Finding your naughty BITS

By

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Finding your naughty BITS

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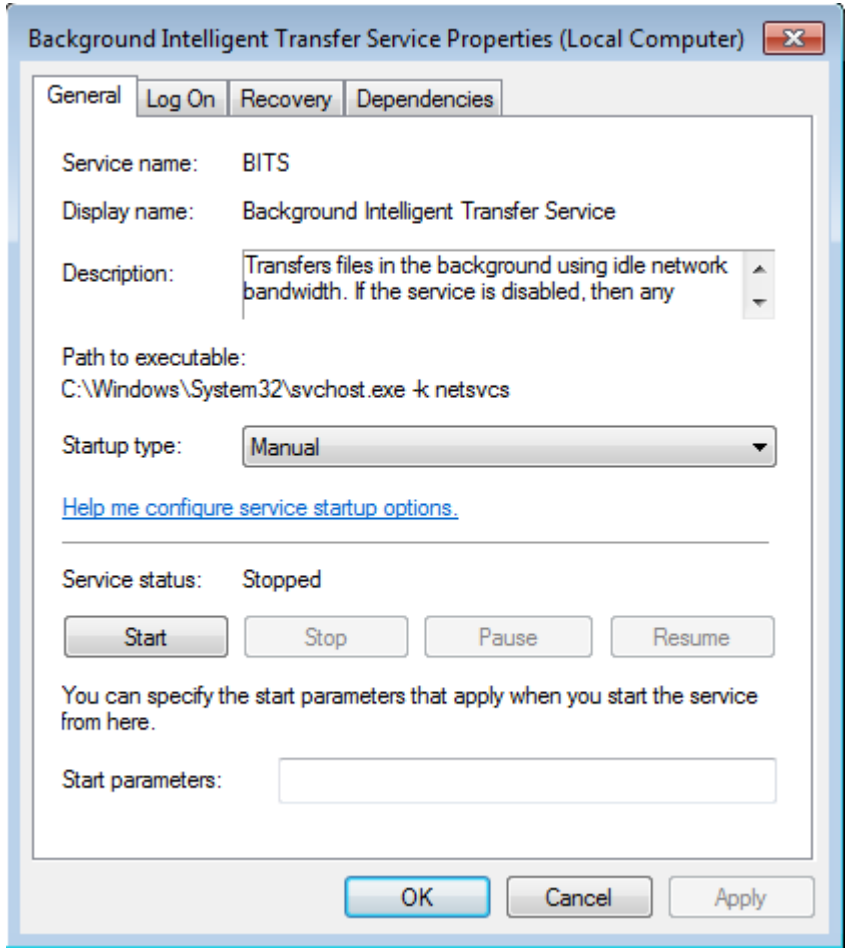
Dell SecureWorks

Might not be the bits you are thinking of …

- The other BITS – Background Intelligent Transfer Service
- Native Windows service
- Publishes an API with a remarkably rich feature set
  - Some capabilities aren't widely known
  - Increasingly* leveraged by intruders and malware
- We will look at:
  - How and why it is being abused
  - Capability to detect and investigate
- Set in context of intrusions trends and tactics

Do I even have BITS ?

- If you use Windows, the answer is yes
- Used by the Windows update mechanism
- Leveraged by a raft of third-party applications, from Adobe products to TechSmith's Camtasia



How do we know that BITS can be naughty?

- Malware samples that use the service for data transfers date back to early 2007
  http://arstechnica.com/information-technology/2007/05/malware-piggybacks-on-windows-background-intelligent-transfer-service/
- New samples keep popping up
  http://community.websense.com/blogs/securitylabs/archive/2015/01/30/new-f0xy-malware-employs-cunning-stealth-amp-trickery.aspx
- We see it used by operators in various intrusion groups – especially those groups that try to avoid deploying detectable tools

