GROUP otr

Report For CEC: Task(s) 5

Brussels• London• Singapore• The Hague

Report for CEC Task(s) 5

28 September 2005

Prepared for: Thomas Kramler

By: Elliott Roper, Mark Crocker
OTR Group – Brussels
Tel: + 32 2 230 2970
Fax: +32 2 231 0681

Author(s): Elliott Roper, Mark Crocker

CONTENTS

REVIEW OF THE UPDATED WSPP DOCUMENTATION

1 COMPLETENESS

As requested by the Commission, we have reviewed Annex B ("Annex B") of Microsoft's response to a letter from the Commission services [1] ("Microsoft's response"). We understand that this Annex is meant as a reply to our report of 11 June 2005 on the completeness of the technical documentation disclosed by Microsoft under the "Workgroup Server Protocol Program" (the "WSPP Technical Documentation").

The Commission also requested us to carry out the examination of another copy of the WSPP Technical Documentation that had been provided by Microsoft on 8 August 2005.

The review of Annex B and the further examination of the WSPP Technical Documentation have confirmed our position that:

- the WSPP Technical Documentation is deficient in introductory, explanatory material,
- it is unusable by organisations not having access to the Microsoft environment,
- it can only be used in conjunction with reverse engineering,
- it is deficient in explaining adequately the sequencing of messages,
- some information is lacking.

1.1 DEFICIENCIES IN INTRODUCTORY, EXPLANATORY MATERIAL

We reaffirm our position that the WSPP Technical Documentation lacks the necessary introductory, explanatory material.

We acknowledge that links to external material have been provided for certain items, but:

- they do not constitute introductory and explanatory background per se,
- such an approach has not been systematically adopted – only certain items contain such links.

[1] Annex B to a letter of 8 July 2005 from Jean-Yves Art, Jean-Yves Art, Director of Competition Law, of Microsoft to Angel Tradacete Cocera, Director in DG Competition.

An appropriate introduction to the topic should include a detailed description of the protocol and its behaviours under all the conditions of operations (this is the common industry practice for a protocol specification[2]). It is difficult to understand a protocol specification without such material.

Such deficiencies make some of the topics of the WSPP Technical Documentation totally unusable. The WSPP Technical Documentation consists only of a large collection of protocol disclosures without sufficient overall description and explanation of the interrelationships between the individual disclosures.

In addition, implementation is prevented by the absence of any information concerning dependencies, in particular essential descriptions like, where, why, and with what impact upon other elements of the system information goes out "over the wire" are missing from the documentation. Only certain information concerning protocols used at a connection between instances of operating systems have been disclosed. Descriptions of the state of the servers executing the protocol transactions or of the purpose of the transaction are not provided.

For example, the Directory Services (DRSUPAI) protocol uses a set of RPC based operations that run over and can be utilized over SMB, Windows Sockets, HTTP, Microsoft Message Queue (MSMQ) and SPX. However, with the exception of SMB, the documentation did not state how DRSUAPI uses these transports. The DRSUAPI only describes its IDL/RPC interface with one or two line description of each function, and the structure definitions of the parameters passed to and received from each function. But the WSPP Technical Documentation does not describe either the kind of service that would use the various functions or the sequence in which the functions should be called.

The example provided in figure 3 of Microsoft's response further illustrates the deficiencies in explanatory material: the Documentation does explain that the BackupKey interface is used by the Data Protection API (DRAPI) to communicate master key backup information between the client machine and the domain controller. There is absolutely no description of how the backup key information is used by either server involved implementing the DRAPI (only a digression into the stateful characteristics of remote procedure calls in general is provided).

[2] Recent examples prove that Microsoft follows this industry practice in other areas. See the XML Paper Specification for XPS at www.microsoft.com/whdc/xps.

1.2 LACK OF USABILITY BY ORGANISATIONS NOT HAVING ACCESS TO THE MICROSOFT ENVIRONMENT

In Annex B Microsoft seeks to answer to the point made in our June report, but only refers to the example we provided to support it and the terminology used in this example. We therefore reiterate that the WSPP Technical Documentation would not be usable by someone without access to the Microsoft environment. There is no overt description of the algorithms, nor of the tabulated effects that would be produced by them.

