103 – A suspicious developer

Team Information

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Instructions

Description The auditing department of a software development company received an internal whistleblower report stating that a developer from the development team had outsourced a project to another company for execution. The auditing department initiated an investigation to determine whether there had been a violation of internal labor and security regulations. In response, that developer claimed to have personally developed the project and submitted the program source files and the resulting executable files to the audit team as evidence. The auditing department obtained the previous deliverables (executable files) that the developer had submitted by retrieving them from company's project management server. Verify the accuracy of the internal whistleblower's claims.

Target	Hash (SHA1)
Files.zip	26B11C75AD1F469B35284A29D973B716C030C71B

Questions

Please solve all problems based on UTC+9 time zone.

1) Write the items indicating the build tool version information stored in the given two PE format executable files in the format of "[ProductID].[BuildID].[Count]". (80 points)
   - Write 9 items per file and do so for both two files. (40 points each)
2) Write the build folder paths for the given two executable files. (20 points)
   - Write the build folder paths for both files. (10 points each)

Teams must:

- Develop and document the step-by-step approach used to solve this problem to allow another examiner to replicate team actions and results.
- Specify all tools used in deriving the conclusion(s).

Tools used:

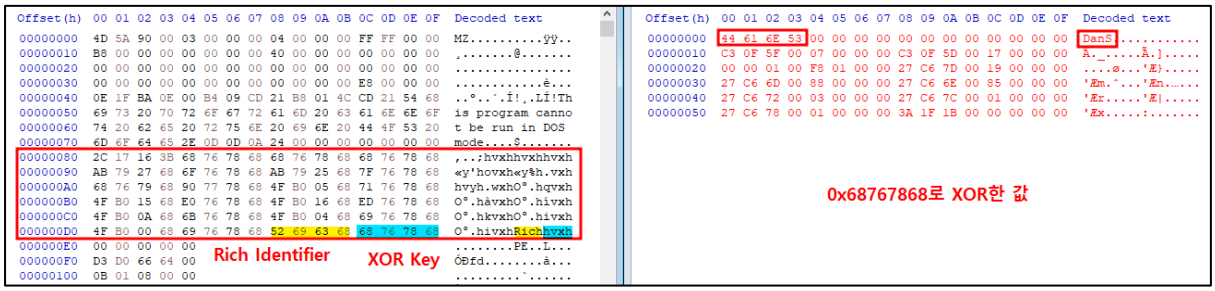
Name:	HxD	Publisher:	mh-nexus
Version:	2.5.0.0		
URL:	https://mh-nexus.de/en/		

Name:	PE-bear	Publisher:	hasherezade
Version:	0.6.5.2		
URL:	https://github.com/hasherezade/pe-bear		

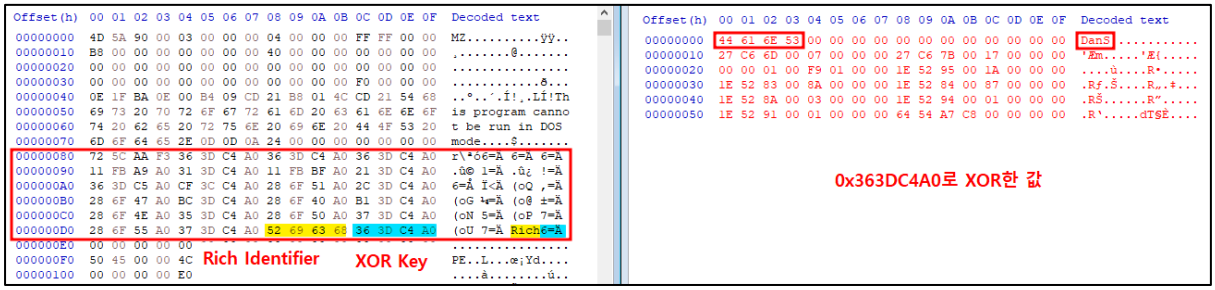
Step-by-step methodology:

Q1. Write the items indicating the build tool version information stored in the given two PE format executable files in the format of "[ProductID].[BuildID].[Count]". (80 points)

문제에서 주어진 2개의 실행 파일에 저장된 빌드 도구 버전 정보는 각 파일의 Rich Header 정보를 통해 파악할 수 있다. Rich Header는 프로그램을 빌드한 컴파일러에 대한 정보 및 실행파일이 생성된 환경에 대한 정보가 저장된 영역이다. HxD 도구로 PE 구조를 살펴보면, 0x80 Offset부터 Rich Header 구조를 확인할 수 있는데, "Rich" 구분자 바로 뒤 4바이트 hex 값으로 XOR 인코딩되어 존재한다. XOR Key로 디코딩 시 초기 "DanS" 문자열 시그니처를 확인할 수 있으며 제로 패딩 값 이후 컴파일러 정보가 기록되어 있다.

