# Analyzing Logon Failures in the Windows Security Log

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LOG & EVENT MANAGER

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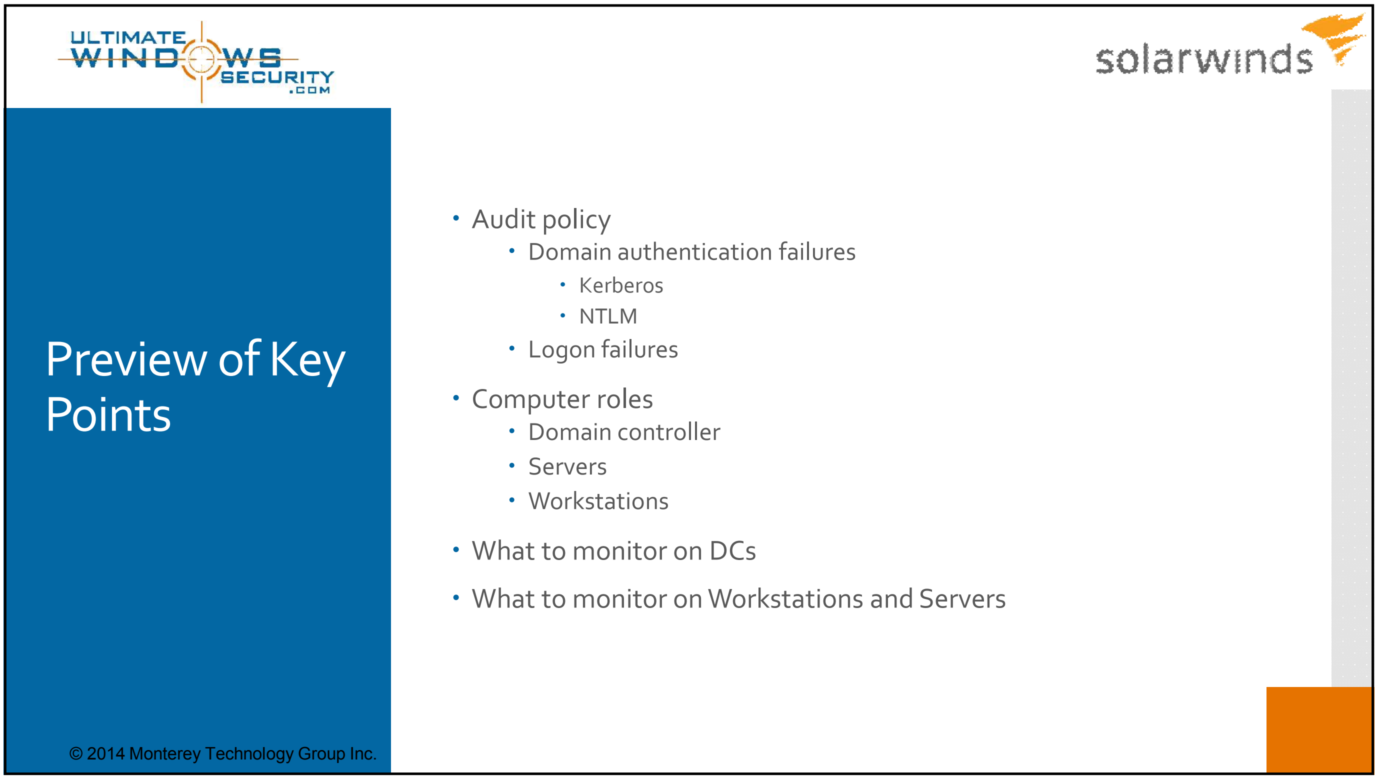
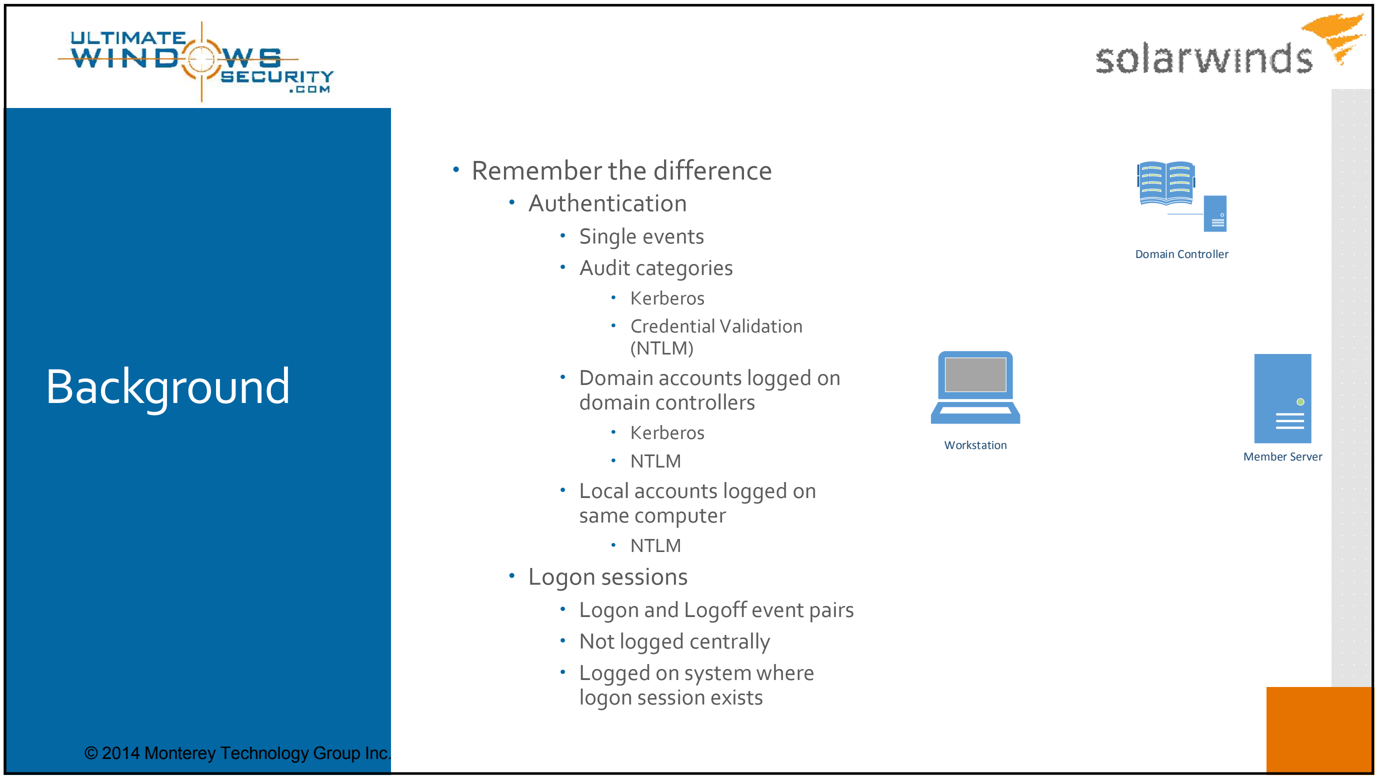