1.3 THE WSPP TECHNICAL DOCUMENTATION COULD ONLY BE USED IN CONJUNCTION WITH REVERSE-ENGINEERING

Microsoft's response has corroborated our view on the subject. It confirms that the way server states are kept is only expressed in the source code and would therefore not be disclosed in the WSPP Technical Documentation. The behaviour of a server cannot be inferred from the reading of the WSPP Technical Documentation, due to the lack of introductory material, the lack of diagrams showing the relationship of a protocol to the state of servers that may use it and the lack of complete message and attribute inventories. This is not in line with industry practice.[3] In order to develop an interoperable product, a competitor would have to perform a considerable number of experiments using functioning combinations of Windows work group servers and PCs.

1.4 DEFICIENCY IN EXPLAINING ADEQUATELY THE SEQUENCING OF MESSAGES

Microsoft's response mentions that: "sequencing is clearly explained in the Technical Specification for those protocols that require an explanation". This means that such sequencing has not been described for the protocols for which, according to Microsoft, it is not necessary.

---

[3] Microsoft's own documentation of CIFS is of a higher standard. see: http://www.microsoft.com/downloads/details.aspx?FamilyId=C4ADB584-7FF0-4ACF-BD91-5F7708ADB23C&displaylang=enSee also examples of external to Microsoft CIFS documentation http://www.snia.org/tech_activities/CIFS/CIFS-TR-1p00_FINAL.pdf http://www.faqs.org/rfcs/rfc793.html tcp specification where it clearly describes the function, flow and objectives of the specification. Also included is the HTTP version 1.1 http://www.ietf.org/rfc/rfc2616.txt Both of which MS has followed allowing it to develop "interoperate protocols"

It is also particularly striking that the example of a sequence description provided in Microsoft's response does not correspond to the kind of sequence incurred in IDLs for server to server operation, but only to a lower level type of communication. A number of such sequences are needed and have consequently to be examined together in order to set up a server to server communication. This has nothing to do with the kind of description commonly used. As an example; the Open Group's documentation of the same general topic is much more helpful.[4]

1.5 SOME INFORMATION WAS LACKING

Examples of missing items concern Microsoft extension of certain standards, description of certificate structures, or description of protocols in the public domain but further extended by Microsoft. For example, the degree of Microsoft's modifications to the IETF RFCs on IPSEC is not fully documented. Almost no information directly stated what had been changed or why it had been changed has been provided. Similarly, we could not find any description of any extension of the digest protocol, which has been extended by Microsoft.

A revision history of the protocols was not provided by Microsoft. Nor does Microsoft provide information about the correlation of protocol revisions with operating system revisions.

2 FITNESS FOR PURPOSE (ACCURACY) OF THE WSPP TECHNICAL DOCUMENTATION

Following the review of Microsoft's response and our further examination of the WSPP Technical Documentation, we reiterate to the following points:

- it is deficient in explanations of meanings of several elements,
- it required elements located outside the WSPP Technical Documentation,
- parts of Active Directory displayed the symptoms of code that had not ever been in a fit state to document,
- to use it at all required a lengthy, forensic examination.

This leads us to the conclusion that the WSPP Technical Documentation does not appear to be fit for purpose.

[4] http://www.opengroup.org/onlinepubs/9629399/docix.htm in general and in particular:-
http://www.opengroup.org/onlinepubs/9629399/chap11.htm#tagcjh_16_04_01

2.1 REQUIREMENT OF INFORMATION LOCATED ELSEWHERE

Apart from the deficiencies already mentioned two types of information were lacking in the WSPP Technical Documentation:

- No information was provided concerning disclosures made by Microsoft outside the WSPP Technical Documentation: frequently no reference to such documentations was made and in certain cases, it was not even mentioned that such documentation exists,

- Information concerning non-Microsoft documentation: the WSPP Technical Documentation often refers to these sources, but provides no further indication on them or on how to access to them.

As an example, an implementer needs access to documentation of the many extensions Microsoft may have made to standard protocols, especially MS LDAP and SMTP and, even if some of these extensions may be quite trivial, there are effective in preventing interoperability with implementations that do comply with the public standards.

