



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

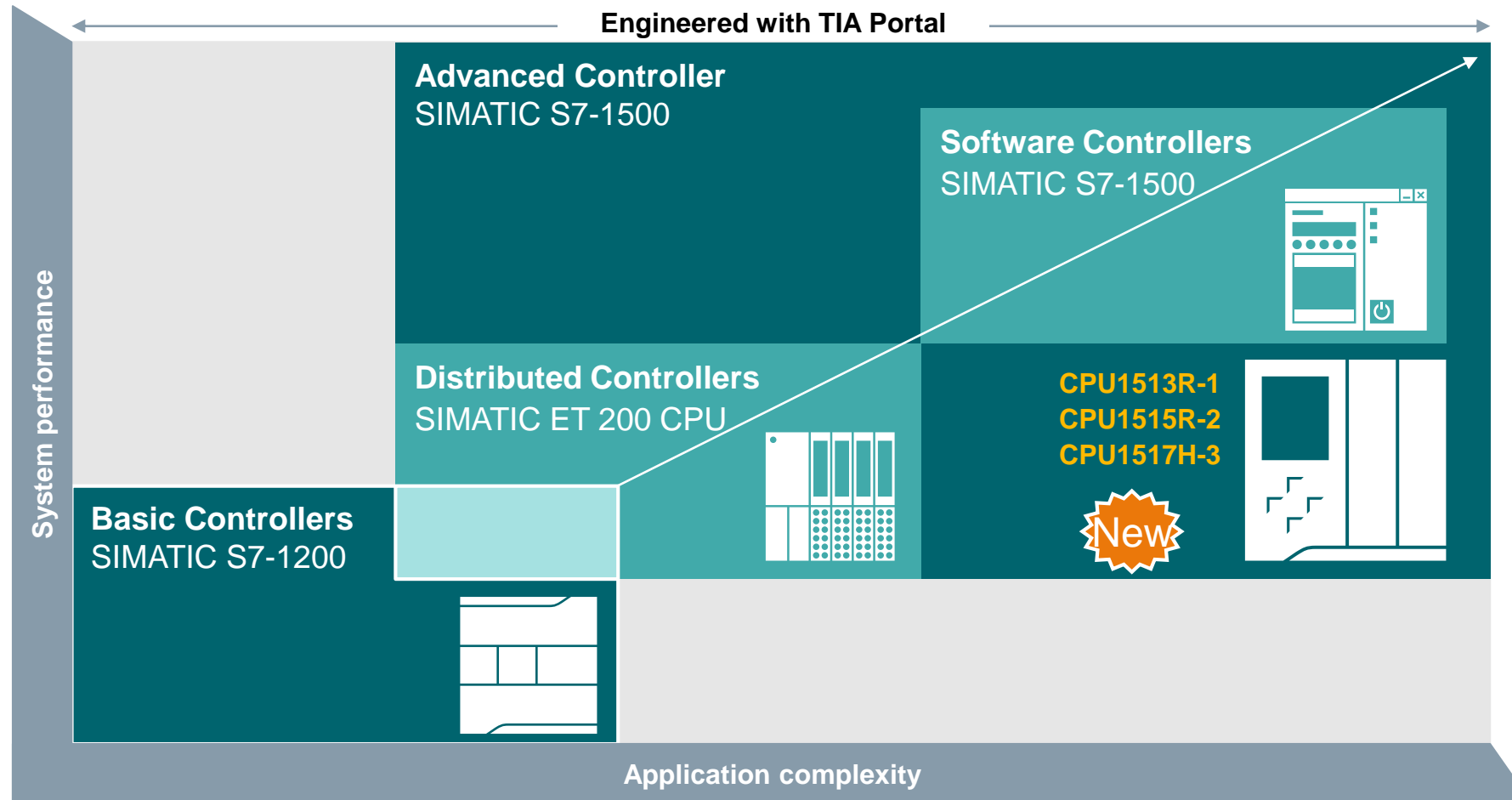
## Save on maintenance

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 (1<sup>st</sup> Release step)