## Preview of Key Points

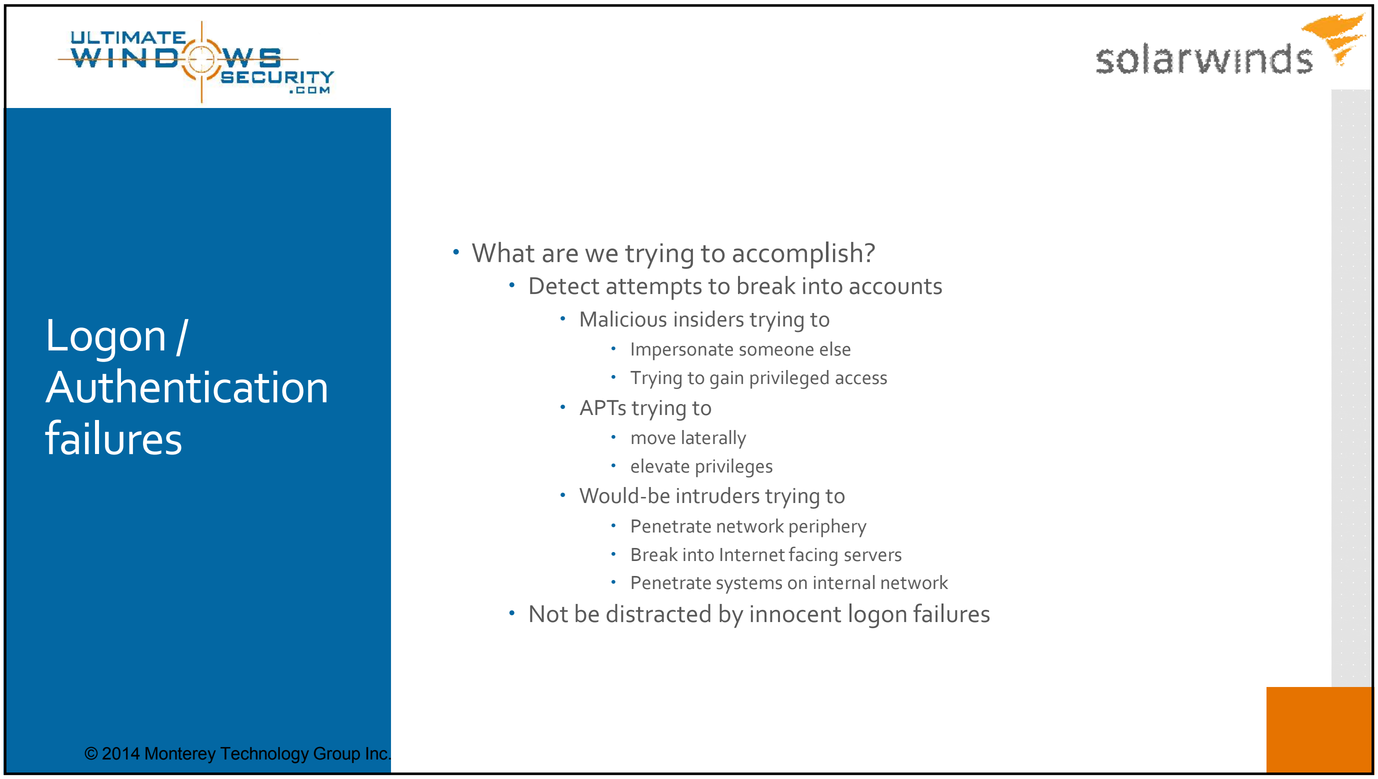
- Audit policy
  - Domain authentication failures
    - Kerberos
    - NTLM
  - Logon failures
- Computer roles
  - Domain controller
  - Servers
  - Workstations
- What to monitor on DCs
- What to monitor on Workstations and Servers



## Background

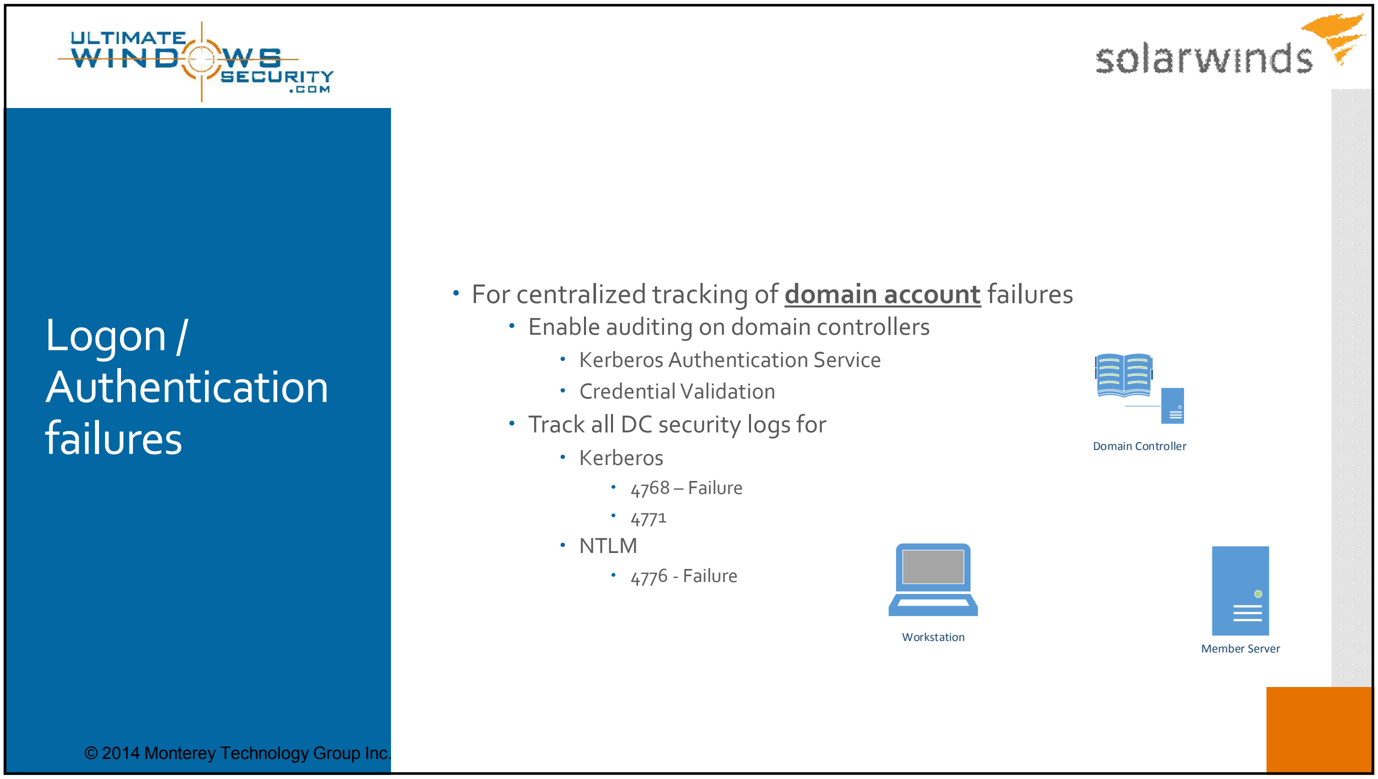
- Remember the difference
  - Authentication
    - Single events
    - Audit categories
      - Kerberos
      - Credential Validation (NTLM)
    - Domain accounts logged on domain controllers
      - Kerberos
      - NTLM
    - Local accounts logged on same computer
      - NTLM
  - Logon sessions
    - Logon and Logoff event pairs
    - Not logged centrally
    - Logged on system where logon session exists