2.2 TO USE IT REQUIRES A LENGTHY, FORENSIC EXAMINATION

Our view is that there is little material to connect one atomic protocol message with another. Except in a few cases, the inter-relationship between messages is not clearly explained. The forensic examination we alluded to in our June report was the lengthy process of discovering those relationships needed to implement an interoperating product.

3 USABILITY OF THE NEW VERSION

Some of the points raised in our preceding report appear to have been solved with the new provided version of the WSPP Technical Documentation.

The previous version of the WSPP Technical Specification was indeed apparently incomplete. For example, some schemas that appeared to be missing in the previous version are now accessible using the later documentation, our equipment, and the PDF viewing method.

We can also confirm the PDF documentation was far easier to use and that we did not encounter the performance limitations concerning the speed of the viewing mechanisms described in our previous report.

GROUP otr

Report For CEC: Task 6

London• Brussels• The Hague• Singapore

Report for CEC Task 6

27 October 2005

Prepared for: Thomas Kramler

By: Elliott Roper, Mark Crocker

OTR Group – Brussels

Tel: + 32 2 230 2970

Fax: +32 2 231 0681

Author(s): Elliott Roper, Mark Crocker

DISTRIBUTION

NAME	TITLE	COMPANY
Thomas Kramler	Case Manager	CEC

CONTENTS

1 INTRODUCTORY REMARKS

As requested by the Commission, we have reviewed a report provided by Microsoft, dated 10th of October 2005, on the "Innovation and Pricing of the Directory & Global Catalogue Replication Protocol Group".

We have maintained a central focus on the review of the 31 innovations which Microsoft claims are disclosed with the DRS specification and analysed if the description of theses features indeed provides evidence of innovation in the DRS protocol.

We summarise our remarks as follows:

- The report does not provide clear evidence that there is any innovation in the DRS protocol - any innovative characteristics would have to be assessed in comparison to prior or parallel art. Microsoft does not provide any point of comparison,

- The list of the so-called "innovations in the Microsoft creation" is a list of some of the standard problems faced by anyone wanting to implement directory services. Microsoft does not provide any information relating to the innovativeness of the Active Directory solutions,

- Many of the "innovations in the Microsoft creation" appear to describe implementation details of Active Directory. It is not clear from the descriptions given, the extent to which each must be documented in order to fully describe the DRS protocols for the purpose of the remedy.

2 NO POINT OF COMPARISON

Microsoft asserts that the so-called "innovations" in the DRS protocol confer value as they would provide one of the following benefits:

- higher resilience,
- better performance,
- lower network utilization,
- higher performance,
- higher replication performance,
- more flexible deployment,
- improves data accuracy,
- tighter security,

– easier development.

However, these assertions are not substantiated: no point of reference is provided, nor any comparison to the state-of-the-art in the protocol technology: "more flexible deployment" could, for example, mean that the protocol allows a more flexible deployment compared to the previous version of the same protocol, but still stay considerably behind protocols provided by other actors of the industry in terms of deployment flexibility.

3 NO DEMONSTRATION OF ANY INNOVATION IN THE SO-CALLED "MICROSOFT'S CREATION" OF THE DRS PROTOCOL

– ***There is considerable prior art in Microsoft's innovations.***

By way of introduction, it has to be stressed that Microsoft has considerably borrowed from prior art and not developed the DRS protocol "from scratch". Directory Services are not a Microsoft's creation at all: work on directory services is now in public domain for over 15 years. For example, LDAP was released by the University of Michigan in 1990.

It should therefore be noted that:

– There has been considerable parallel development of directory services in the period during which Microsoft developed DRS, including development within the LDAP standard setting process,

– A great deal of research has been done in academia concerning the methods and speed of replication,

– ***The claimed innovations are standard features of this kind of technolog.***

Microsoft classifies its innovations under 3 categories, namely: 'topology optimizations', 'replication optimizations', and 'directory structure', 'deployment and security' and further details the solutions provided by the innovation under each of these headers.

However, the description of the details of the solutions provided by Microsoft only points to problems that have been faced by all suppliers in the industry. For example: speed of replication, method of replication, structure and method of the replication tree, and error handling are common problems in the field. They had to be solved by all other suppliers as well, and no evidence is provided that Microsoft's solutions are innovative when compared to the solutions competitors deploy.