Consistent concept –  
**Identical** synchronization  
process

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

CPU type

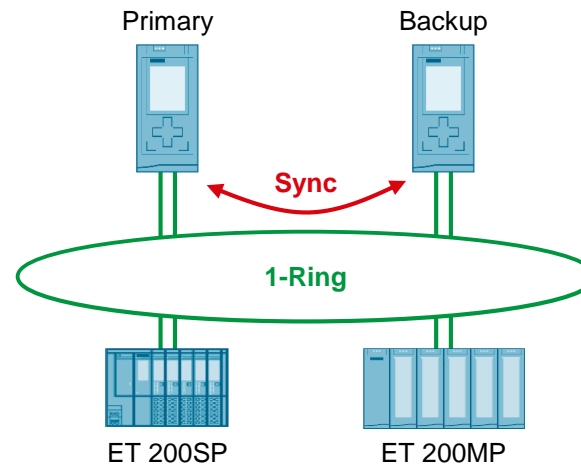
Synchronization

Switchover time

I/O systems

Type of connection

### Redundant – S7-1500R



**CPU 1513R/CPU 1515R**

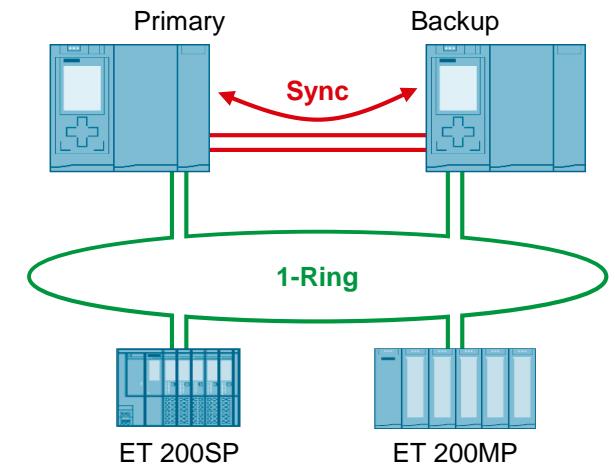
via **Profinet Ring (MRP)**

**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	1 1	1 1	1 1	1 1	1 2 1	1 2 1 3	1 2 1 3	1 2 4 1 3	1 1	1 2 1	1 2 1 3	1 2 1 3	1 2 4 1 3	1 1	1 2 1	1 2 3 1 3	
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 <sup>1)</sup>				
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 <sup>2)</sup>	5	5	5	5	7	7	70	128	5	7	55	70	128	5	7	70	
- maximum <sup>3)</sup>	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

# SIMATIC S7-1500 Redundant systems Portfolio

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

**SIEMENS**  
*Ingenuity for life*

### Efficient Engineering

Integrated Engineering of controller and visualization in TIA Portal

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### Multiple execution levels

The application program can be structured into several execution levels

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### Smooth changeover

The changeover has no negative impact on the process



### Automatic program and data synchronization

Simplifies the configuration and handling of both CPUs

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### System-IP

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

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### Higher Availability

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

# SIMATIC S7-1500 Redundant systems

## Always there when it counts

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### Airport logistics

- Baggage transport
- Storage



### Tunnel

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



Source: iStock

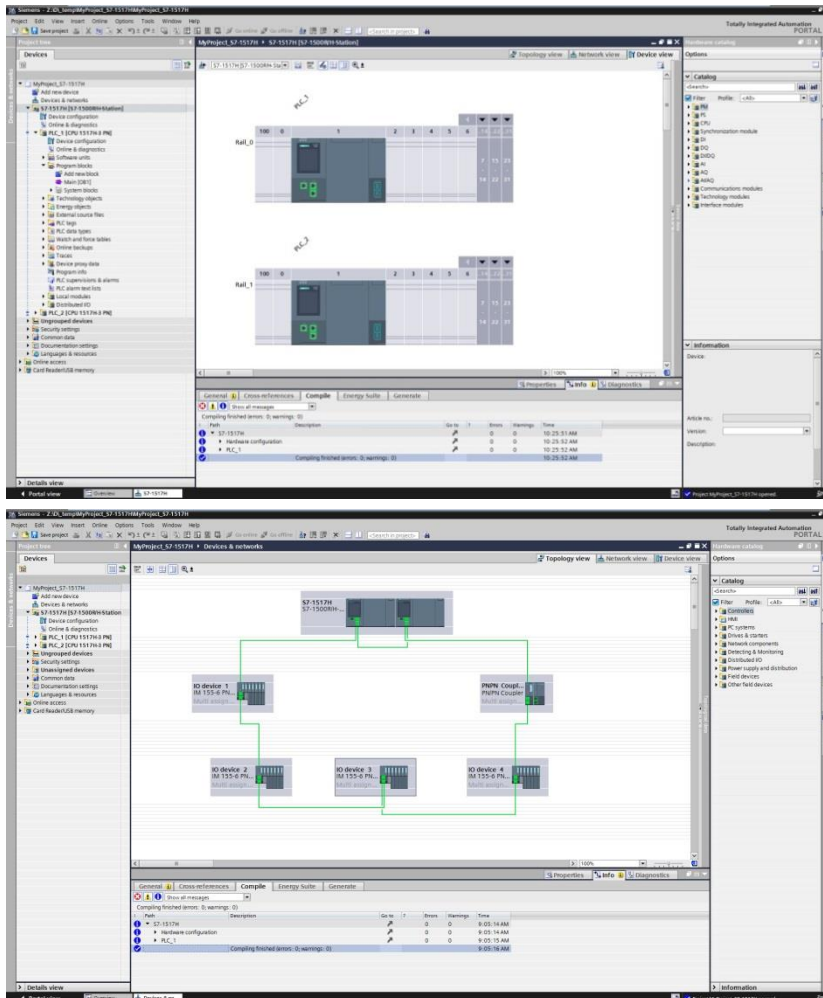
### HVAC in Data centers

- 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!

**SIEMENS**  
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