Domain Controller
Workstation
Member Server



## Logon / Authentication failures

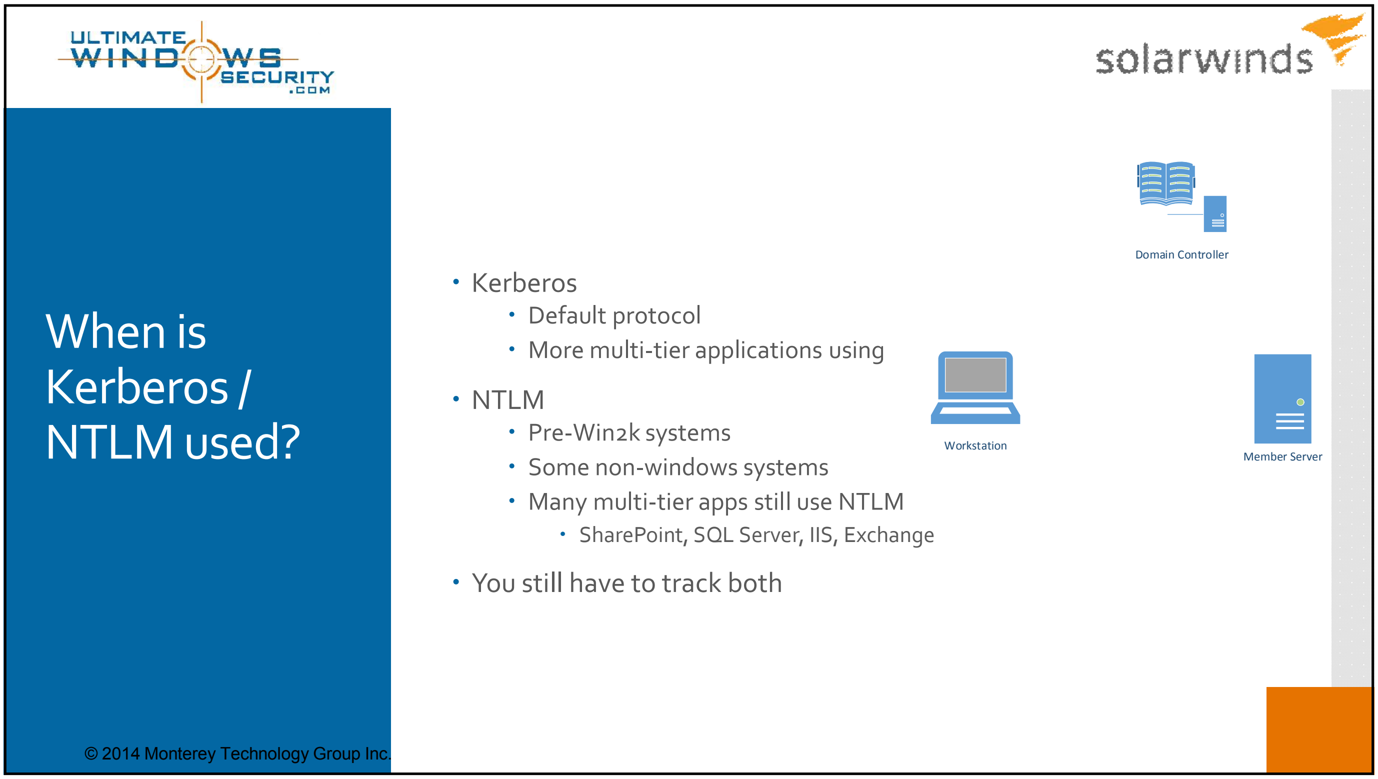
- What are we trying to accomplish?
  - Detect attempts to break into accounts
    - Malicious insiders trying to
      - Impersonate someone else
      - Trying to gain privileged access
    - APTs trying to
      - move laterally
      - elevate privileges
    - Would-be intruders trying to
      - Penetrate network periphery
      - Break into Internet facing servers
      - Penetrate systems on internal network
  - Not be distracted by innocent logon failures



## Logon / Authentication failures

- For centralized tracking of **domain account** failures
  - Enable auditing on domain controllers
    - Kerberos Authentication Service
    - Credential Validation
  - Track all DC security logs for
    - Kerberos
      - 4768 – Failure
      - 4771
    - NTLM
      - 4776 - Failure

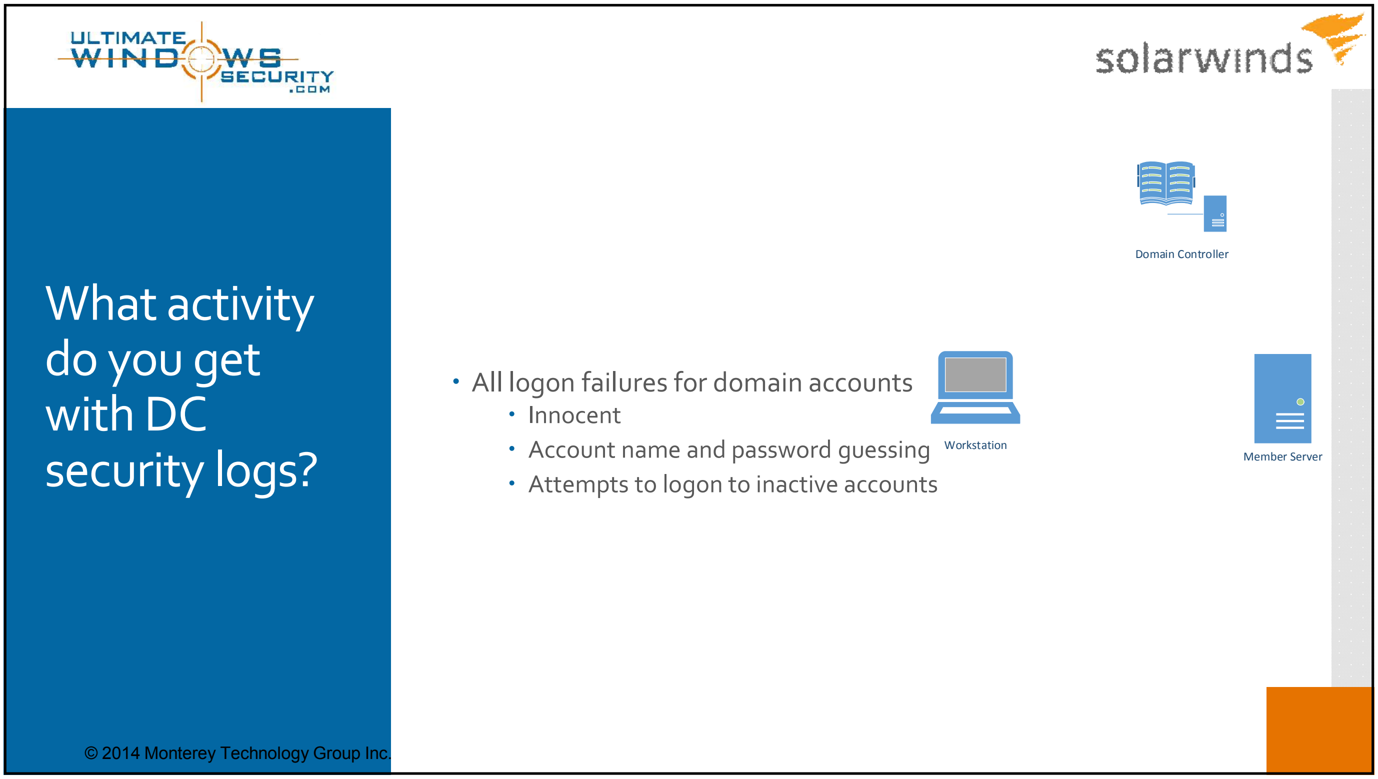
Domain Controller
Workstation
Member Server