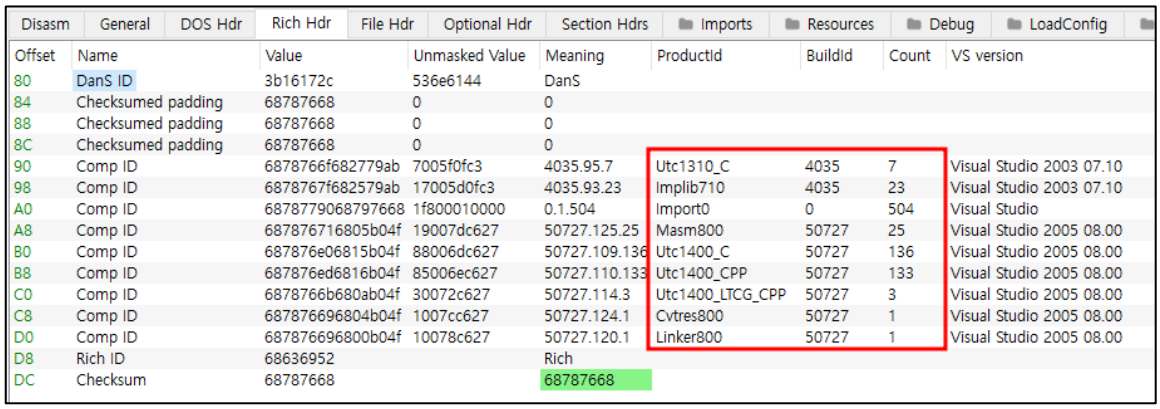


FromBuildServer.exe



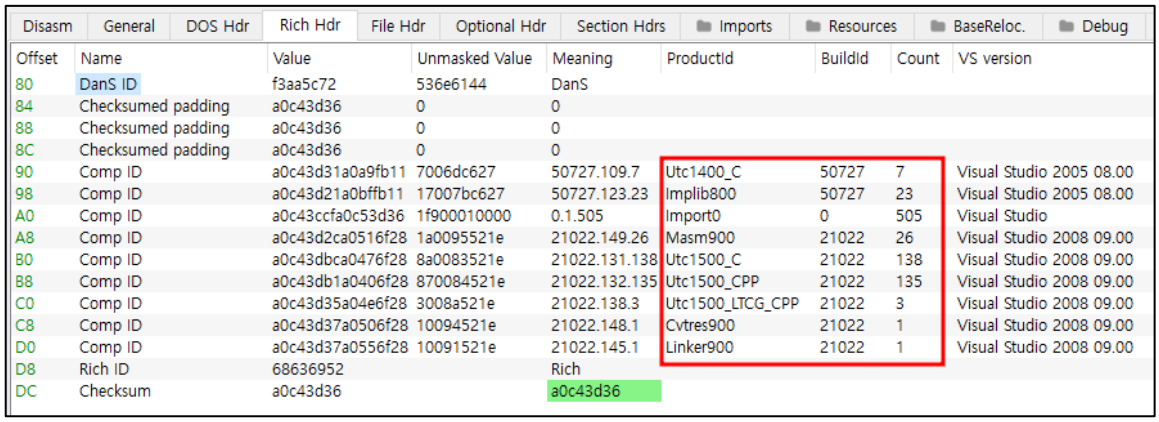
FromDeveloper.exe

Rich Header 분석 기능을 제공하는 PE-Bear 도구를 사용하여 각 파일의 ProductID, BuildID, Count 값을 확인할 수 있었다.



Offset	Name	Value	Unmasked Value	Meaning	ProductId	BuildId	Count	VS version
80	DanS ID	3b16172c	536e6144	DanS				
84	Checksumed padding	68787668	0	0				
88	Checksumed padding	68787668	0	0				
8C	Checksumed padding	68787668	0	0				
90	Comp ID	6878766f682779ab	7005f0fc3	4035.95.7	Utc1310_C	4035	7	Visual Studio 2003 07.10
98	Comp ID	6878767f682579ab	17005d0fc3	4035.93.23	Implib710	4035	23	Visual Studio 2003 07.10
A0	Comp ID	6878779068797668	1f800010000	0.1.504	Import0	0	504	Visual Studio
A8	Comp ID	687876716805b04f	19007dc627	50727.125.25	Masm800	50727	25	Visual Studio 2005 08.00
B0	Comp ID	687876e06815b04f	88006dc627	50727.109.136	Utc1400_C	50727	136	Visual Studio 2005 08.00
B8	Comp ID	687876ed6816b04f	85006ec627	50727.110.133	Utc1400_CPP	50727	133	Visual Studio 2005 08.00
C0	Comp ID	6878766b680ab04f	30072c627	50727.114.3	Utc1400_LTCG_CPP	50727	3	Visual Studio 2005 08.00
C8	Comp ID	687876696804b04f	1007cc627	50727.124.1	Cvtres800	50727	1	Visual Studio 2005 08.00
D0	Comp ID	687876696800b04f	10078c627	50727.120.1	Linker800	50727	1	Visual Studio 2005 08.00
D8	Rich ID	68636952		Rich				
DC	Checksum	68787668		68787668				

