

# Windows PowerShell - Management of Active Directory infrastructure

## TARGET AUDIENCE

This 3 days long workshop is intended for:

- **Administrators** of Active Directory technology who want to automate tasks **related to administration of AD infrastructure (i.e. management of domains and forests, trust management, management of AD topology and AD replication management and analysis)** in order to make them more effective and less error prone
- **Administrators** who wants to convert their current ADSI based vbs or java scripts into PowerShell scripts
- **Administrators or programmers who want just to learn** as much as possible about AD technologies by managing them programmatically on the low-level

## BUSINESS NEEDS

This workshop is intended for both Active Directory administrators and programmers who want to implement the **AD infrastructure management related task** by means of PowerShell scripting language or who just want to gain deeper knowledge of these technologies by learning their programmatic management.

The workshop content is designed to cover all areas of AD infrastructure management and contains more than 90 reusable code examples of many operations.

All AD infrastructure management concepts are first thoroughly explained theoretically before the description of their PowerShell based programmatic management proceeds. For each topic rich set of examples completely covering given area of AD infrastructure management will be demonstrated.

## BENEFITS

After completion of this workshop students will be able to use PowerShell to automate the tasks from following areas of AD infrastructure management:

- Administration and management of domains, forests and domain controllers, their properties and FSMO roles
- Administration and management of domain trusts and their properties and monitoring of current operational status of domain trusts
- Administration and management of all AD replication topology components
- Management and monitoring of AD replication process

## WORKSHOP COURSEWARE

The workshop courseware is provided in both printed and electronic form and it can be used by students after the course completion on daily basis as a graphical quick reference guide (both for PowerShell scripting language and AD



infrastructure management oriented technologies).

The courseware contains lots of pictures, schemas and diagrams that describe object models, technology concepts and the map of the configuration partition that can be used to identify AD object that are targeted by particular management tasks. The courseware also contain more than 90 examples of PowerShell code that can be reused in nearly cut-and-paste manner.

## SYLABUS

### Part I

- **Module 1: Administration of AD infrastructure using Windows 2008 R2 AD provider and AD related cmdlets**
  - Overview of **Windows 2008 R2 AD provider**, its object model and categorization of AD management related cmdlets
  - Navigation within AD database using AD provider
  - **Forest** management using **Windows 2008 R2 cmdlets**
  - **Domain** management using **Windows 2008 R2 cmdlets**
  - **Password policies** management using **Windows 2008 R2 cmdlets**
  - **Domain Controller** management using **Windows 2008 R2 cmdlets**

### Part II

- **Module 2: Management of domains, forests and domain controllers**
  - Binding to a domain controller – **DirectoryContext** class description and usage
  - Overview of **Domain** class and **Forest** class objects; implementation of algorithm for recursive enumeration of domains in a forest
  - Management of properties of a **Domain** and **Forest** objects, explanation of differences between various domain and forest modes
  - Overview of **DomainController** and **GlobalCatalog** objects
  - Discovering the DCs, GCs in forest, domain, site, etc.
  - FSMO overview, FSMO management, Global catalog management
- **Module 3: Management of trust**
  - **Overview** of trust types, trust direction, trust transitivity, trust path
  - **Description of internal AD implementation of trusts** (TDO objects)
  - **External trust lifecycle management** – practical implementation, SID filtering, selective authentication
  - **Selective Authentication** – technology overview and practical implementation
  - **Forest trust** – overview, Kerberos authentication description, practical implementation, lifecycle management
- **Module 4: AD replication topology management**
  - Overview of AD replication topology concepts and components
  - Detailed map of configuration partition
  - KCC and replication topology generation process
  - **ActiveDirectorySite** class – overview, usage, examples of scripted AD site management tasks
  - **ActiveDirectoryTransport** class – overview, usage, examples of management
  - **ActiveDirectorySiteLink** class – overview, usage, cost and schedule management, examples
  - **ActiveDirectorySchedule** class – overview, creation, management, schedule merging and interaction explanation
  - **ActiveDirectorySiteLinkBridge** class - overview, creation

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- **ReplicationConnection** class - overview, creation, management, bitmask **options** attribute management
  - **ActiveDirectorySubnet** class – overview, creation, usage
  
  - **Module 5: Management of replication process**
    - Replication process overview
    - The methods of **DomainController** class dedicated to the replication process management – triggering the replication with various replication scope and mode
  
  - **Module 6: Analysis of replication metadata**
    - Replication metadata – theory, metadata changes for originating and replicated update
    - **Replication metadata** class – description, displaying metadata for an AD object
    - **High watermark** and **up-to-dateness** vector explanation
    - **ReplicationNeighbor** class – analysis of current state of a replication process for given partition on a DC , displaying high watermark for a specific partition
    - **ReplicationCursor** class – description, displaying up-to-dateness vector
    - **Analysis of replication flow, simulation of replication conflicts**

## PRE-REQUISITES

Basic knowledge of PowerShell scripting language and environment:

- Ability to use basic set of pipeline processing and formatting cmdlets (\*-object, format-\*)
- Working with basic data types (numeric, strings, arrays) and operators
- Working with Powershell variables
- Ability to use basic PowerShell language constructs (conditional statements, looping statements)
- Ability to create and use PowerShell functions

Basic knowledge of AD administration principles:

- User account administration
- Group account administration
- Computer account administration

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