

# S7 OPC Server Performance-Test

## Abstract

The performance test described in this document explores the effectiveness of S7 OPC servers from 8 different manufacturers. It has been measured the time for read access on one or several Siemens S7 PLCs via the OPC interface. The communication between the computer and the PLC was done via Ethernet TCP/IP.

### 1. Test Computer

All tests have been executed on a 2,4 GHz computer with 256MB RAM and Windows 2000 as operating system.

### 2. Test S7 PLCs

Three S7-400 controllers with CP 443-1 communication processors have been used. PLC 1 was connected via 100 MBit, PLC 2 and 3 via 10 MBit Ethernet with the test computer.

PLC no.	CPU	CP	Ethernet in MBit/s
PLC 1	6ES7 414 2XG03 - 0AB0	443-1EX11-0XE0	100
PLC 2	6ES7 414 1XG02 - 0AB0	443-1EX00-0XE0	10
PLC 3	6ES7 413 1XG00 - 0AB0	443-1EX00-0XE0	10

Table 1: Specification of the three S7 test controllers

### 3. Test OPC Server

Beside the Softing S7 OPC Server the latest versions of the S7 OPC servers from Applicom, IBH, INAT, Kepware, Langner, Siemens und Wonderware have been tested. Two of eight OPC servers did not meet the requirements of the test cases defined in table 2 (e.g. no support of arrays) resp. did not comply to the OPC specification. Therefore only six different OPC servers are listed in the test results.

### 4. Test OPC Client

Based on the Softing OPC Toolbox a test OPC client has been developed which creates a connection to the test OPC server, creates an OPC Group and the OPC Items according to the test cases defined in table 2. Therefore the time for setting up the connection to the OPC server and the time to create OPC Group and OPC Items did not effect the measured time for reading data.

## 5. Execution of the Test

Every OPC Item was read 200 times with synchronous OPC read requests. Using the Windows performance counter the time before and after the synchronous read request has been measured. The difference between these two times is the actual duration for processing the read request. The average value of all 200 measurement results has been calculated.

## 6. Test Cases

The test cases include reading of single counters (double word), inputs as well as arrays of counters, flags and timers. The size of arrays was varied between seven and 1.000 bytes.

Test case	Type of read access	(size in bytes)	PLC
1	DB200.DBDO	Data block (DB): 200; one double word; (counter)	PLC 1
2	DB200.DBB100[1..1000] DB200.DBDO	DB: 200; one byte; offset: 100; size of array: 1.000 DB: 200; one double word (counter)	PLC 1
3	DB200.DBB100[1..90] DB201.DBB100[1..90] DB202.DBB100[1..90] DB203.DBB100[1..90] DB200.DBDO	DB: 200; one byte; offset: 100; size of array: 90 DB: 201; one byte; offset: 100; size of array: 90 DB: 202; one byte; offset: 100; size of array: 90 DB: 203; one byte; offset: 100; size of array: 90 DB: 200; one double word (counter)	PLC 1
4	DB200.DBB100[1..500] DB201.DBB100[1..500] DB200.DBDO	DB: 200; one byte; offset: 100; size of array: 500 DB: 201; one byte; offset: 100; size of array: 500 DB: 200; one double word (counter)	PLC 1
5	DB200.DBB100[1..50] EB0[1..8] MB0[1..30] TO[1..10] ZO[1..10] DB200.DBDO	DB: 200; one byte; offset: 100; size of array: 50 Input byte; size of array: 7 Flag byte; size of array: 30 one timer; size of array: 10 one counter; size of array: 10 DB: 1; one double word (counter)	PLC 1
6-10	Test cases 1 - 5 with two S7 PLCs in parallel		PLC 2 and PLC 3

Table 2: Definition of 10 test cases

## 7. Test Results

In 8 of 10 test cases the product of manufacturer Softing AG demonstrates the shortest read request times and therefore is the fastest OPC server in its class. Fig. 1 and 2 show the results of the measurements of test case 3 and test case 6 as examples.

