Thinking outside the Box, learning a little about a lot

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@retracement

Agenda

Become a DBA 2.5

SQL Instance Enterprise name resolution strategies

D.I.Y. Virtual SAN

D.I.Y. Virtual Cluster

Failing Cluster Groups between independent Clusters

Using the CLR to expose and manage the OS

Generalist vs Specialist

Generalist

- “Jack of all trades” (...master of none), versatile
- Unfocused, unproductive

Specialist

- Attention to detail, *very* productive, take responsibility
- A risk, inflexible, bottleneck

Generalist (the reality)

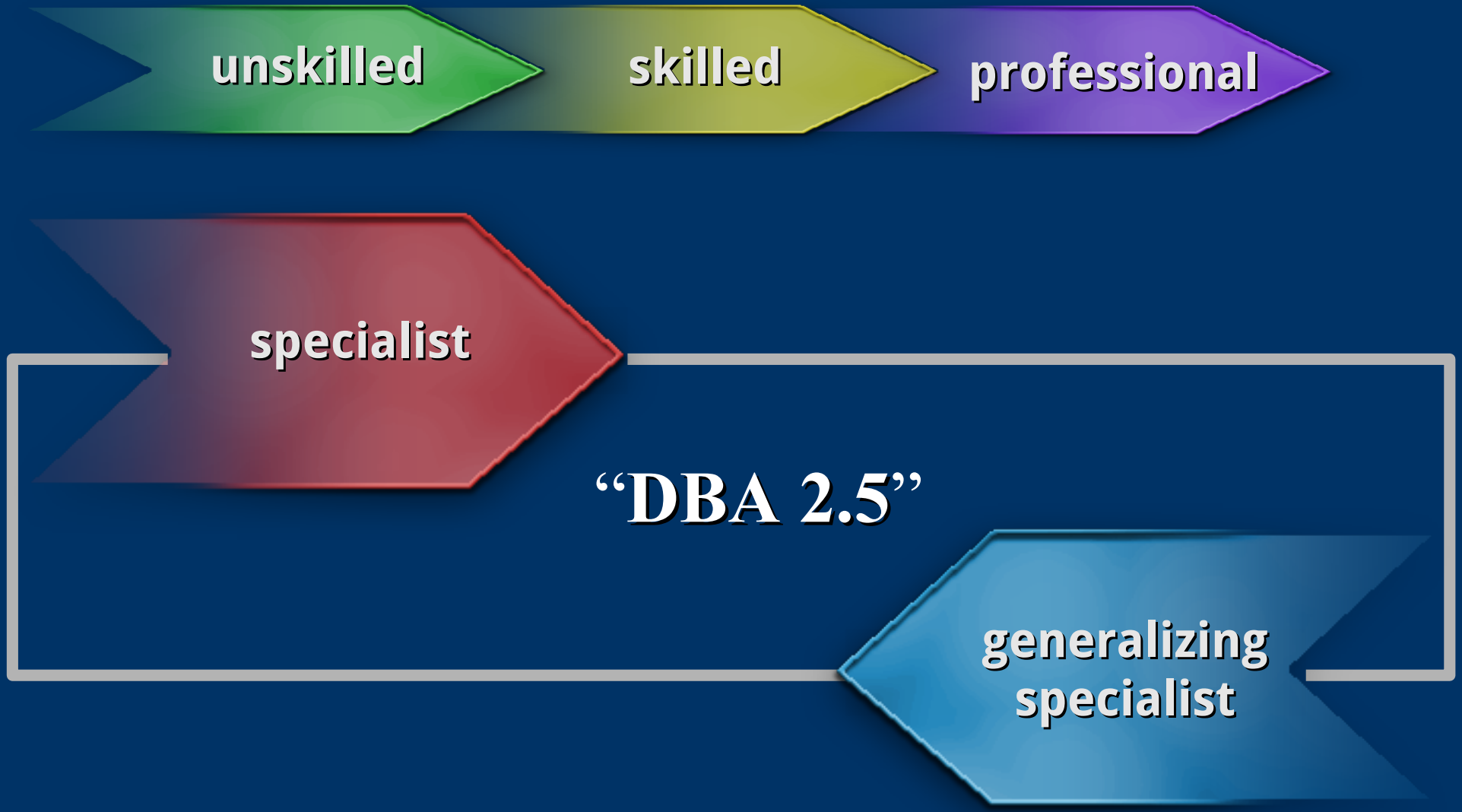
Specialist (the reality)

Generalizing Specialist

- Agile
- Productive
- Can see larger picture
- Focused
- Versatile
- Take responsibility
- Less Risk

Generalizing Specialist (the reality)

DBA Life-cycle



"A human being should be able to change a diaper, plan an invasion,
butcher a hog, conn a ship, design a building,write a sonnet, balance accounts,
build a wall, set a bone, comfort the dying, take orders, give orders,
cooperate, act alone, solve equations, analyze a new problem,
pitch manure, program a computer, cook a tasty meal,
fight efficiently, die gallantly.

