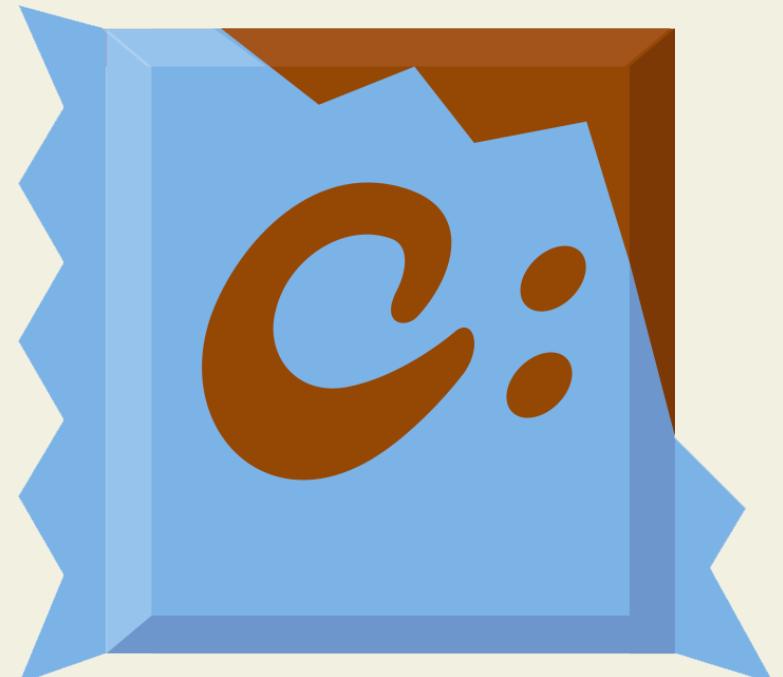
- Terminology: "Package" is nupkg file, "Software" is binaries or installers
- Zip files + Versioning, Dependencies & PowerShell
- Metadata - Software Information / Package Information
- PowerShell - <https://chocolatey.org/docs/helpers-reference>
 - 30+ Built-in functions - complex tasks become 1 liners
 - Handle additional missing installer logic (like add to PATH)
 - Add options missing from installer arguments
- Files - drop in binaries, native installers