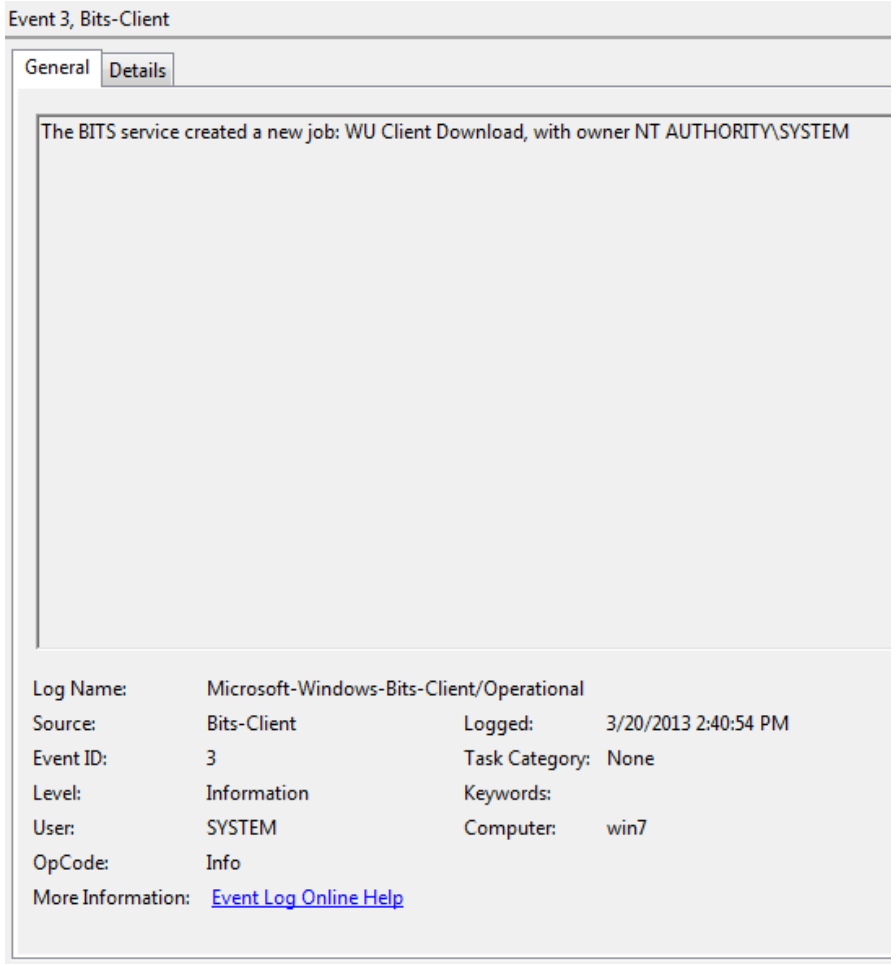
What can I even do with my BITS?

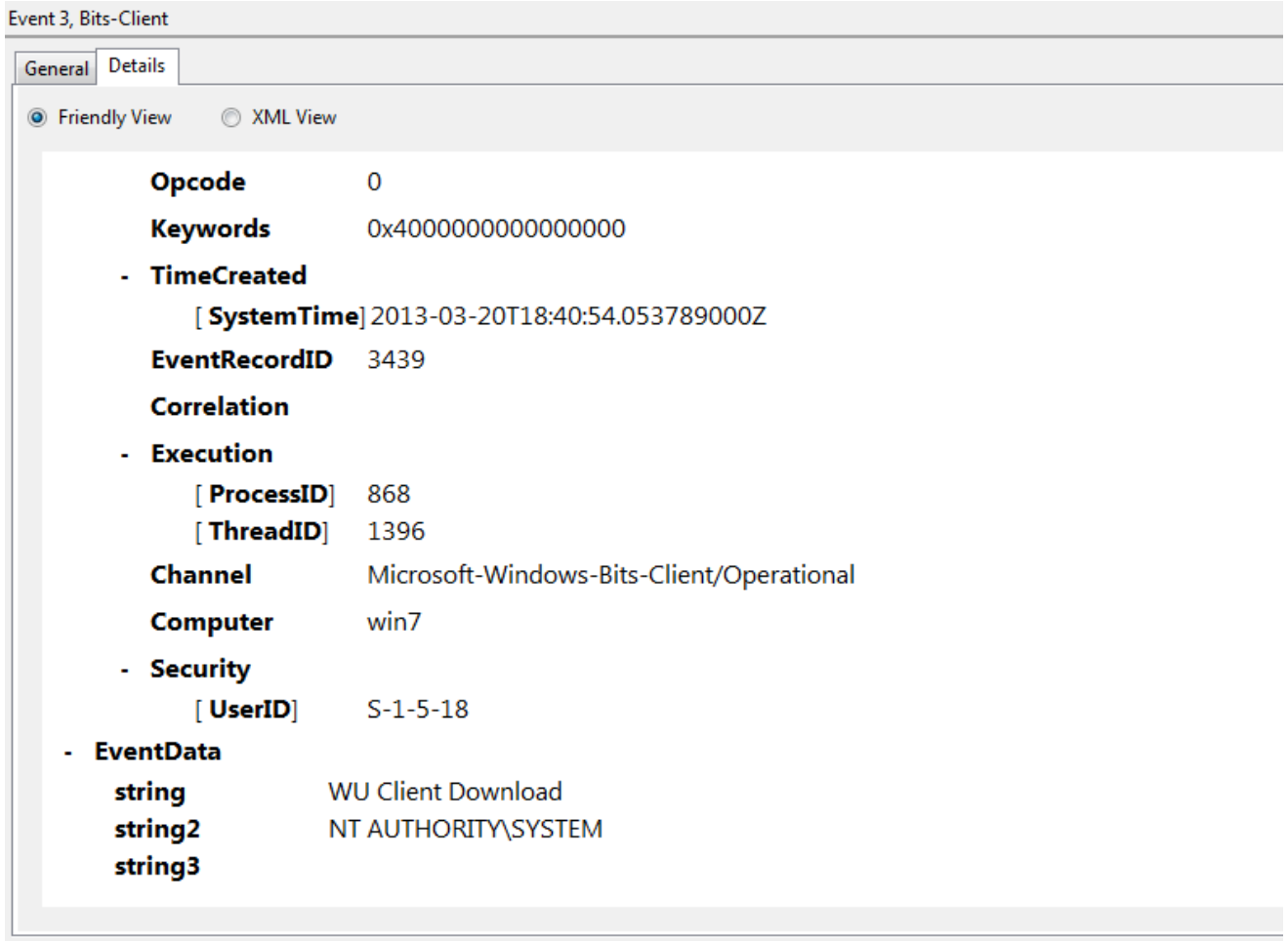
- retrieve files
- upload files
- bandwidth throttling
- smart retransmissions and maintenance of partial transfer state
  - configure retry period (default 10 min)
  - configure max lifetime of a job (default maximum is 90 days, but that can be extended) https://msdn.microsoft.com/en-us/library/aa362844%28v=vs.85%29.aspx
- associate a "policy" with a network connection so that data transfer only happens over certain networks
  - *like maybe those that don't have IDS or logging*
    https://msdn.microsoft.com/en-us/library/hh994437%28v=vs.85%29.aspx
- Trusted by host firewalls
- run arbitrary "notification" program with cmdline arguments after transfer completes
- in environments where this is configured – peer-to-peer transfers

