



Engineered with TIA Portal

SIMATIC S7-1500 Redundant Systems

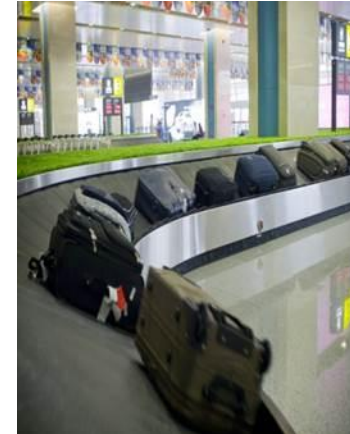
Redundant systems

Motivation



Preventing plant downtime

High availability during operation,
Avoidance of loss of production



Prevention of data losses

The data remain intact and long restart times after a failure are eliminated.

Prevention of damages

Avoidance of unplanned production stops
where the product to be processed would
be permanently damaged

Operation without persons locally

Maintenance trips can be better
planned

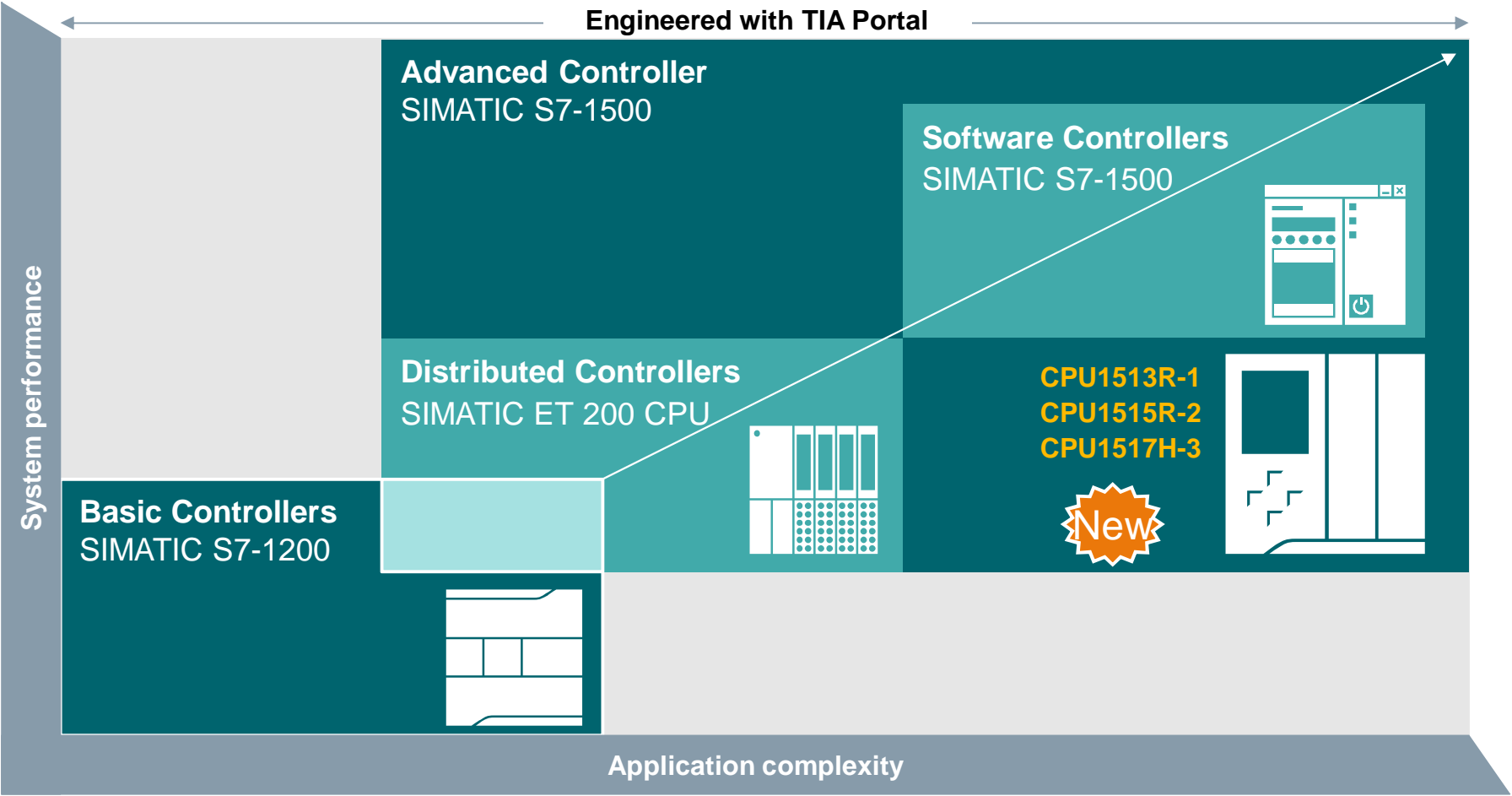
Save on maintenance

Application solutions are mostly
complicated and difficult to
maintain



Redundant systems reduce costs

Das SIMATIC Controller Portfolio always offers the right controller – plus integrated added values!