Specialization is for insects!"

Robert A. Heinlein.

How to become a DBA 2.5 part I

Understand ~~your~~ the environment

- Get out of your comfort zone
- Visit the server room!!!
- Talk to people!
- Research
- Talk some more
- Get involved and take an interest

How to become a DBA 2.5 part II

From a technical level

- Use Personal Virtualization
- Understand hardware, RAID Levels and Storage
- Understand TCP/IP and networking

  ...and know when to use ping, nslookup, netstat etc
- Use other Operating Systems and Database Engines
- Program a .NET language to a competent level
- Have an arsenal of tools and scripts

How to become a DBA 2.5 part III

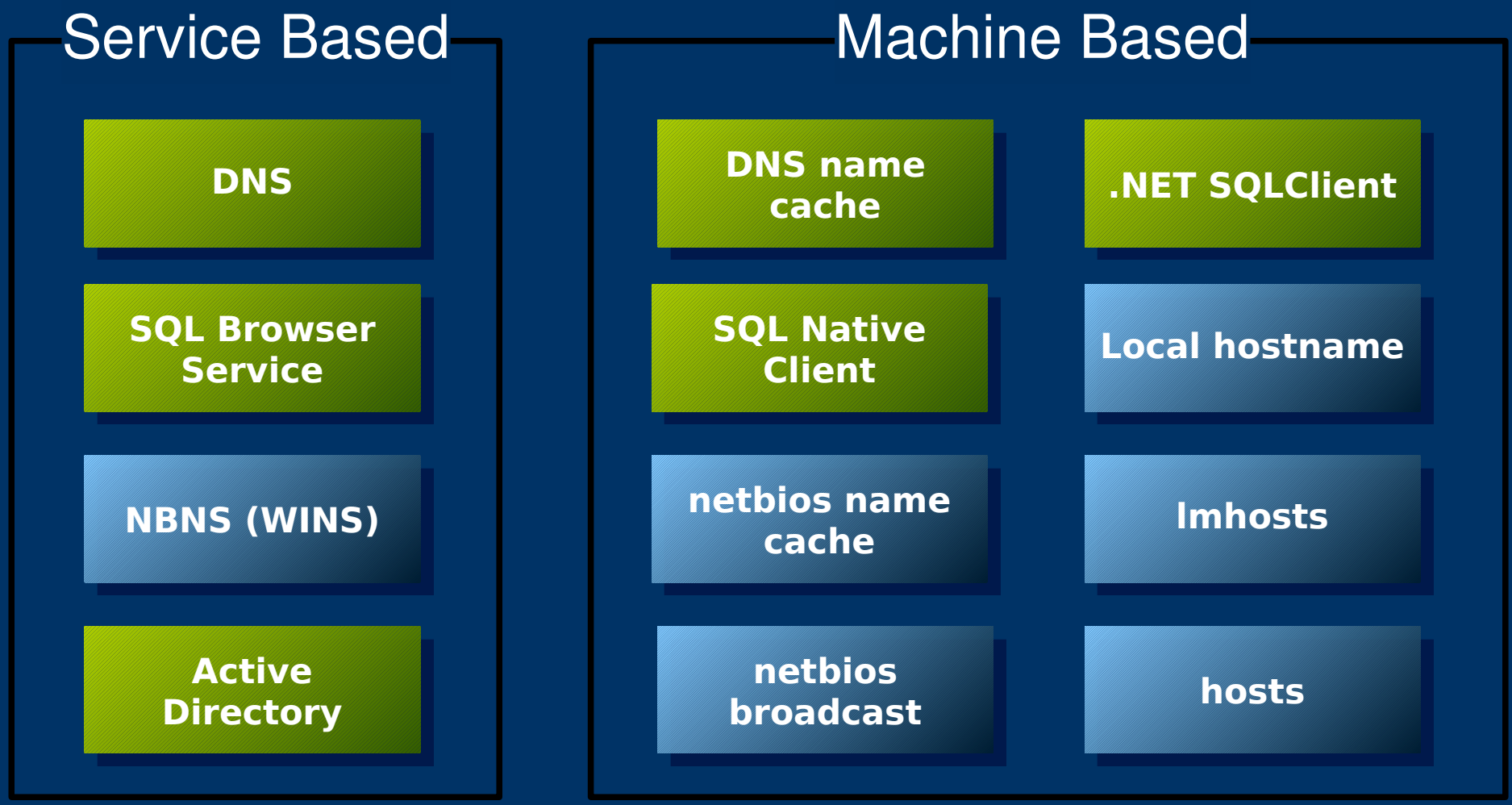
From a personal level

- Invest time
- Maintain standards
- Produce documentation and notes
- Don't be afraid to say NO – you are responsible
- Don't be afraid to ask questions
- Surround yourself with *brilliant* people