# When is Kerberos / NTLM used?

- Kerberos
  - Default protocol
  - More multi-tier applications using
- NTLM
  - Pre-Win2k systems
  - Some non-windows systems
  - Many multi-tier apps still use NTLM
    - SharePoint, SQL Server, IIS, Exchange
- You still have to track both

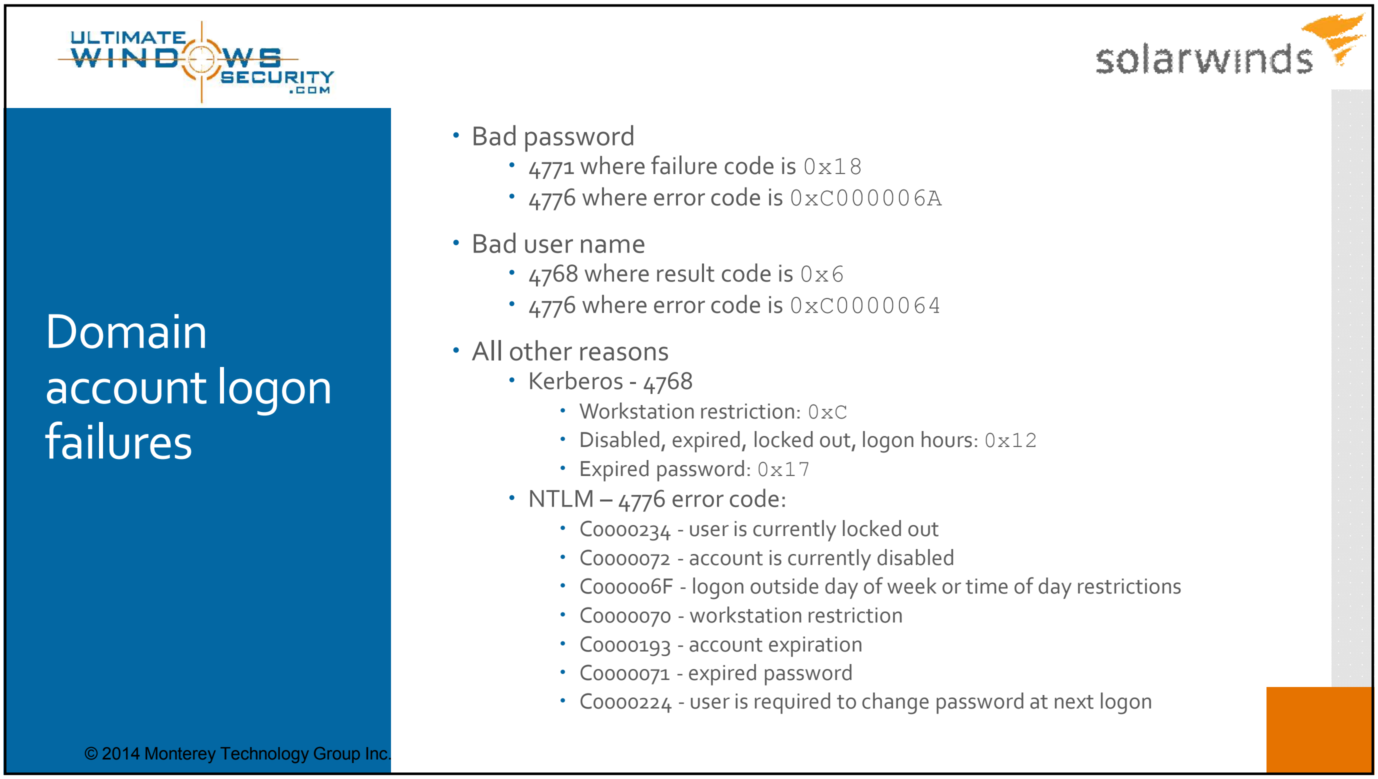
Domain Controller
Workstation
Member Server



# What activity do you get with DC security logs?

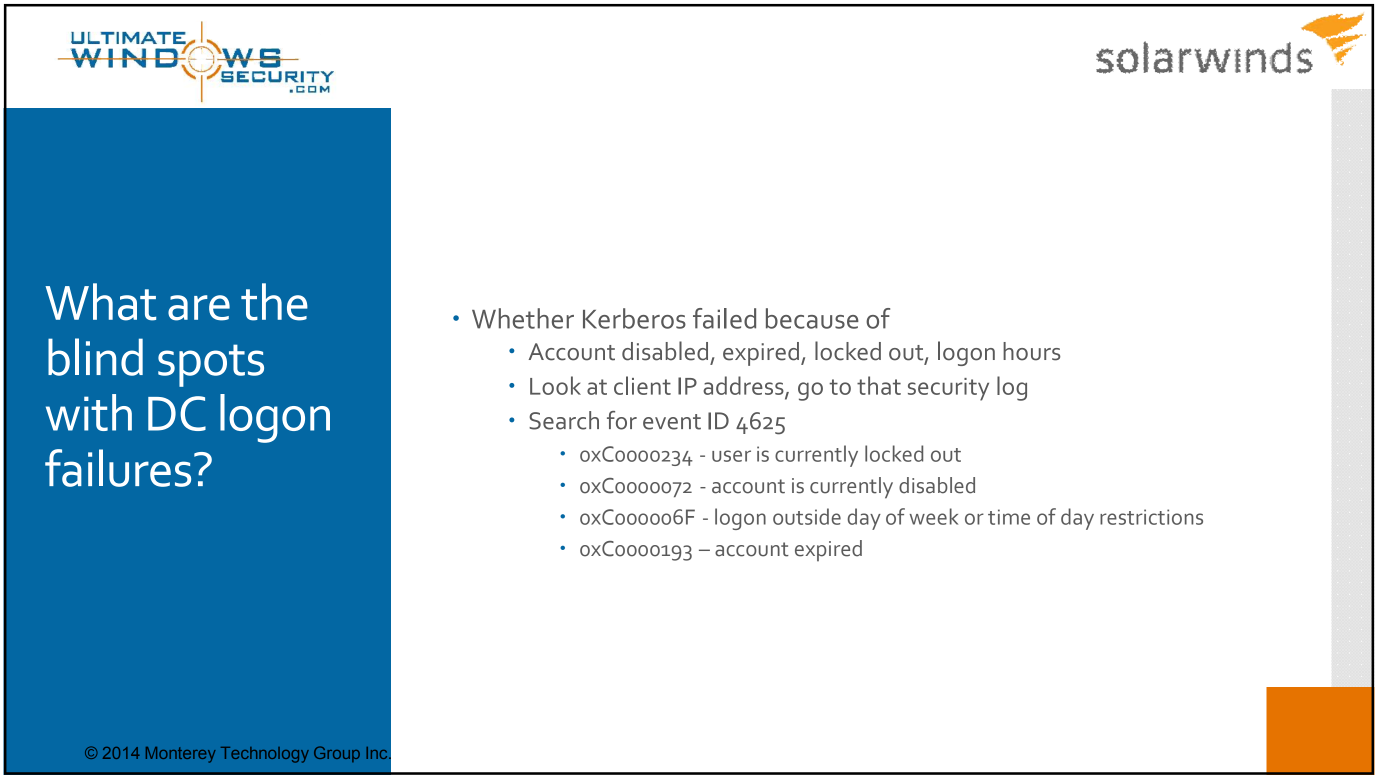
- All logon failures for domain accounts
  - Innocent
  - Account name and password guessing
  - Attempts to logon to inactive accounts