- Efficient Engineering
- Innovative Design
- Reliable Diagnosis
- Safety Integrated
- Security Integrated
- Technology Integrated

SIMATIC S7-1500 Redundant systems

System overview (1st Release step)

Consistent concept –
Identical synchronization
process

Scaling of the switching
performance over the **available
bandwidth** of the
sync connection

CPU type

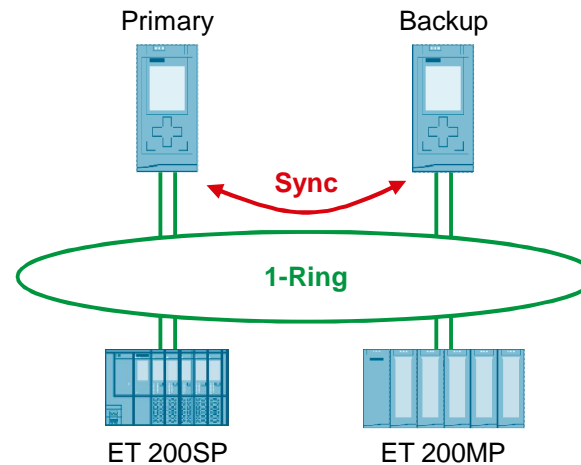
Synchronization

Switchover time

I/O systems

Type of connection

Redundant – S7-1500R



CPU 1513R/CPU 1515R

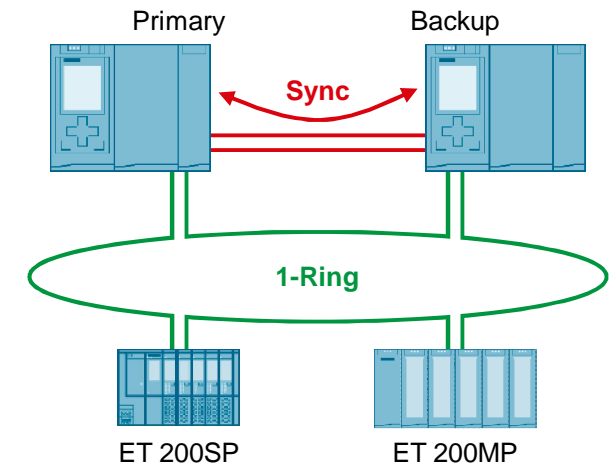
via **Profinet Ring (MRP)**

200 – 500ms

ET 200SP and ET 200MP

Single connection (PN redundancy S2)

High available – S7-1500H



CPU 1517H

Via **Sync module**

<100ms

ET 200SP and ET 200MP

Single connection (PN redundancy S2)



SIMATIC S7-1500 Redundant systems

Technical characteristics / placement in the S7-1500 Portfolio



	Compact		Standard						Technology				MFP	Redundant/ High available		
CPU types	1511C-1 PN	1512C-1 PN	1511F-1 PN	1513F-1 PN	1515F-2 PN	1516F-3 PN/DP	1517F-3 PN/DP	1518F-4 PN/DP	1511TF-1 PN	1515TF-2 PN	1516TF-3 PN/DP	1517TF-3 PN/DP	1518F-4 PN/DP MFP	1513R-1 PN	1515R-2 PN	1517H-3 PN
Interfaces	<div>1</div> <div>1</div>	<div>1</div> <div>1</div>	<div>1</div> <div>1</div>	<div>1</div> <div>1</div>	<div>1</div> <div>2</div> <div>1</div>	<div>1</div> <div>2</div> <div>1</div> <div>3</div>	<div>1</div> <div>2</div> <div>1</div> <div>3</div>	<div>1</div> <div>2</div> <div>4</div> <div>3</div>	<div>1</div> <div>1</div>	<div>1</div> <div>2</div> <div>1</div>	<div>1</div> <div>2</div> <div>1</div> <div>3</div>	<div>1</div> <div>2</div> <div>1</div> <div>3</div>	<div>1</div> <div>2</div> <div>4</div> <div>3</div>	<div>1</div> <div>1</div>	<div>1</div> <div>2</div> <div>1</div>	<div>1</div> <div>2</div> <div>3</div> <div>3</div>
Work Memory	175 KB	250 KB	150/225 KB	300/450 KB	500/750 KB	1/1,5 MB	2/3 MB	4/6 MB	225/225 KB	750/750 KB	1,5/1,5 MB	3/3 MB	4/6 MB	300 KB	500 KB	2 MB
Data memory(MB)	1	1	1	1,5	3	5	8	20	1	3	5	8	20	1,8	3,5	8
													50/500 MB ¹⁾			
Bit-Performance (ns)	60	48	60	40	30	10	2	1	60	30	10	2	1	40	30	2
Connections max.	96	128	96	128	192	256	320	384	96	192	256	320	384	128	192	320
Positioning axes																
- typical ²⁾	5	5	5	5	7	7	70	128	5	7	55	70	128	5	7	70
- maximum ³⁾	10	10	10	10	30	30	128	128	10	30	80	128	128	10	30	128
Width (mm)	85	110	35	35	70	70	175	175	35	70	175	175	175	35	70	175