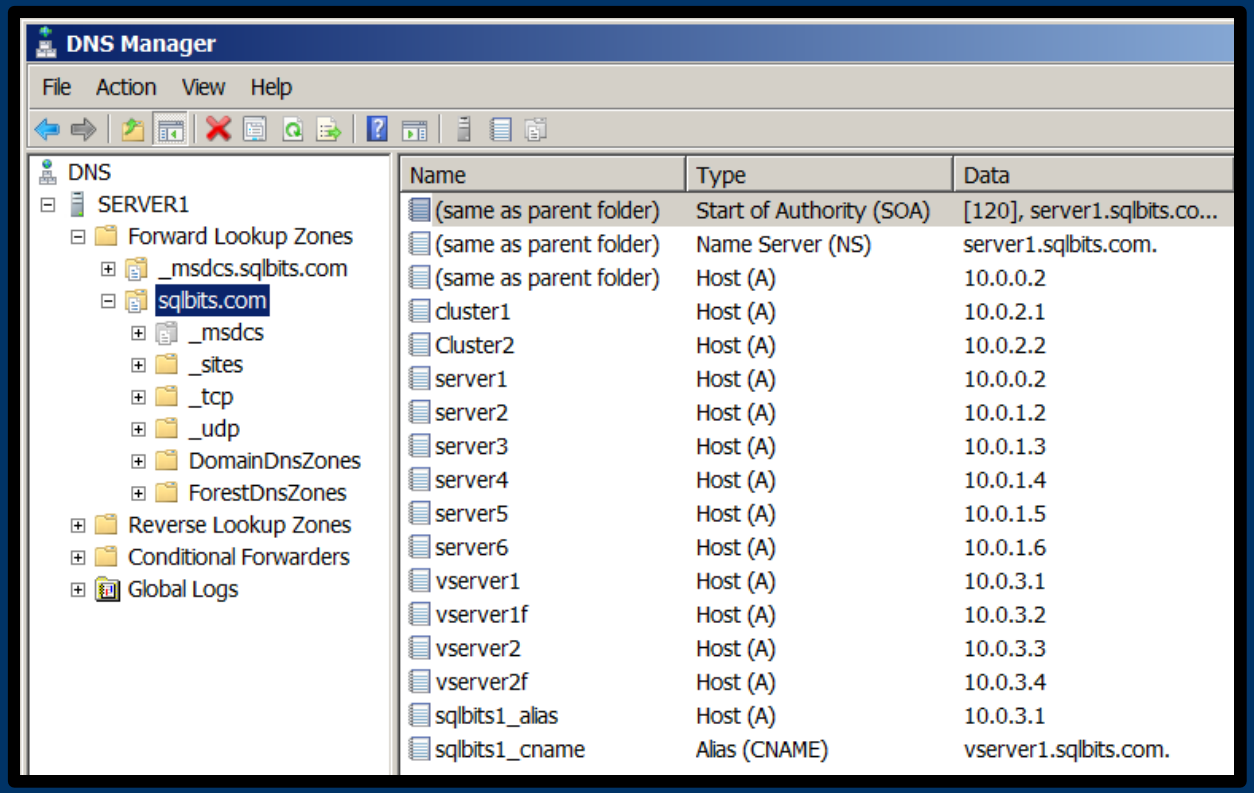
Demo

Virtualization – the basics

Name Resolution



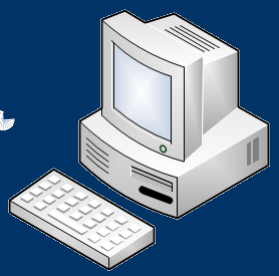
Using DNS



sqlbits.com.

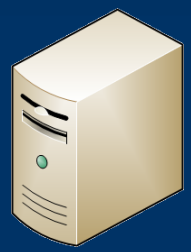
AUTHORITIVE
POSITIVE
REFERRAL
NEGATIVE

Lookup
sqlbits1_alias

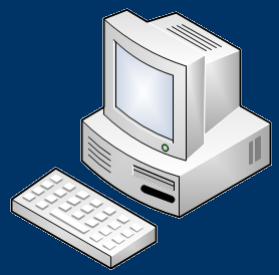


Connect to IP
and instance
10.0.3.1\sql1

vserver1.sqlbits.com.