It has to be stressed that it might even be a 'nuisance" for a competitor to contort its directory products and services to provide a service that interoperates with the Microsoft's protocols.

- ***The so-called "in-depth technical analysis" does not provide any proof of innovation for any of the 31 claimed "innovations in the DRS specification".***

On the basis of the information provided by Microsoft in this report, none of the "innovations" described appear to be innovative:

- Most of them correspond to problems that have already been solved, and no information has been provided by Microsoft that the protocol specifications would describe a more innovative solution than the ones known in the industry,
- They correspond to public standard or common industry practice,
- When we looked into the Technical Documentation, we could not find anything innovative in the specifications of the protocol,
- Some of the items are not innovations but in fact constraints imposed by the implementation of Active Directory.

The same points or concepts have been restated many times, giving the impression that there are more "Microsoft's creations".

category	Microsoft creation	Why not innovative?
Topology optimization	1.Topology calculation	Prior and parallel art (spanning tree et. al.) in Academia, network routing products and other directory replication systems such as usenet. Moreover, In Active Directory, as in many other replication systems, human-specified link cost assignment facilities are commonly used, which lessens the utility of any innovation in this area.
	2. Topology generator election	Prior art not only in directory services but also in network redundancy technology. Solved by Cisco or, earlier, by DECnet's preferred router .election method.
	3. Intersite topology creation	This appears to describe Microsoft specific implementation detail to 1. Any other replication scheme would already have similar objects and methods.
	4. Bridgehead server election	Number of older solutions exist, such as BGP4 and DECnet area router election.
	5. Site/domain topologies	Item covered in 4.
	6. Intersite transport	No innovation described in the Technical Documentation: standard SMTP (which is an open-standard) used as the transport for the e-mail variation.
	7. Replication technology modelling	Item covered by 1.
	8. Ring topology optimization	Common practice on usenet for a very long time, applied across the whole internet (within a site, Active Directory replicates over a hybrid topology combining aspects of tree and ring, with shortcut links).
	9. Graph state object	Item covered in 5 and its predecessors.
	10. Replication over unreliable commlink	Item covered in 6.
	11. Server failure response	Item covered in 2.
Replication Optim-izations	12. Replication from a partner	This appears to be a partly a consequence of any tree-like directory. As such there is considerable prior art.
	13. Collision management	Prior art: Thomas's Write Rule (1976), after ordering potential conflicts by a logical clock (Parker 1983) called UTD vectors in the Microsoft report.
	14. Global catalogue promotion	Global catalogue replication is handled in a single master fashion. DNS represents prior art.

	15. Replication cycle initiation	Requirement stemming from Microsoft's implementation.
	16. Propagation dampening	Item covered in 15.
	17. Special object update	Not enough information to comment.
	18. Update rule application	Not enough information to comment.
	19. Missing and deleted object resolution	In common with much prior art, Microsoft deals with deleted objects by using "tombstones". These are remnants of the deleted object used to discard delayed updates or reverse the deletion operation.
	20. Up-to-datedness confirmation	Item covered in 15.
	21. Linked value replication	Item covered in 16, 17, 20. This is a natural result of a hierarchical directory structure of which there is much prior art. It also covers version vectors again.
	22. Partial attribute set replication	Item covered in 12, 15 and 21.
Directory Structure, Deployment and Security	23. Forest all-domain rename	Has only to be implemented because of Microsoft's network topology others may approach this in a different way.
	24. Forest mode	Has only to be implemented to maintain backward compatibility with earlier Microsoft implementations and therefore not valuable.
	25. Trust maintenance	Public standard: Kerberos.
	26. Group membership records	Normal industry 'web of trust' technology.
	27. Canonical naming	Common practice derived from external DNS standards.
	28. Aggregate abstract schema	Simple application of the LDAP schema.
	29. Application directory	No value added: others systems tackle the problem as successfully.
	30. Class structure	Prior art: standard procedure in many similar development environments.
	31. DNS enhancement	Prior art: standard feature of several others operating systems, e.g. VMS; and some Unix operating systems.