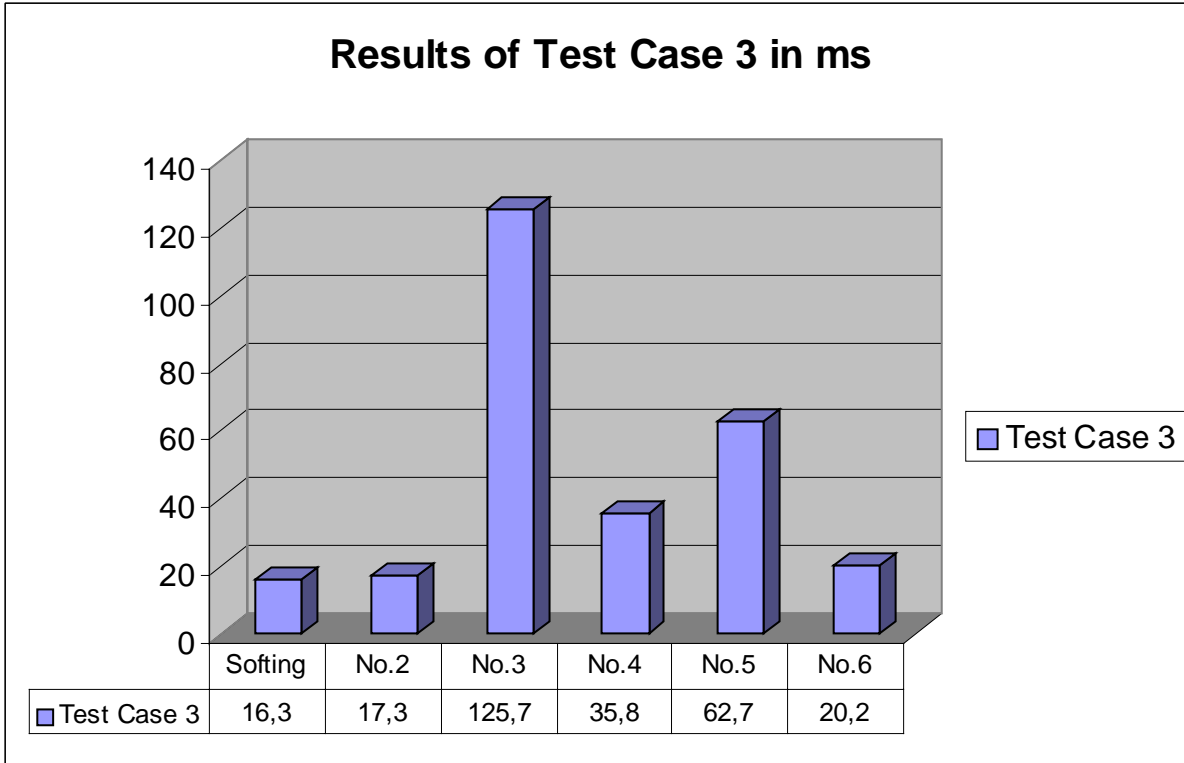


Fig. 1: Results of the measurement of test case no. 3

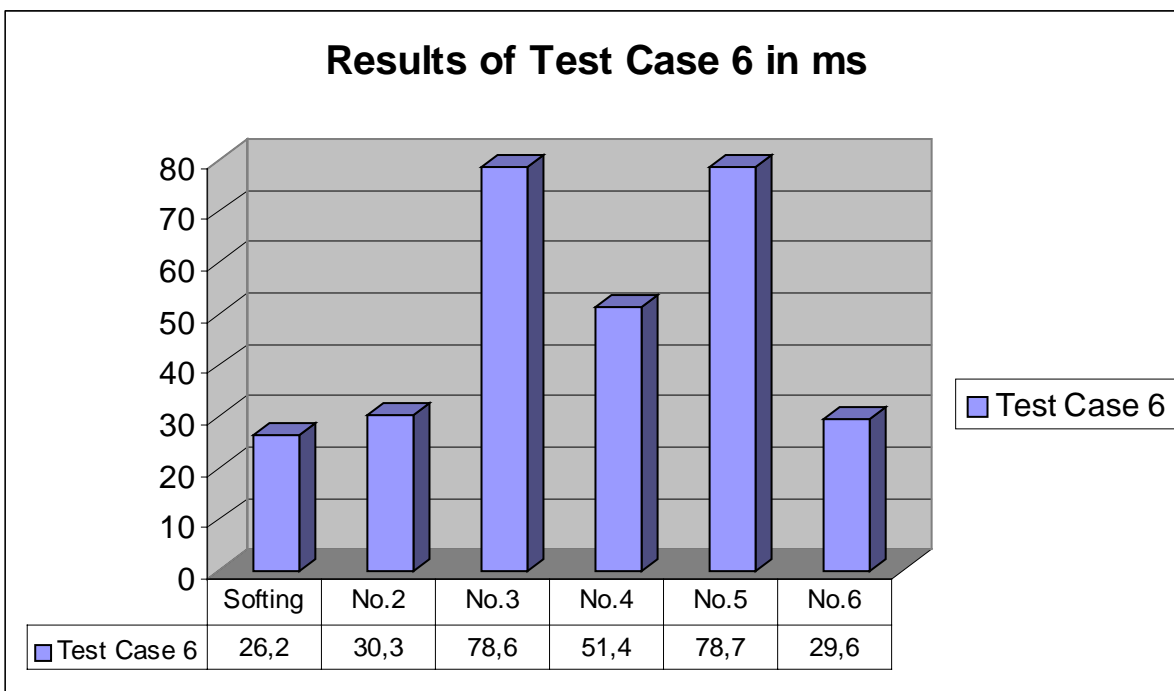


Fig. 2: Results of the measurement of test case no. 6

Fig. 3 shows the results of the two fastest OPC servers for