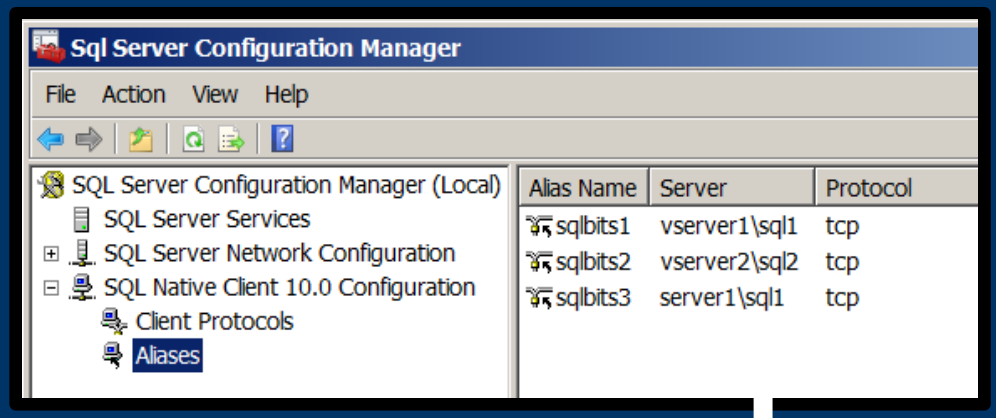


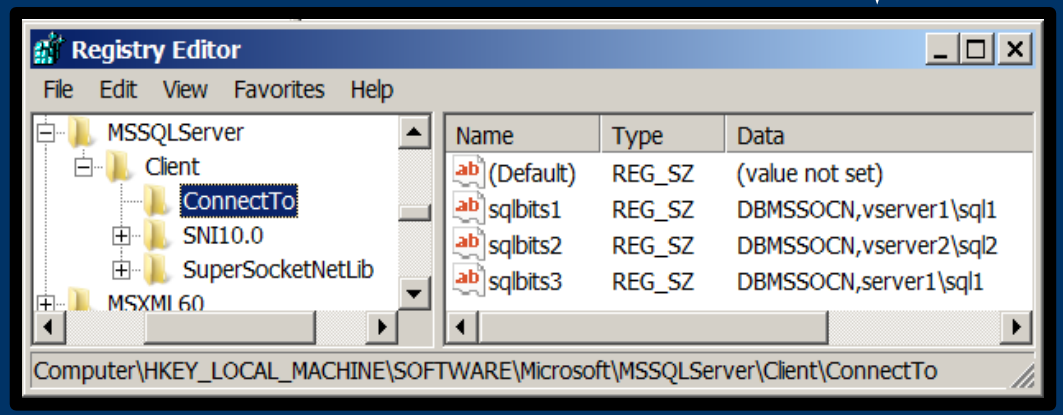
Using SQL Native Client



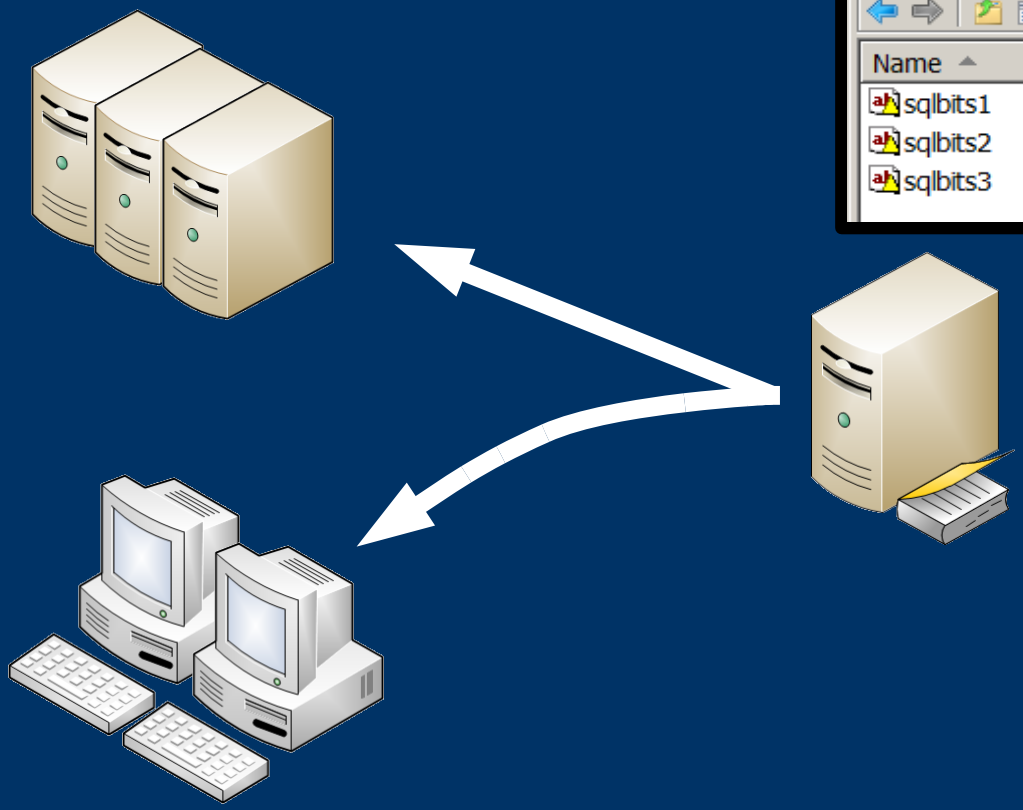
Lookup **sqlbits1**

Connect to **vserver1\sql**





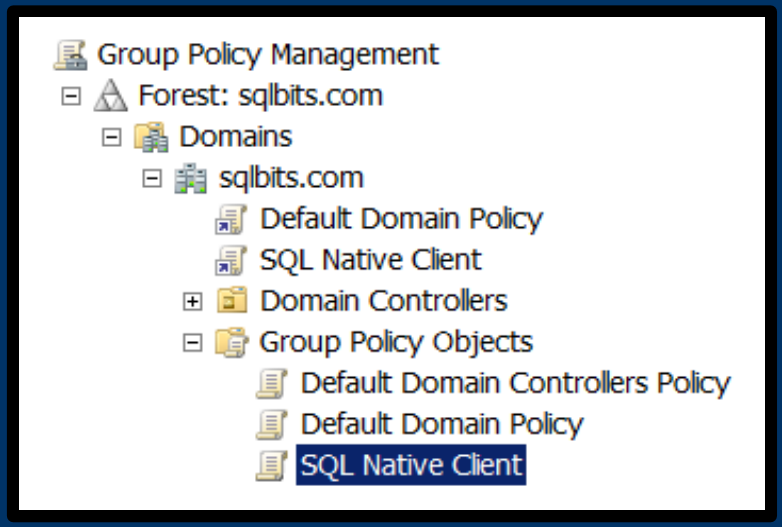
Updating SQL Native Client by Group Policy



Group Policy Management Editor

File Action View Help

Name	Value Name	Value Data	Action	Order
sqlbits1	sqlbits1	DBMSSOCN,vserver1\sql1	Update	1
sqlbits2	sqlbits2	DBMSSOCN,vserver2\sql2	Update	2
sqlbits3	sqlbits3	DBMSSOCN,server1\sql1	Update	3



Demo

Redirecting an instance using SQL Native Client and Group Policy

Using application based redirection

- DBMirroring Failover partner in connection string
  - .NET 2.0 upwards
- Application based error handling
  - Inline
  - Configuration files
- Virtualization?

What is a SAN?

..Storage Area Network

- Works at the block level
- Scalable
- Highly available
- Remote
- Highly Accessible (Universal Storage Connectivity)
- High performance

Preparing for our Virtual SAN

Virtual Hardware

- Disk/s for Operating System and iSCSI targets
- Network Card

Installation Media

- FreeNAS ISO or CD (alternatives such as Openfiler)

