



# Knowledge Server 2.1

## Performance Test Report



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## 1. Executive Summary

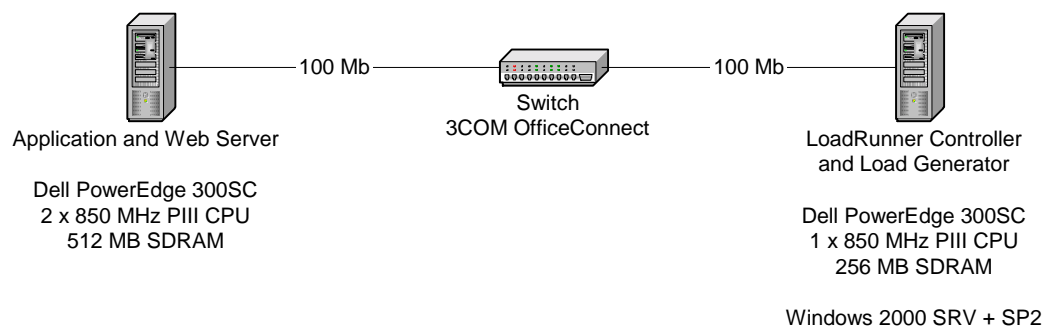
The Intellix Knowledge Server 2.1 was tested on three Microsoft Windows operating systems, Windows NT 4.0 Server, Windows 2000 Server and Windows .NET Standard Server using LoadRunner 7.02 from Mercury Interactive.

Simulating the actions of a varying number of users the load on the CPU was held against the recorded hits per second, the throughput in kilobytes per second and the transaction response time. The Windows NT 4.0 Server installation showed the poorest performance, while the Windows 2000 and Windows .NET servers behaved similar for low CPU load. For high CPU load the Windows .NET Server performed better than the Windows 2000 Server. The Windows .NET Server was able to use above 99 percent of the CPU while the Windows 2000 Server topped at 95 percent.

## 2. Testing Methodology

### 2.1 Network configuration

The Knowledge Server 2.1 was tested in the following network configuration:



A detailed listing of the hardware specifications of the Application Server and the LoadRunner Controller have been placed in Appendix C.

### 2.2 Test tool

LoadRunner 7.02 was used as test tool.

### 2.3 Installations

Two servers were involved in the test environment. An Application/Web Server and a Controller/Load Generator.

#### 2.3.1 Application Server

The Application Server was installed with three different Microsoft operating systems, Windows NT 4.0 Server (SP6a, IIS 4.0), Windows 2000 Server (SP2, IIS 5.0) and Windows .NET Standard Server (beta 3, IIS 6.0). Intellix Knowledge Server 2.1 and Intellix Remote Administrator 2.1 were installed on the Application Server. Three Guide domains were uploaded to the Knowledge Server each with 60 instances. The metabase of the Internet Information Server (IIS) on the Application Server was optimised with settings recommended by XTune, an IIS optimisation tool.

#### 2.3.2 Controller/Load Generator

The LoadRunner Controller and Load Generator (version 7.02) was installed on a Windows 2000 Server (SP2).

## 2.4 Test scenario

A well-defined case using the Mini-Bank domain was recorded with the LoadRunner VuGen tool. The LoadRunner script contained 13 user actions each resulting in a transaction at the Application Server. A wait time of 5 seconds between each user action was inserted in the script. The contents of the LoadRunner script may be found in Appendix B.

## 2.5 Test procedures

The LoadRunner script was altered to comply with the relevant server name, which differed for the three operating systems.

Using LoadRunner functionality the load against the Application Server was gradually increased by adding 5 users every 8 seconds until the total number of users in the scenario was reached. After this ramp up period the scenario was run for 20 minutes.

The LoadRunner Controller captured performance data from the Application Server with regards to CPU utilisation, hits per second and throughput in bytes per second. The data was stored in an SQL database for further analysis.

A number of LoadRunner scenarios were created to comply with varying number of users and varying operating system. Below are listed the number of scenarios created.