Investigating your naughty BITS

- Not typically integrated into security auditing
- Still, this is a native Windows service, so logs should be helpful, right?

Job creation details are ... sparse





BITS will expose a lot about itself on a running system

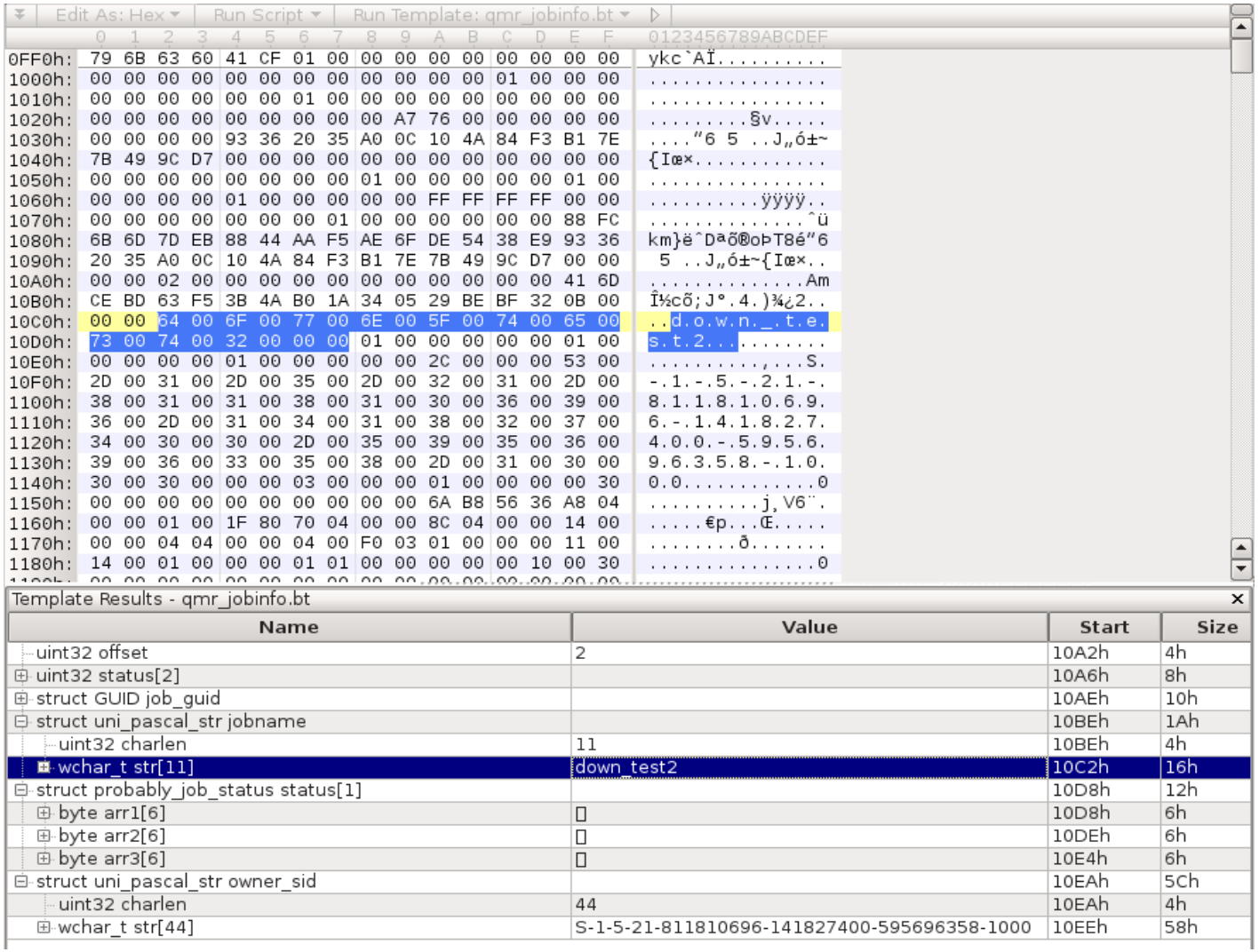
```
C:\Windows\system32>bitsadmin.exe /list /allusers /verbose

BITSADMIN version 3.0 [ 7.5.7601 ]
BITS administration utility.
(C) Copyright 2000-2006 Microsoft Corp.

BITSAdmin is deprecated and is not guaranteed to be available in future versions of Windows.
Administrative tools for the BITS service are now provided by BITS PowerShell cmdlets.

GUID: {FF1877AC-B4BB-463C-8EA1-DCFAC7F8D7F5} DISPLAY: 's'
TYPE: DOWNLOAD STATE: SUSPENDED OWNER: win7\user
PRIORITY: NORMAL FILES: 0 / 1 BYTES: 0 / UNKNOWN
CREATION TIME: 8/2/2015 6:07:24 PM MODIFICATION TIME: 8/2/2015 7:03:14 PM
COMPLETION TIME: UNKNOWN ACL FLAGS:
NOTIFY INTERFACE: UNREGISTERED NOTIFICATION FLAGS: 3
RETRY DELAY: 600 NO PROGRESS TIMEOUT: 1209600 ERROR COUNT: 0
PROXY USAGE: PRECONFIG PROXY LIST: NULL PROXY BYPASS LIST: NULL
DESCRIPTION:
JOB FILES:
        0 / UNKNOWN WORKING http://live.sysinternals.com/ZoomIt.exe -> C:\Users\user\Documents\tools\zoomit.exe
NOTIFICATION COMMAND LINE: 'C:\Users\user\Documents\tools\zoomit.exe'
owner MIC integrity level: HIGH
owner elevated ?           true

Peercaching flags
        Enable download from peers      :false
        Enable serving to peers         :false

CUSTOM HEADERS: NULL
```