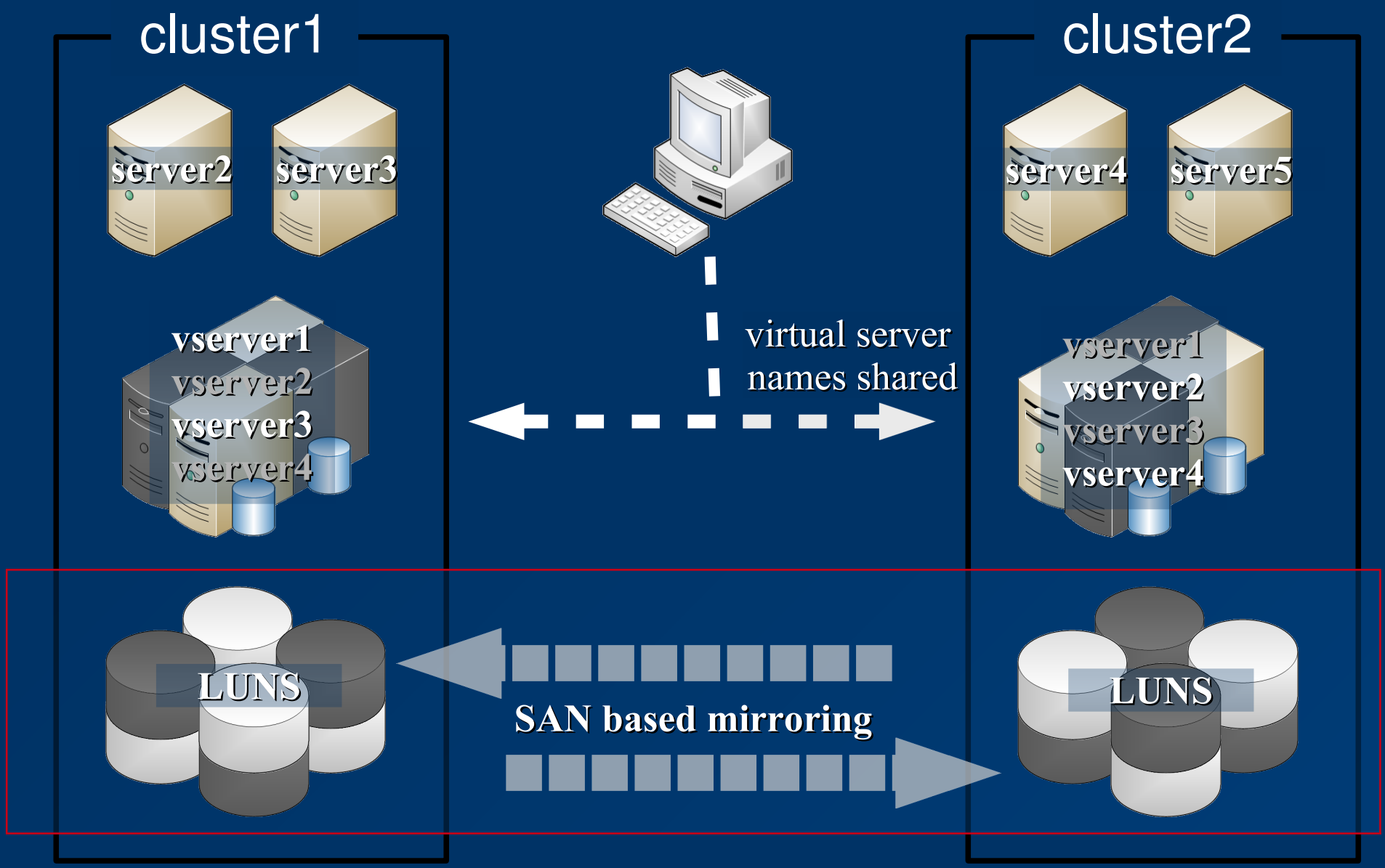
Configuration Considerations

- IP address, subnet mask, g/w, memory
- Active Directory

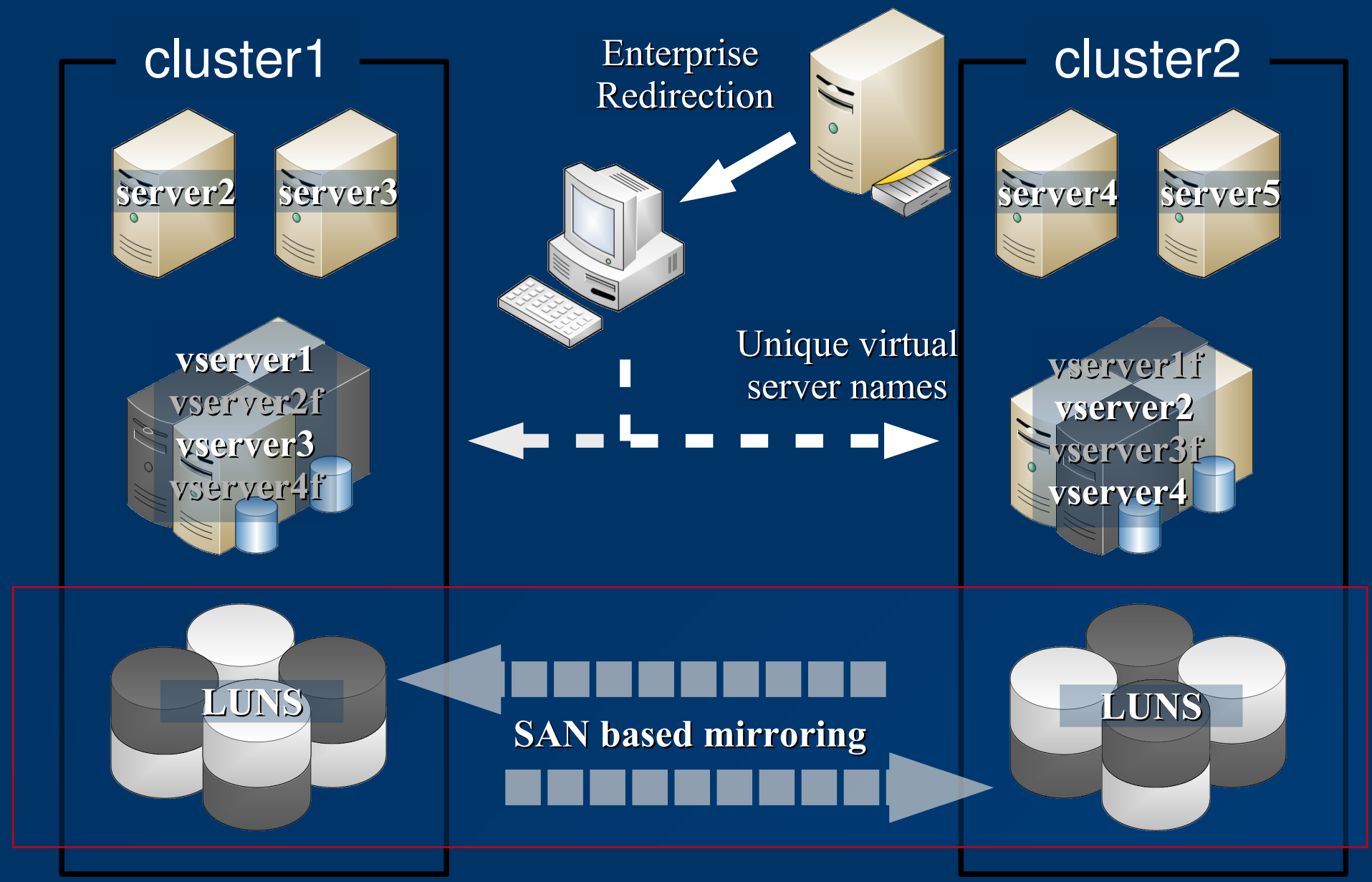
Demo

Setup our Virtual SAN and Virtual Cluster

Clustering solution version 1



Clustering solution version 2



Demo

Failing Groups across Clusters

Using the CLR

Calling Assemblies

- Call through SQLCLR
- Call through xp_cmdshell
- Directly/ scheduled tasks
- Integration Services Packages
- Powershell

Using the CLR

```
using sql = Microsoft.SqlServer.Server;
using io = System.IO;

public class IO {
    [sql.SqlFunction()]
    public static sqltype.SqlInt64 DriveFree(sqltype.SqlString drive){
        io.DriveInfo di;
            try {
            di = new System.IO.DriveInfo(drive.ToString());
            return di.TotalFreeSpace;
        }
        catch { return -1; }
    }
    .......
}
```

Using the CLR

```
CREATE ASSEMBLY SQLCallAssembly
    FROM 'H:\SQLCallAssembly.DLL'
    WITH PERMISSION_SET = EXTERNAL_ACCESS
GO

CREATE FUNCTION dbo.udf_drivefree(@drive NVARCHAR(1))
    RETURNS BIGINT
    EXTERNAL NAME SQLCallAssembly.IO.DriveFree;
GO
CREATE FUNCTION dbo.udf_driveused(@drive NVARCHAR(1))
...
CREATE FUNCTION dbo.udf_drivesize(@drive NVARCHAR(1))
...
CREATE FUNCTION dbo.udf_drivefreepercent(@drive NVARCHAR(1))
...
CREATE FUNCTION dbo.udf_driveusedpercent(@drive NVARCHAR(1))
...
GO
```