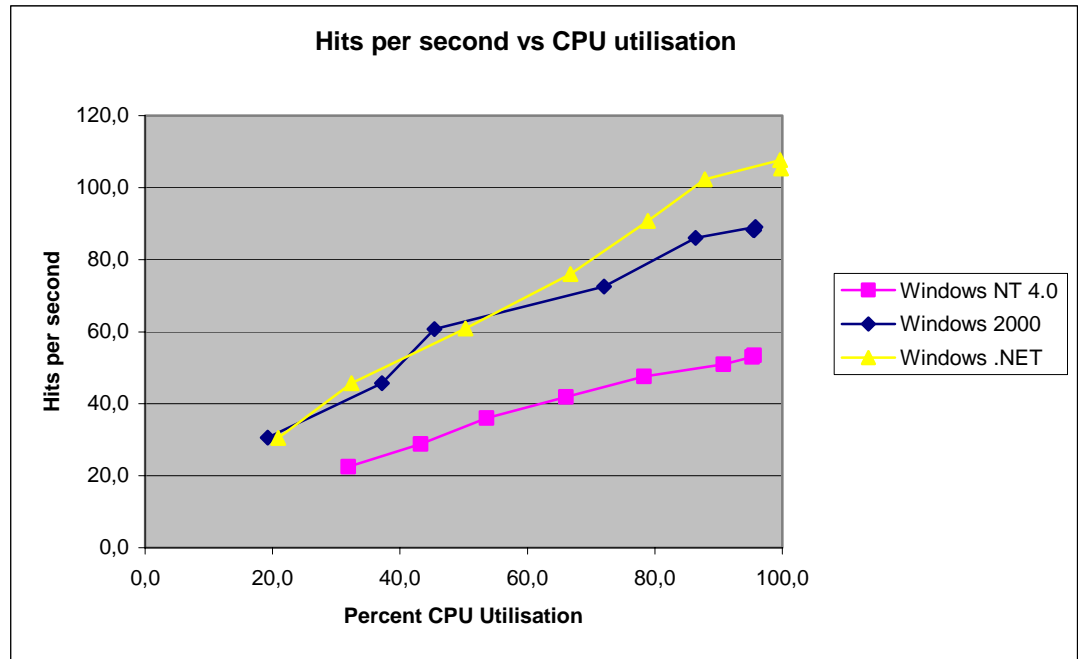
Operating system	Scenario ID	Number of users
Windows NT 4.0	1	100
	2	150
	3	200
	4	225
	5	250
Windows 2000	6	100
	7	150
	8	200
	9	250
	10	300
	11	250
	12	400
	13	450
Windows .NET	14	100
	15	150
	16	200
	17	250
	18	300
	19	350
	20	400
	21	450

Before each run the Knowledge Server 2.1 service on the Application Server was restarted as were the World Wide Web Publishing service and the IIS Admin service.

## 3. Test Result

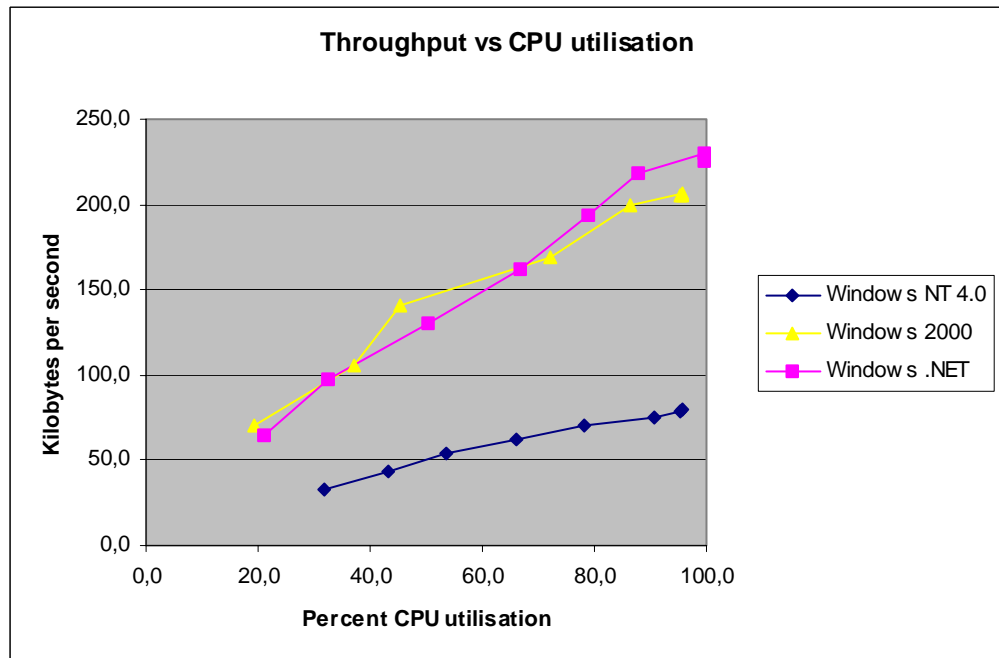
From the result files offered by LoadRunner average values for CPU utilisation, hits per second and throughput in bytes per second were extracted. The data depicted in the following graphs is listed in Appendix A.