Domain Controller
Workstation
Member Server



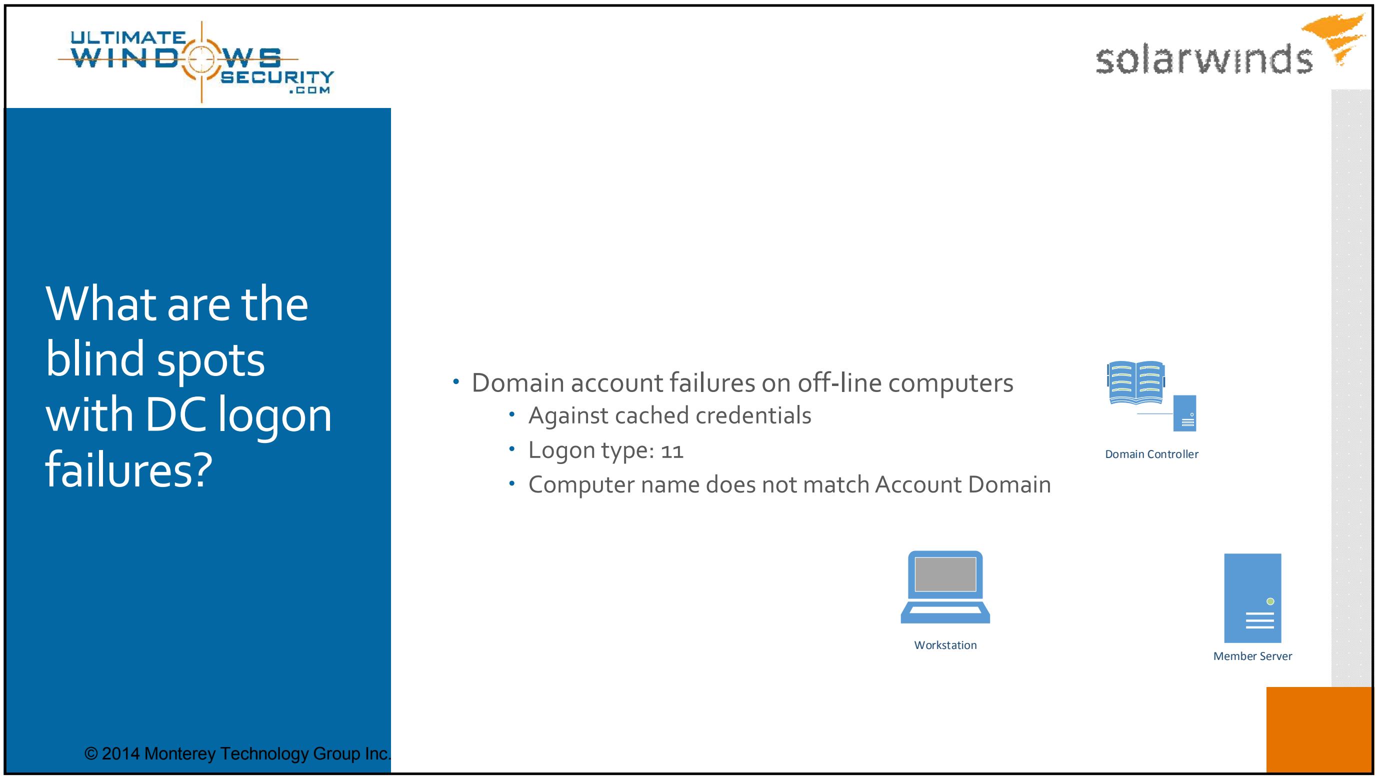
## Domain account logon failures

- Bad password
  - 4771 where failure code is `0x18`
  - 4776 where error code is `0xC000006A`
- Bad user name
  - 4768 where result code is `0x6`
  - 4776 where error code is `0xC0000064`
- All other reasons
  - Kerberos - 4768
    - Workstation restriction: `0xC`
    - Disabled, expired, locked out, logon hours: `0x12`
    - Expired password: `0x17`
  - NTLM – 4776 error code:
    - C0000234 - user is currently locked out
    - C0000072 - account is currently disabled
    - C000006F - logon outside day of week or time of day restrictions
    - C0000070 - workstation restriction
    - C0000193 - account expiration
    - C0000071 - expired password
    - C0000224 - user is required to change password at next logon



## What are the blind spots with DC logon failures?

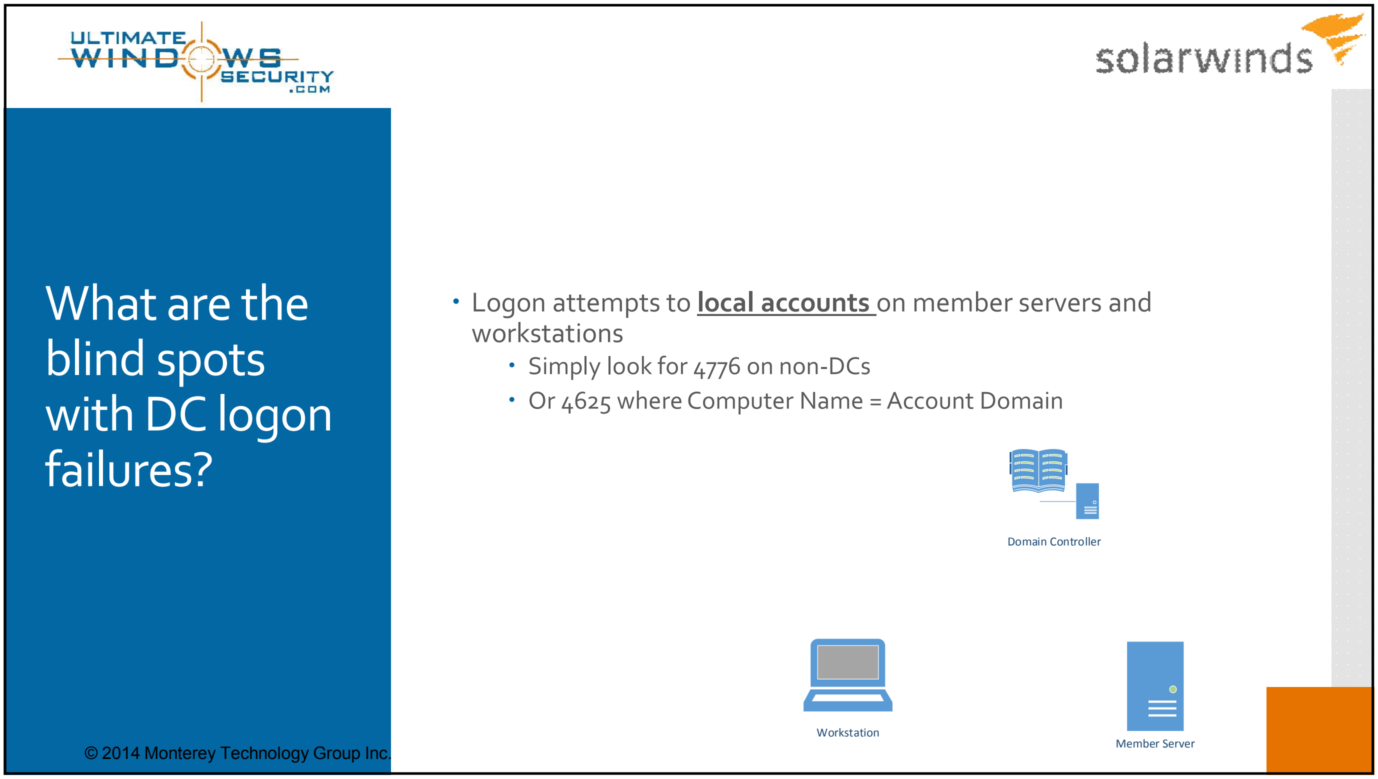
- Whether Kerberos failed because of
  - Account disabled, expired, locked out, logon hours
  - Look at client IP address, go to that security log
  - Search for event ID 4625
    - 0xC0000234 - user is currently locked out
    - 0xC0000072 - account is currently disabled
    - 0xC000006F - logon outside day of week or time of day restrictions
    - 0xC0000193 – account expired