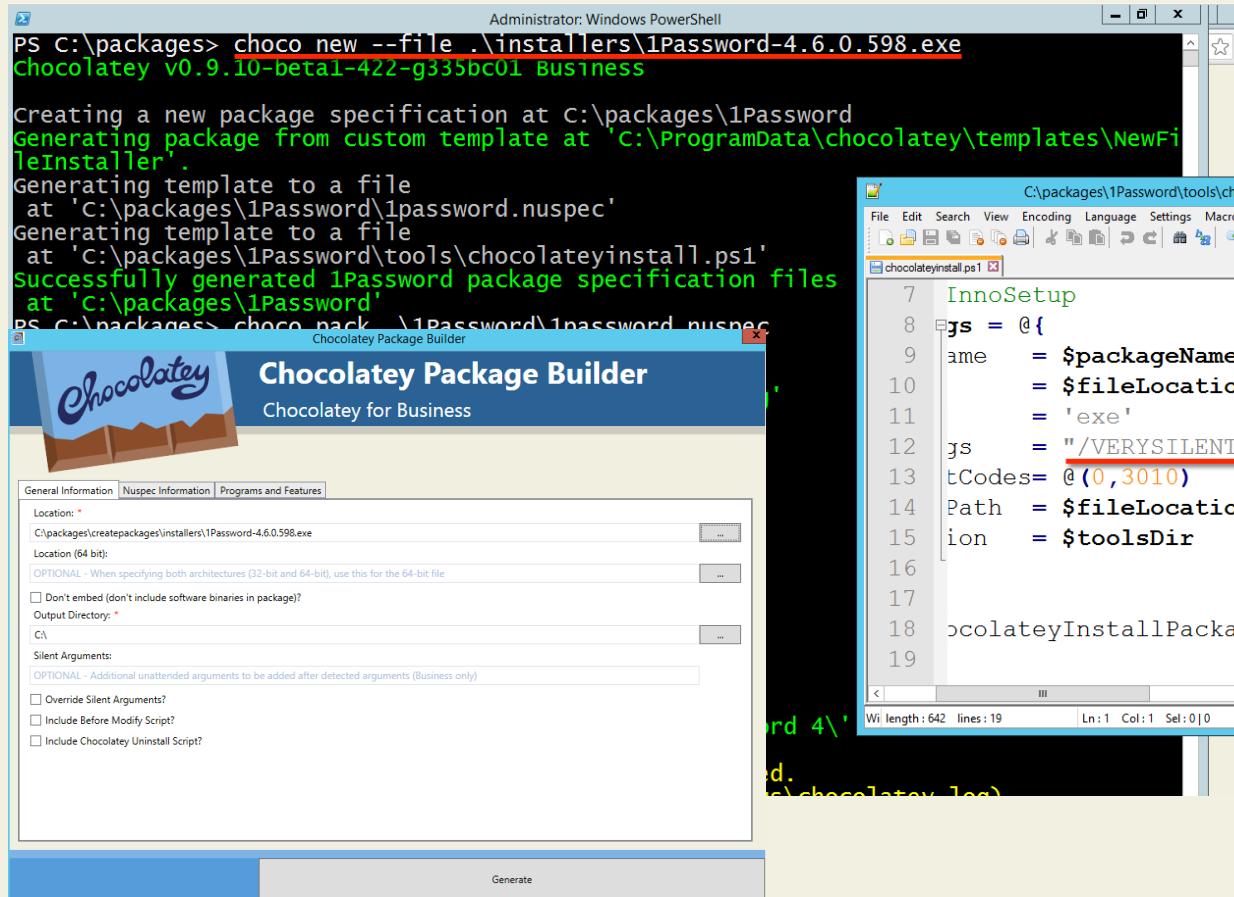
Creating Packages

- <https://chocolatey.org/docs/create-packages>
- choco new
 - Generates package files with most of the work done
 - Create your own packaging templates!





Package Builder (C4B) - “Generate software deployment packages in seconds”



- Package Builder automatically creates high quality packaging from an installer/zip in 5-10 seconds
- Determines everything necessary for silently installing software for 70% of installers out there
- Supports passing urls (and checksums) - downloads files first
- Allows customization
- Supports exe, msi, 7z, zip, msu, and msp files





Package Synchronizer (Licensed) - Auto Sync

- Chocolatey maintains state based on packages. System state can be manipulated outside of Chocolatey
- Any Chocolatey command will trigger synchronization in licensed editions of Chocolatey
- Package Synchronizer syncs with manual software removal
- Syncs w/software that automatically upgrades, such as Chrome

```
PS C:\> choco list -lo
Chocolatey v0.10.8 Business
[Syncronize] Removing grepwin package - it has been uninstalled outside of Chocolatey.
7zip 16.4.0.20170506
7zip.install 16.4.0.20170506
baretail 3.50.0.20120226
bitvise-ssh-server 5.60.0
Charles 3.11.5
chocolatey 0.10.8
chocolatey-agent 0.8.0
chocolatey-core.extension 1.3.1
chocolatey.extension 1.12.5
chocolatey.server 0.1.3
chocolateygui 0.16.0-unstable0074
DotNet4.0 4.0.30319.20141222
DotNet4.5.2 4.5.2.20140902
git 2.7.0.0
gitextensions 2.50.01
```





Other Features

- <https://chocolatey.org/docs/release-notes>
- Internal sources (like ProGet)
- *choco upgrade all* - Windows update for your 3rd party and internal software
- Shimming - like symlinks but better
- Pass install arguments directly through to installer (append or override package args)
- Package Parameters to adjust logic in packages
- Handles locking on upgrades in package folders
- Great reference docs - <https://chocolatey.org/docs/commands-reference> & <https://chocolatey.org/docs/helpers-reference>
- Excellent open source support community
- 30+ built-in PowerShell Functions
- Extend functionality with your own PowerShell Modules
- Custom Package Templates
- Can manage anything on Windows





Other Features (C4B)

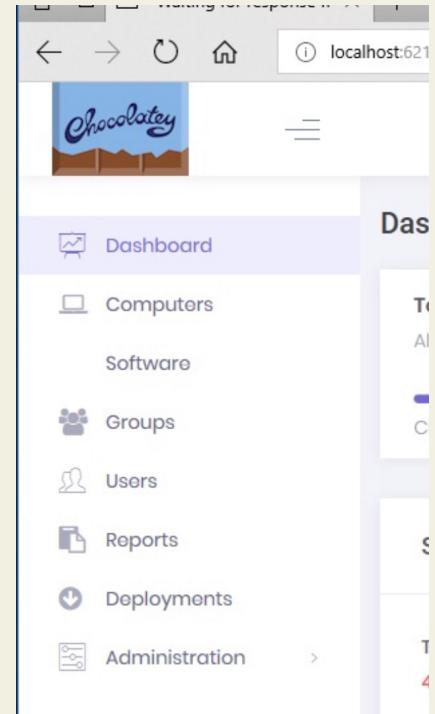
- <https://chocolatey.org/docs/release-notes-licensed>
- Auto-uninstaller more effective - uninstaller detection / Package Synchronizer
- Install/upgrade keeping secrets out of logs
- Ubiquitous Install Directory Option
- More built-in PowerShell functions
- Uninstall non-Chocolatey managed software
- Direct Installer - install directly from exe/msi
- Package Throttle
- Runtime malware protection
- CDN Cache
- Professional Packaging Services
- Amazing expert support team - <https://chocolatey.org/support>