In Figure 2.5-1 the relation between CPU utilisation and hits per second against the Application Server is compared for the three operating systems.



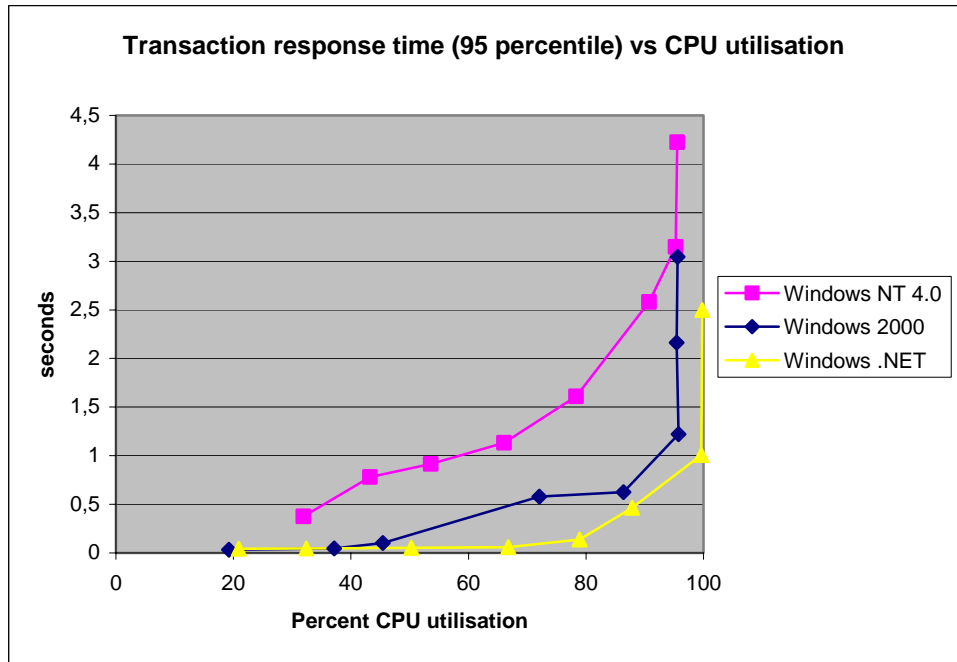
• Figure 2.5-1: Hits per second as a function of CPU utilisation

In Figure 2.5-2 the relation between CPU utilisation and the throughput in bytes per second is compared for the three operating systems.



• Figure 2.5-2: Throughput in kilobytes per second as a function of CPU utilisation

In Figure 2.5-3 the relation between CPU utilisation and the transaction response time (95 percentile) is compared for the three operating systems.



• Figure 2.5-3: Transaction response time (95 percentile) as a function of percent CPU utilisation

## Appendix A Test Results

### Windows NT 4.0

CPU utilisation	hits/sec	kilobytes/sec	T95(sec)
31,9	22,5	33,4	0,375
43,2	28,9	42,8	0,781
53,6	36,1	53,6	0,915
66,0	41,9	62,1	1,132
78,3	47,6	70,6	1,609
90,8	50,9	75,6	2,582
95,3	53,0	78,7	3,146
95,6	53,5	79,4	4,223

### Windows 2000 Server

CPU utilisation	hits/sec	kilobytes/sec	T95 (sec)
19,2	30,6	71,0	0,034
37,1	45,7	106,2	0,045
45,4	60,8	141,2	0,103
72,0	72,5	168,6	0,580
86,4	86,1	200,0	0,626
95,8	89,0	206,9	1,220
95,4	88,3	205,3	2,164
95,6	88,2	205,1	3,045

### Window .NET Standard Server (beta 3)

CPU utilisation	hits/sec	kilobytes/sec	T95 (sec)
20,9	30,5	65,1	0,042
32,4	45,7	97,5	0,048
50,3	60,9	130,2	0,052
66,8	76,0	162,1	0,061
78,9	90,7	193,6	0,139
87,8	102,3	218,4	0,464
99,6	107,6	229,8	1,007
99,8	105,3	224,8	2,498