## What are the blind spots with DC logon failures?

- Domain account failures on off-line computers
  - Against cached credentials
  - Logon type: 11
  - Computer name does not match Account Domain

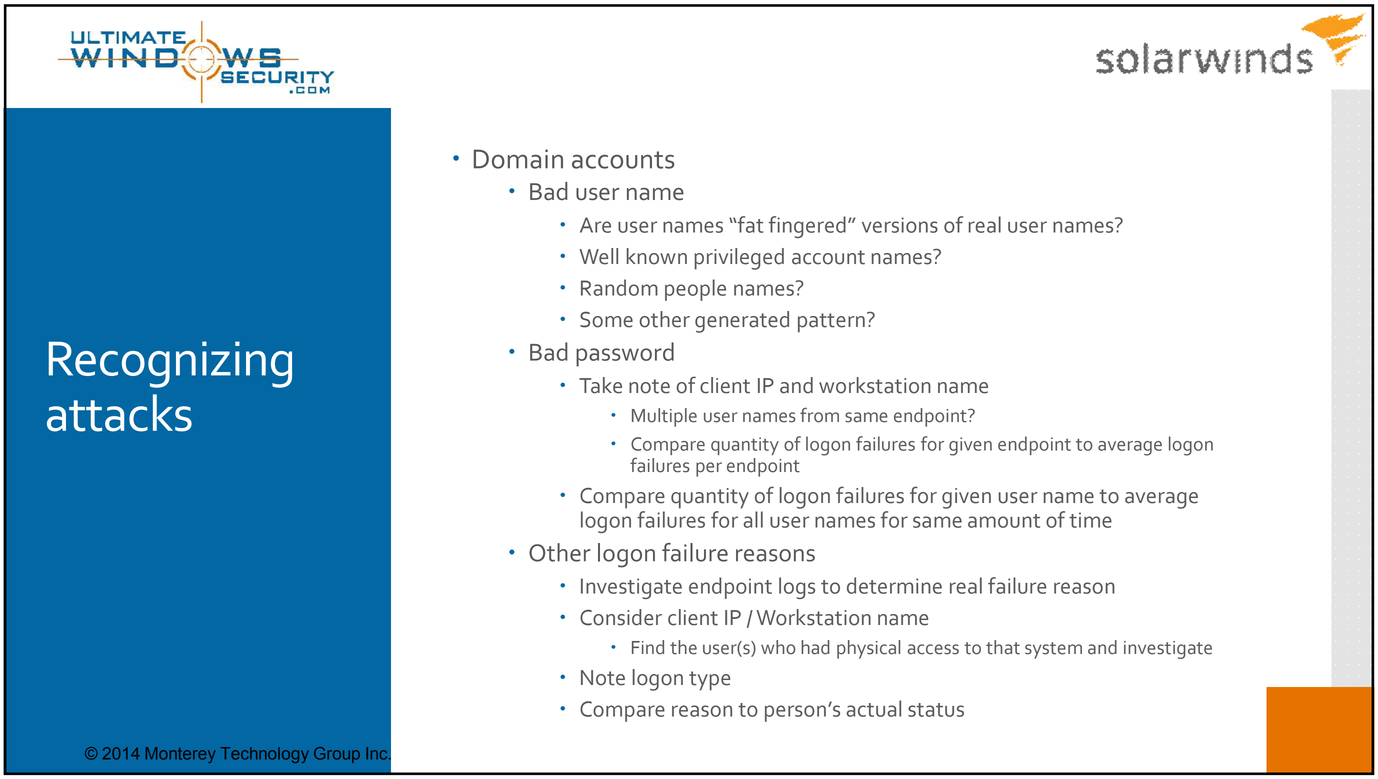
Domain Controller
Workstation
Member Server



## What are the blind spots with DC logon failures?

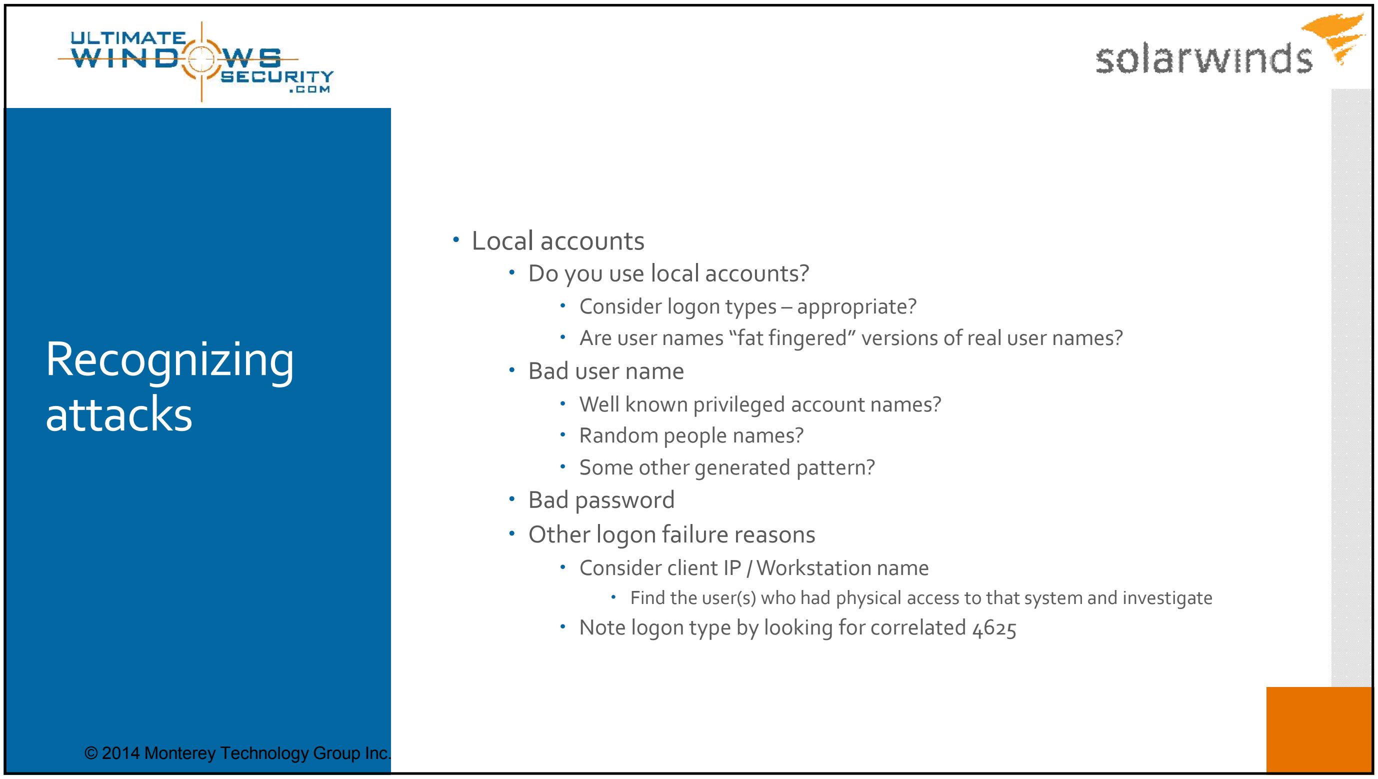
- Logon attempts to **local accounts** on member servers and workstations
  - Simply look for 4776 on non-DCs
  - Or 4625 where Computer Name = Account Domain