Other ways to probe your BITS

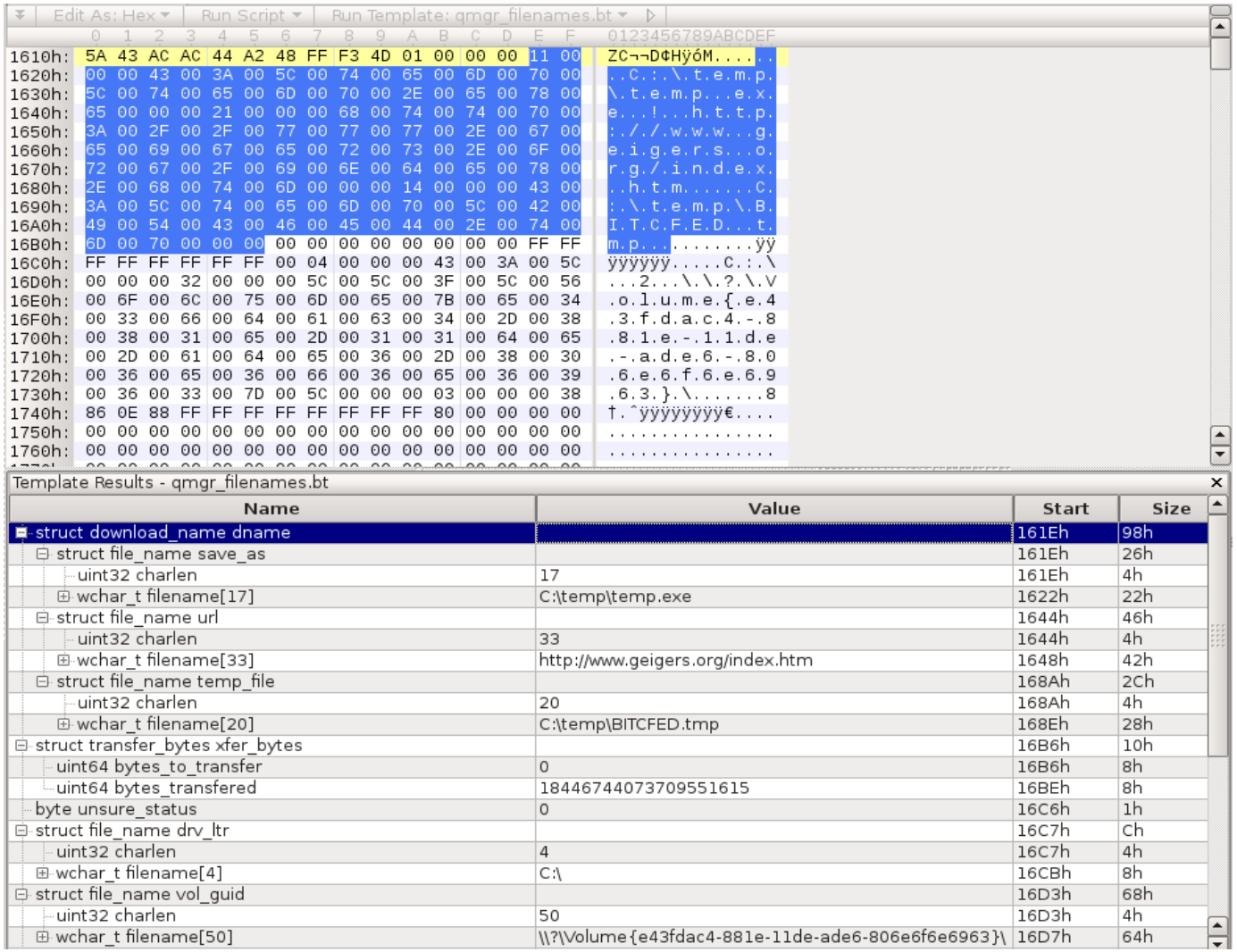
- So, if not in logs, how do we find out about pending jobs?
- Powershell BITS cmdlets or scripting BITSadmin queries
  - Can be more than a little messy at scale

- Dead systems, forensic images?
  - Behind the creation and maintenance of BITS jobs is the Queue Manager (QMGR) interface
  - Maintains an opaque, undocumented database that stores job specifications and state
  - Two files: %ALLUSERSPROFILE%\Microsoft\Network\Downloader\qmgr0.dat & qmgr1.dat

QMGR database – job information



QMGR database – file transfer information



Learning from your BITS

- BITS provides much more capability for abuse than file transfer
  - A biggie is the ability to house a long-deferred, "retrieve and execute" task
  - Task stored in BITS skirt detection by the tools and systems that DFIR practitioners typically use
  - Logging is not so great
- The BITS service is being incorporated into an ad hoc native "toolset" by intruders
  - Allows operating inside an environment without deploying tools that trigger traditional detections
  - Using the WMI facility for malware persistence or to remotely execute commands
  - At.exe for lateral movement
  - Many others
  - This approach has been dubbed “Living off the Land”
- Security controls haven’t fully adapted to this strategy and techniques
  - Need improved logging and visibility into these actions
  - Increase awareness among defenders, responders and forensic analysts
  - Make abuse of these facilities as detectable as the other tools in intruder toolkits

Last BITS

Coming soon (I hope)

https://github.com/macgeiger/bitsee

Further BITS references

BITSAdmin command reference
https://technet.microsoft.com/en-us/library/cc753856.aspx

BITS API documentation
https://msdn.microsoft.com/en-us/library/aa362820%28v=vs.85%29.aspx

Reversing a targeted trojan that uses BITS
http://datarescue.com/laboratory/trojan2008/index.html