- 1) additional 50 MB memory for C/C++ functions (ODK) / 500 MB for applications (Runtime, API)
- 2) at 4ms Servo/IPO clock pulse
- 3) no use of further TOs

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CPU 1513R-1		6ES7513-1RL00-0AB0
CPU 1515R-2		6ES7515-2RM00-0AB0
CPU 1517H-3		6ES7517-3HP00-0AB0
Synchronization-Module		6ES7960-1CB00-0AA5 (up to 10 m) 6ES7960-1FB00-0AA5 (up to 10km)
FO-cable		6ES7960-1BB00-5AA5 (1 m) 6ES7960-1BC00-5AA5 (2 m) 6ES7960-1CB00-5AA5 (10 m)
S7-1500H Bundle		6ES7500-0HP00-0AB0

SIMATIC S7-1500 Redundant systems

The easiest way to a redundant solution



Efficient Engineering

Integrated Engineering of controller and visualization in TIA Portal

Multiple execution levels

The application program can be structured into several execution levels

Smooth changeover

The changeover has no negative impact on the process



Automatic program and data synchronization

Simplifies the configuration and handling of both CPUs

System-IP

Simple connection via Ethernet to other devices (e.g. HMI, SCADA) like with single CPU systems

Higher Availability

The CPU-redundancy significantly increases the availability compared to single CPU systems

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Always there when it counts

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Airport logistics

- Baggage transport
- Storage



Tunnel

- Ventilation
- Smoke extraction,
- Light,
- Traffic control



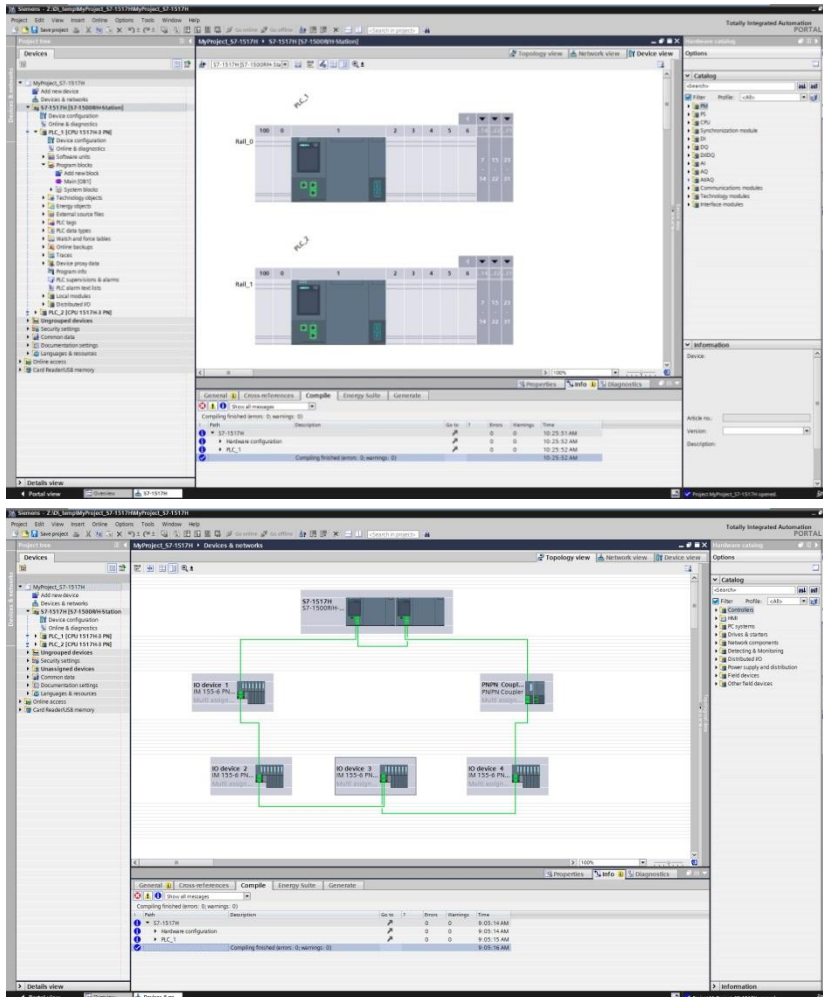
Source: iStock

HVAC in Data centers

- Ventilation,
- Air treatment
(e.g. humidification),
- Heating

SIMATIC S7-1500 Redundant systems

Integrated system functions save engineering time



Feature/Function

2 synchronized CPUs
Peripheral connection via
PROFINET-Ring

Engineering nearly as with a
standard CPU

System IP address

Automatic data synchronization

Automatic program synchronization

Benefit

Significantly higher availability
compared to single CPU systems

Little redundancy engineering know-
how required

HMI and SCADA can be connected
like to a single CPU.
No redundancy Knowhow necessary.

No configuration necessary.
All data is always up to date.

The latest program always runs in the
spare part or in the case of a CPU
switchover.

SIMATIC S7-1500 Redundant systems

The easiest way to a redundant solution

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You would like to
increase the plant
availability by a
redundant
controller?



You want to make
sure that no data is
lost?

You don't want to
worry about data,
synchronization or
project consistency?



SIMATIC S7-1500R/H

Thank you!

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