FromBuildServer.exe



Offset	Name	Value	Unmasked Value	Meaning	ProductId	BuildId	Count	VS version
80	DanS ID	f3aa5c72	536e6144	DanS				
84	Checksumed padding	a0c43d36	0	0				
88	Checksumed padding	a0c43d36	0	0				
8C	Checksumed padding	a0c43d36	0	0				
90	Comp ID	a0c43d31a0a9fb11	7006dc627	50727.109.7	Utc1400_C	50727	7	Visual Studio 2005 08.00
98	Comp ID	a0c43d21a0bffb11	17007bc627	50727.123.23	Implib800	50727	23	Visual Studio 2005 08.00
A0	Comp ID	a0c43ccfa0c53d36	1f900010000	0.1.505	Import0	0	505	Visual Studio
A8	Comp ID	a0c43d2ca0516f28	1a0095521e	21022.149.26	Masm900	21022	26	Visual Studio 2008 09.00
B0	Comp ID	a0c43dbca0476f28	8a0083521e	21022.131.138	Utc1500_C	21022	138	Visual Studio 2008 09.00
B8	Comp ID	a0c43db1a0406f28	870084521e	21022.132.135	Utc1500_CPP	21022	135	Visual Studio 2008 09.00
C0	Comp ID	a0c43d35a04e6f28	3008a521e	21022.138.3	Utc1500_LTCG_CPP	21022	3	Visual Studio 2008 09.00
C8	Comp ID	a0c43d37a0506f28	10094521e	21022.148.1	Cvtres900	21022	1	Visual Studio 2008 09.00
D0	Comp ID	a0c43d37a0556f28	10091521e	21022.145.1	Linker900	21022	1	Visual Studio 2008 09.00
D8	Rich ID	68636952		Rich				
DC	Checksum	a0c43d36		a0c43d36				

FromDeveloper.exe

리치헤더 구조에 따라 확인한 "[ProductID].[BuildID].[Count]"는 아래와 같다. ProductID에 매칭되는 Int 값은 아래 Github 정보를 참고하였다.

- https://github.com/kirschju/richheader/blob/master/prodids.py

	FromBuildServer.exe	FromDeveloper.exe
1	[95(Utc1310_C)].[4035].[7]	[109(Utc1400_C)].[50727].[7]
2	[93(Implib710)].[4035].[23]	[123(Implib800)].[50727].[23]
3	[1(Import0)].[0].[504]	[1(Import0)].[0].[505]
4	[125(Masm800)].[50727].[25]	[149(Masm900)].[21022].[26]

5	[109(Utc1400_C)].[50727].[136]	[131(Utc1500_C)].[21022].[138]
6	[110(Utc1400_CPP)].[50727].[133]	[132(Utc1500_CPP)].[21022].[135]
7	[114(Utc1400_LTCG_CPP)].[50727].[3]	[138(Utc1500_LTCG_CPP)].[21022].[3]
8	[124(Cvtres800)].[50727].[1]	[148(Cvtres900)].[21022].[1]
9	[120(Linker800)].[50727].[1]	[145(Linker900)].[21022].[1]

Q2. Write the build folder paths for the given two executable files. (20 points)

Build folder path는 PDB Path를 통해 알 수 있다. PDB 파일은 PE 파일에 대한 디버깅 관련 정보를 담고 있으며, PE 파일의 디버그 섹션에 존재하는 타입 중 CODEVIEW 타입 정보에서 해당 PE와 연결된 PDB 파일의 이름과 경로를 획득할 수 있다. 아래는 PE-Bear 도구를 사용하여 각 실행파일의 빌드 폴더를 확인한 내용이다.

2-1) FromBuildServer.exe

프로젝트 폴더는 d:₩BusinessDev₩ DFC_Company이고, 실행 파일 및 pdb 파일이 위치한 경로는 d:₩BusinessDev₩DFC_Company₩DFC2023₩Release이다. 그리고 pdb 파일의 경로는 d:₩BusinessDev₩DFC_Company₩DFC2023₩Release₩DFC2023.pdb 이다.

Visual C++ (CodeView) [1 entry]

Offset	Name	Value
24B28	CvSig	RSDS
24B2C	Signature	{9E35CEC6-D7F6-4870-9A86-689D86D6DF68}
24B3C	Age	1
24B40	PDB	d:₩BusinessDev₩DFC_Company₩DFC2023₩Release₩DFC2023.pdb

2-2) FromDeveloper.exe

프로젝트 폴더는 C:₩Users₩dskm₩Documents₩Visual Studio 2008₩Projects₩DFC2023이고, 실행 파일 및 pdb 파일이 위치한 경로는 C:₩Users₩dskm₩Documents₩Visual Studio 2008₩Projects₩DFC2023₩Release이다. 그리고 pdb 파일의 경로는 C:₩Users₩dskm₩Documents₩Visual Studio 2008₩Projects₩DFC2023₩Release₩DFC2023.pdb 이다.

Visual C++ (CodeView) [1 entry]

Offset	Name	Value
23E50	CvSig	RSDS
23E54	Signature	{0FA20D54-E45C-43DA-A626-DF38EB80B4F4}
23E64	Age	1
23E68	PDB	C:₩Users₩dskm₩Documents₩Visual Studio 2008₩Projects₩DFC2023₩Release₩DFC2023.pdb