Using the CLR

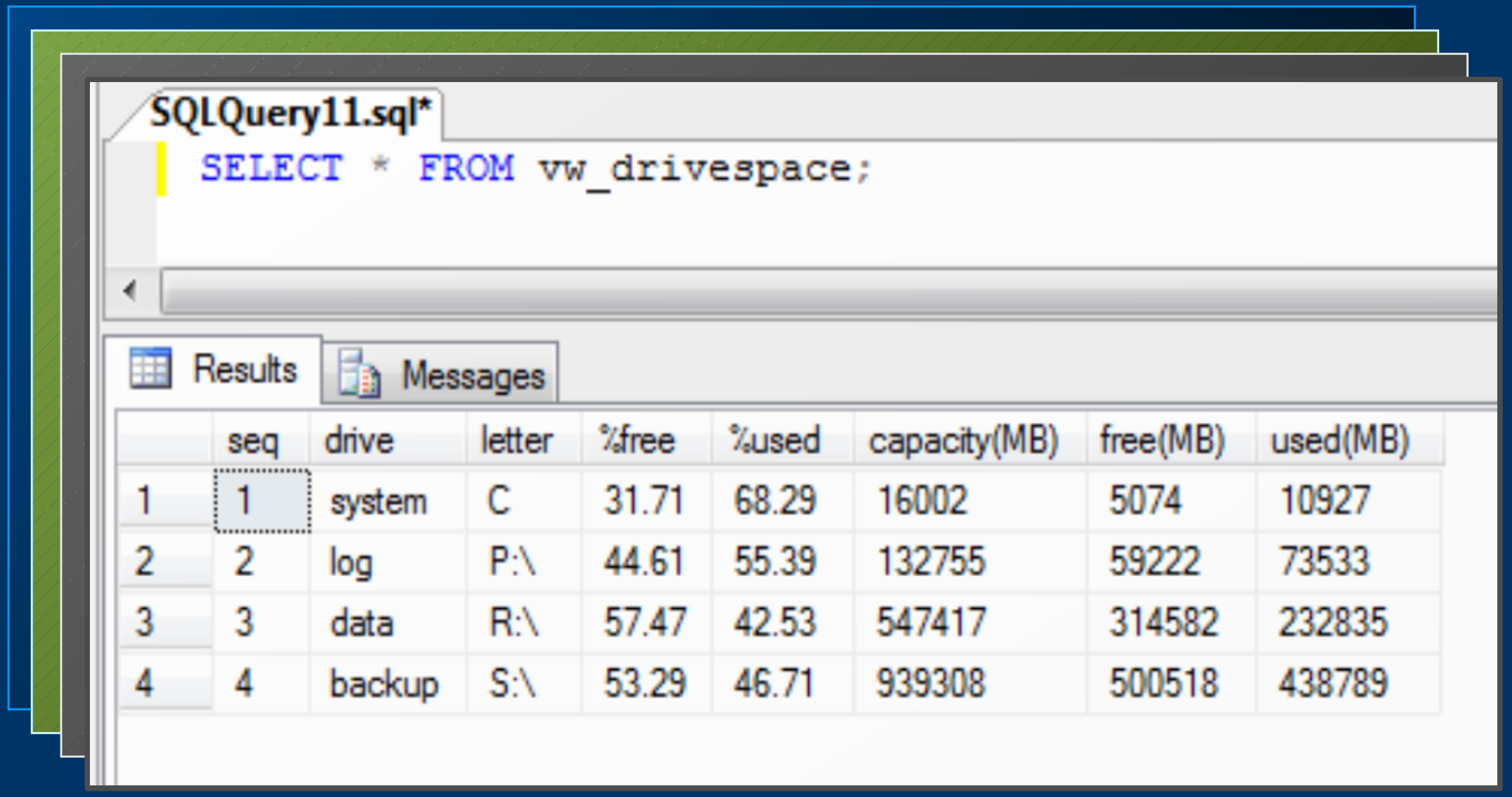
```
CREATE VIEW vw_drivespace AS
    SELECT 1 as 'seq',
        'system' as drive,
        'C' as 'letter',
        [dbo].[udf_drivefreepercent]('c') AS [%free],
        [dbo].[udf_driveusedpercent]('c')as [%used],
        [dbo].[udf_drivesize]('c')/1048576 AS [capacity(MB)],
        [dbo].[udf_drivefree]('c')/1048576 AS [free(MB)],
        [dbo].[udf_driveused]('c')/1048576 as [used(MB)]
    UNION

    .....

    SELECT .....

GO
```

Using the CLR



	seq	drive	letter	%free	%used	capacity(MB)	free(MB)	used(MB)
1	1	system	C	31.71	68.29	16002	5074	10927
2	2	log	P:\	44.61	55.39	132755	59222	73533
3	3	data	R:\	57.47	42.53	547417	314582	232835
4	4	backup	S:\	53.29	46.71	939308	500518	438789

Summary #1

DBA 2.5

- Widen your skillset but still stay focused
- Talk to other teams and get involved
- Get your own Virtual Environment

Name Resolution

- Useful for abstracting from the host name
- Not suitable for every situation, good for applications

Summary #2

Virtual SAN and Virtual Cluster

- Easy to setup, great for testing

Failing over Cluster Groups across Clusters

- Effective, but element of risk
- Ensure strict guidelines and standards are followed

Using the CLR

- Useful for the DBA too!
- Many uses and ways of calling assemblies

Further Resources

http://tenbulls.co.uk/sqlbits/references

or

http://bit.ly/a27KPH

Questions

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