all 10 test cases. In average the S7 OPC Server of Softing is about 10 % faster than the second fastest product of a different manufacturer.

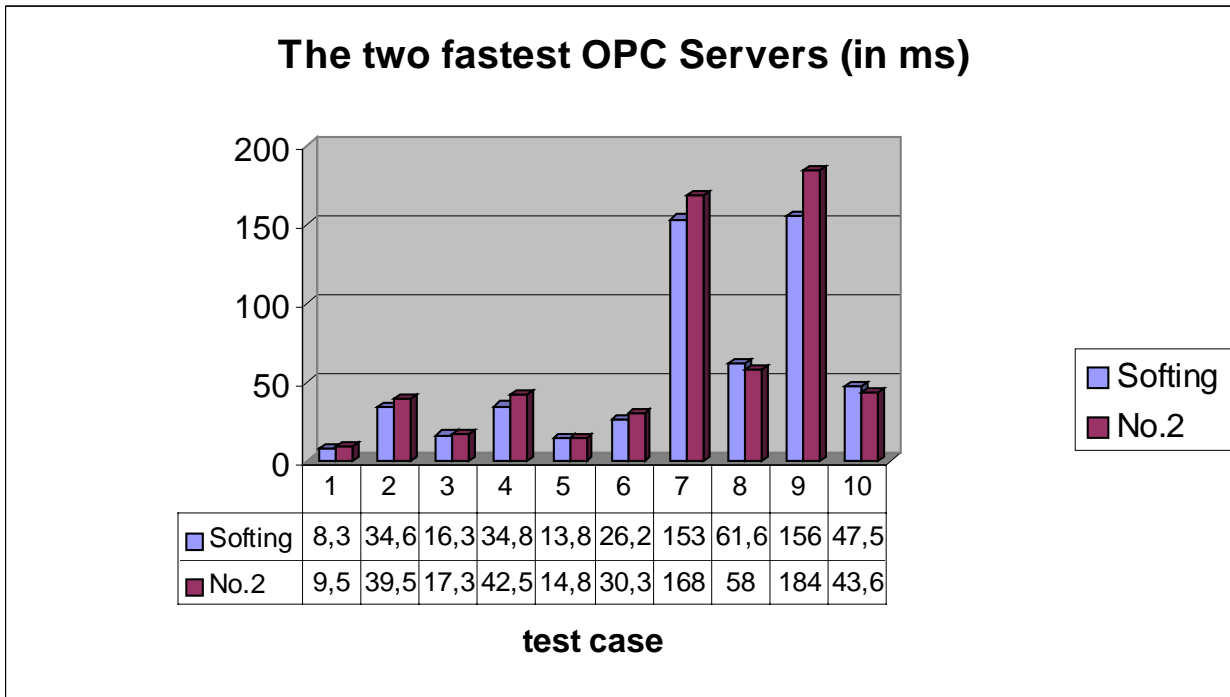


Fig. 3: Comparison of the two fastest OPC servers for all 10 test cases