Domain Controller
Workstation
Member Server



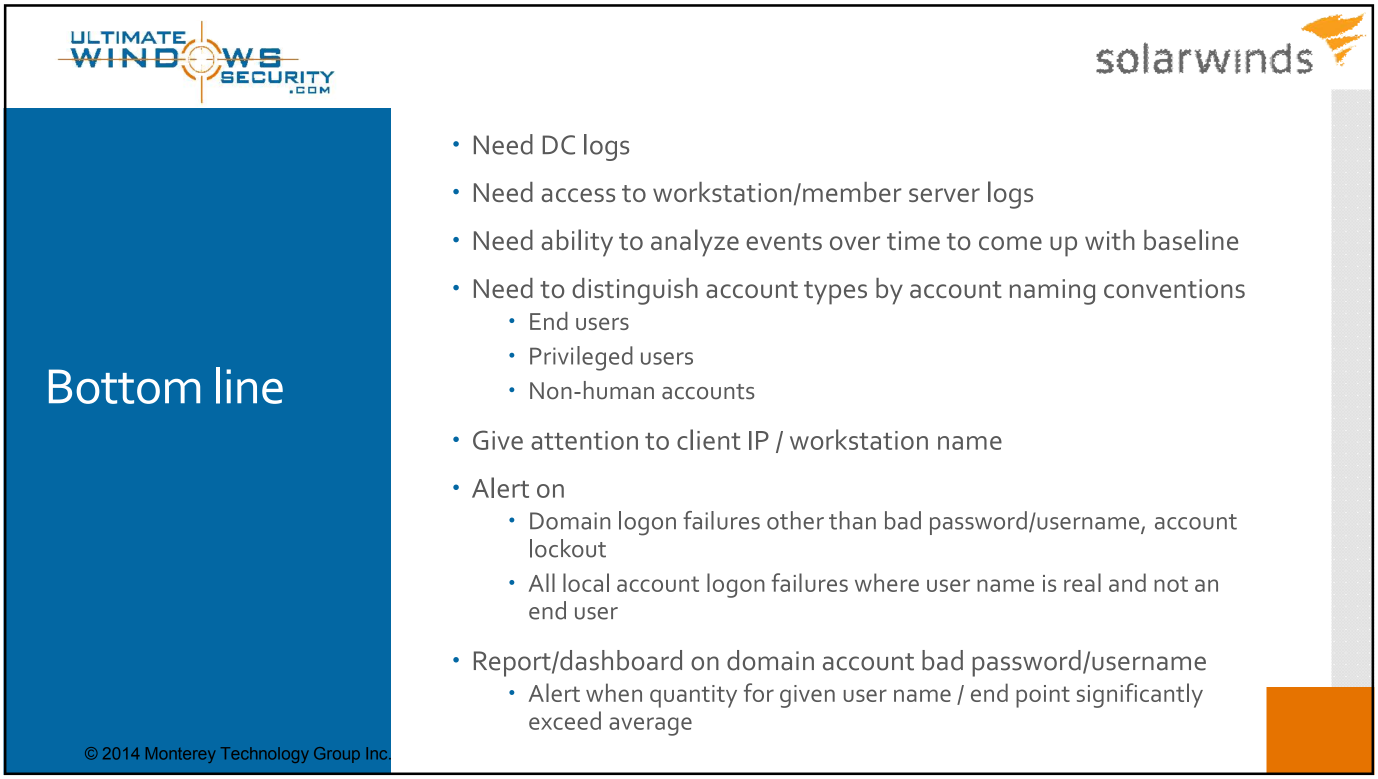
## Recognizing attacks

- Domain accounts
  - Bad user name
    - Are user names "fat fingered" versions of real user names?
    - Well known privileged account names?
    - Random people names?
    - Some other generated pattern?
  - Bad password
    - Take note of client IP and workstation name
      - Multiple user names from same endpoint?
      - Compare quantity of logon failures for given endpoint to average logon failures per endpoint
    - Compare quantity of logon failures for given user name to average logon failures for all user names for same amount of time
  - Other logon failure reasons
    - Investigate endpoint logs to determine real failure reason
    - Consider client IP / Workstation name
      - Find the user(s) who had physical access to that system and investigate
    - Note logon type
    - Compare reason to person's actual status