Chocolatey Roadmap

- <https://chocolatey.org/docs/roadmap> • More GUIs (C4B)
 - Authenticode / GPG Signing
 - Package Grid (C4B)
 - Deferred Installer (C4B)
 - Possible support on other platforms
- Central Management UI (C4B)
- Choco Deploy CLI (C4B)
- WSA / AppX / MSIx
- Package Enhancements
- Pack Validation





Chocolatey Fest 2019

- Dates: TBA
- Two Day
- City: Somewhere, USA
- <https://chocolateyfest.com>





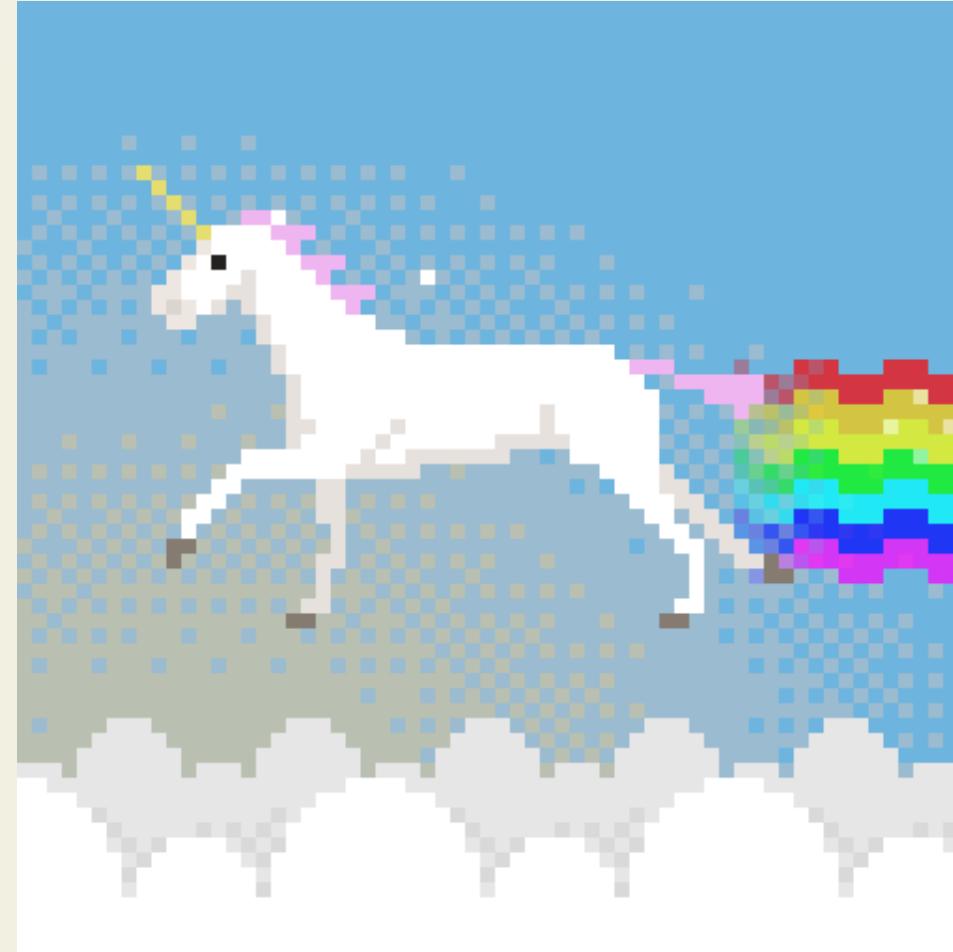
Demo





This is you







This is you on Chocolatey







Any Questions?





- Rob (@ferventcoder)
 - rob at chocolatey dot io



Evaluate Chocolatey for Business in your environment - discounts available conference attendees - reach out at <https://chocolatey.org/contact> for details