## Appendix B LoadRunner Script

```
XML Guide MiniBank VarSrv.usr
```

```
#include "as_web.h"
```

```
XMLGuideMiniBank()
```

```
{
```

```
    int ThinkTime = 5;
```

```
    web_url("Start.asp",  
            "URL=http://ixrdtest7-0s/ks2-  
xmlguide/Start.asp?DomainAlias=Credit%20Automation",  
            "TargetFrame=",  
            "Resource=0",  
            "RecContentType=text/html",  
            "Referer=http://ixrdtest7-0s/xmlguide/start.asp",  
            "Snapshot=t2.inf",  
            "Mode=HTML",  
            LAST);
```

```
    Ir_think_time( ThinkTime );
```

```
    web_submit_form("SSN",  
                   "Snapshot=t3.inf",  
                   ITEMDATA,  
                   "Name=Value", "Value=012346789", ENDITEM,  
                   LAST);
```

```
    Ir_think_time( ThinkTime );
```

```
    web_submit_form("Name",  
                   "Snapshot=t4.inf",  
                   ITEMDATA,  
                   "Name=Value", "Value=John Doe", ENDITEM,  
                   "Name=submit.x", "Value=19", ENDITEM,  
                   "Name=submit.y", "Value=21", ENDITEM,  
                   LAST);
```

```
    Ir_think_time( ThinkTime );
```

```
    web_submit_form("CreditAmount",  
                   "Snapshot=t5.inf",  
                   ITEMDATA,  
                   "Name=Value", "Value=100000", ENDITEM,  
                   LAST);
```

```
    Ir_think_time( ThinkTime );
```

```
web_submit_form("Married",
    "Ordinal=1",
    "Snapshot=t6.inf",
    ITEMDATA,
    LAST);

lr_think_time( ThinkTime );

web_submit_form("Security",
    "Ordinal=1",
    "Snapshot=t7.inf",
    ITEMDATA,
    LAST);

lr_think_time( ThinkTime );

web_submit_form("YearlySalary",
    "Snapshot=t8.inf",
    ITEMDATA,
    "Name=Value", "Value=200000", ENDITEM,
    LAST);

lr_think_time( ThinkTime );

web_submit_form("Housing",
    "Ordinal=2",
    "Snapshot=t9.inf",
    ITEMDATA,
    LAST);

lr_think_time( ThinkTime );

web_submit_form("CreditCards",
    "Ordinal=3",
    "Snapshot=t10.inf",
    ITEMDATA,
    LAST);

lr_think_time( ThinkTime );

web_submit_form("OverdraftsDays",
    "Snapshot=t11.inf",
    ITEMDATA,
    "Name=Value", "Value=2", ENDITEM,
    LAST);

lr_think_time( ThinkTime );

web_submit_form("OverdraftAmount",
    "Snapshot=t12.inf",
```

```
        ITEMDATA,  
        "Name=Value", "Value=500", ENDITEM,  
        LAST);  
  
    lr_think_time( ThinkTime );  
  
    web_submit_form("ExternalHistory",  
        "Ordinal=2",  
        "Snapshot=t13.inf",  
        ITEMDATA,  
        LAST);  
    lr_think_time( ThinkTime );  
    web_link("Close Session",  
        "Text=Close Session",  
        "Snapshot=t14.inf",  
        LAST);  
  
    lr_think_time( ThinkTime );  
  
    return 0;  
}
```

## Appendix C Test Equipment Specification

Intellix R&D Id		IxRdTest7	Pluto
Role in tests		Application Server	Controller/Load Generator
PC	Product	Dell	Dell
	Model	PowerEdge	PowerEdge
	Type	300SC	300 SC
CPU	Product	Intel	Intel
	Model	Pentium	Pentium
	Type	III	III
	Speed	850 MHz	850 MHz
	Number	2	1
CPU Bus	Speed	100 MHz	100 MHz
CPU cache	Level 1 Size	32 kB	32 kB
	Level 2 Size	256 kB	256 kB
RAM	Type	SDRAM	ECC SDRAM
	Size	512MB (2*256)	256 MB
	Speed	100 MHz	100 MHz
Hard disk	Product	WDC	WDC/MAXTOR
	Type	EIDE	EIDE/EIDE
	Size	20 GB	20 GB/80 GB
	Speed	7200 RPM	7200 RPM/7200 RPM
Floppy Drive	Size	1,44 MB	1,44 MB
CD-ROM	Product		
	Type	IDE	
	Model		
	Speed		
Display Adapter	Product	ATI	ATI
	Model	3D RAGE IIC AGP	3D RAGE IIC AGP
Net Adapter	Product	Intel	3COM
	Model	Pro 100+ NIC	3C905B-TX
	Speed	10/100 Mbit/s	10/100 Mbit/s
Secondary Net Adapter	Product	3COM	
	Model	3C905B-TX	
	Speed	10/100 Mbit/s	
Sound Card	Product		
	Model		