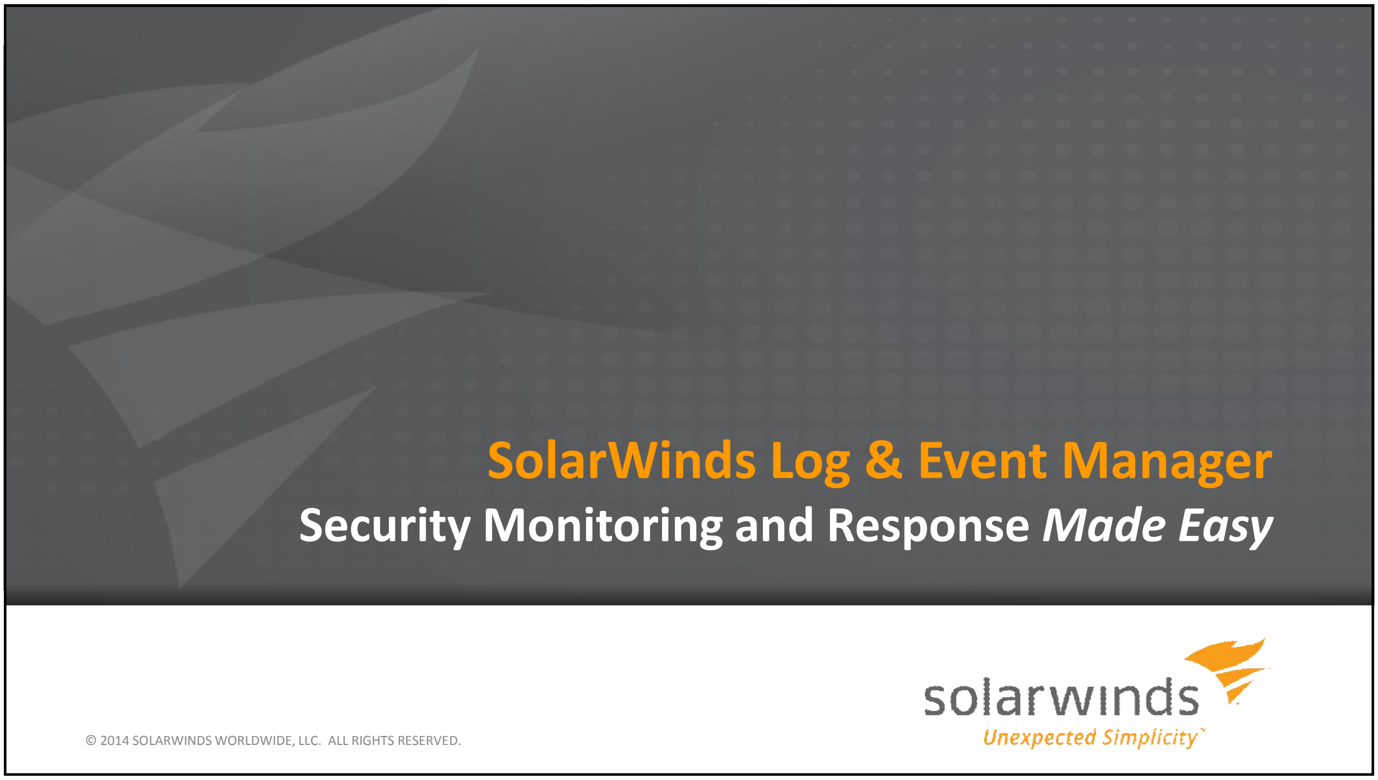
## Recognizing attacks

- Local accounts
  - Do you use local accounts?
    - Consider logon types – appropriate?
    - Are user names "fat fingered" versions of real user names?
  - Bad user name
    - Well known privileged account names?
    - Random people names?
    - Some other generated pattern?
  - Bad password
  - Other logon failure reasons
    - Consider client IP / Workstation name
      - Find the user(s) who had physical access to that system and investigate
    - Note logon type by looking for correlated 4625



## Bottom line

- Need DC logs
- Need access to workstation/member server logs
- Need ability to analyze events over time to come up with baseline
- Need to distinguish account types by account naming conventions
  - End users
  - Privileged users
  - Non-human accounts
- Give attention to client IP / workstation name
- Alert on
  - Domain logon failures other than bad password/username, account lockout
  - All local account logon failures where user name is real and not an end user
- Report/dashboard on domain account bad password/username
  - Alert when quantity for given user name / end point significantly exceed average



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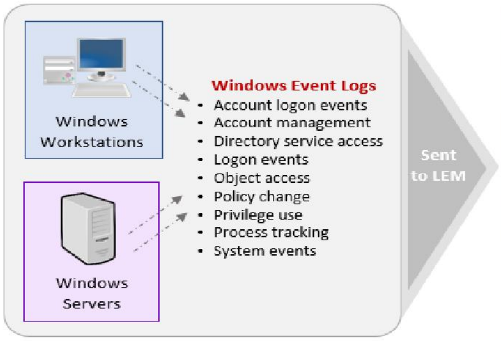
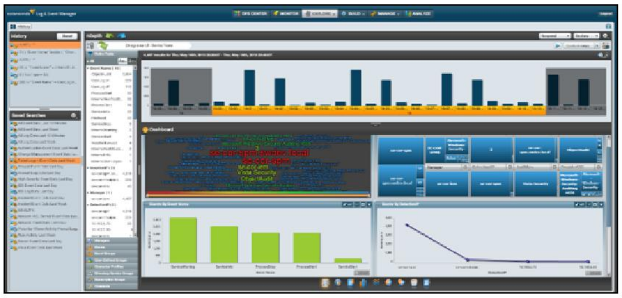
Unexpected Simplicity

## Find the Needle in the Haystack – *Fast!*

**SolarWinds Log & Event Manager** goes far beyond log collection and analysis by providing **real-time, multi-dimensional event correlation combined with automated response capabilities** to **immediately identify and stop threats *before* the damage is done.**





SolarWinds Log & Event Manager Collects & Correlates Windows Server and Workstation Logs in Real Time

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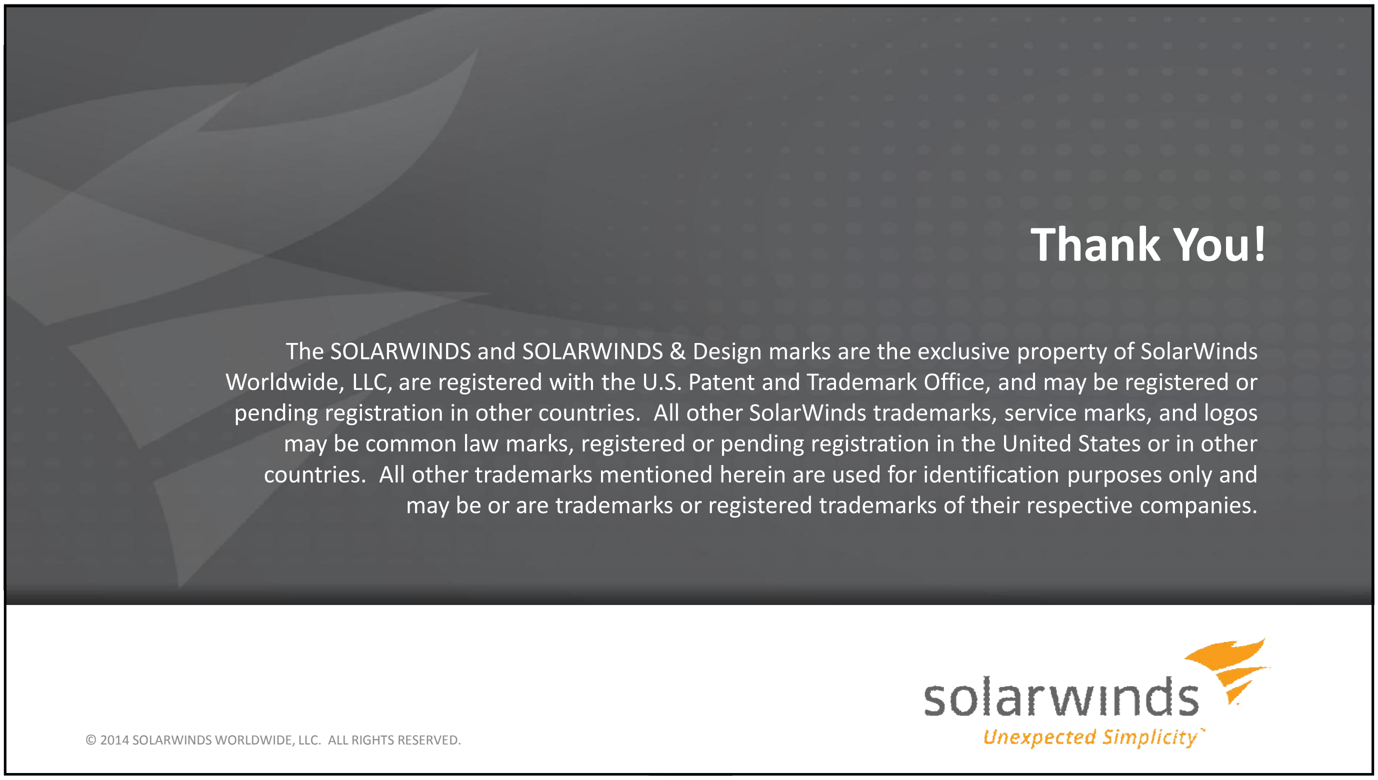

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