

	New Functions of PROFINET
Overview	Shared-Device
MRP	Access from multiple IO-Controllers to
Shared Device	<ul> <li>I-Device (Intelligent Device)</li> <li>Controller as Intelligent IO-Device</li> </ul>
I-Device	Redundancy MRP – Media Redundancy Protocol
Web on Controller	Web on Controller Userdefined Web Pages
	IRT and Clocksynchronisation (OB6x)
	OB



Overview

MRP

Shared Device

**I-Device** 

Web on Controller IEC 61158-5-10Edition 1.0 2007-12

INTERNATIONAL Standard

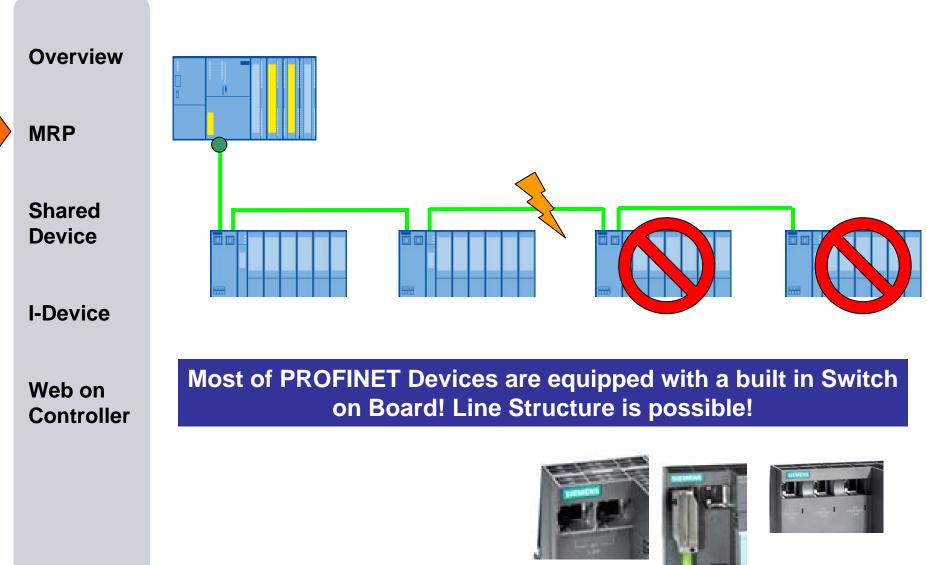


- Based on ring topology.
  - Max. number (50) of ring nodes
    - PN IO controller
    - PN IO devices
    - Network infrastructure components (switches)
- Configuration and Diagnostic in Engineering
- Reconfiguration time 200ms



# Todays configuration possibility

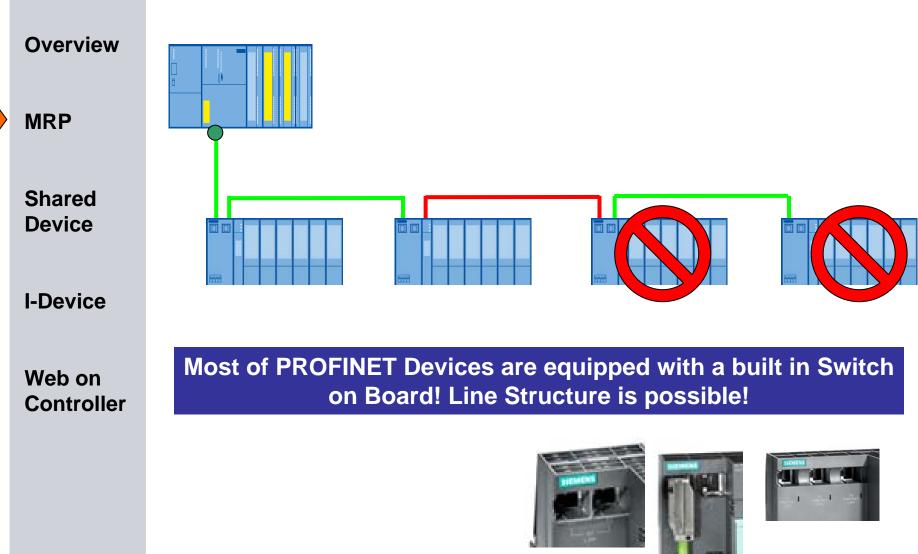
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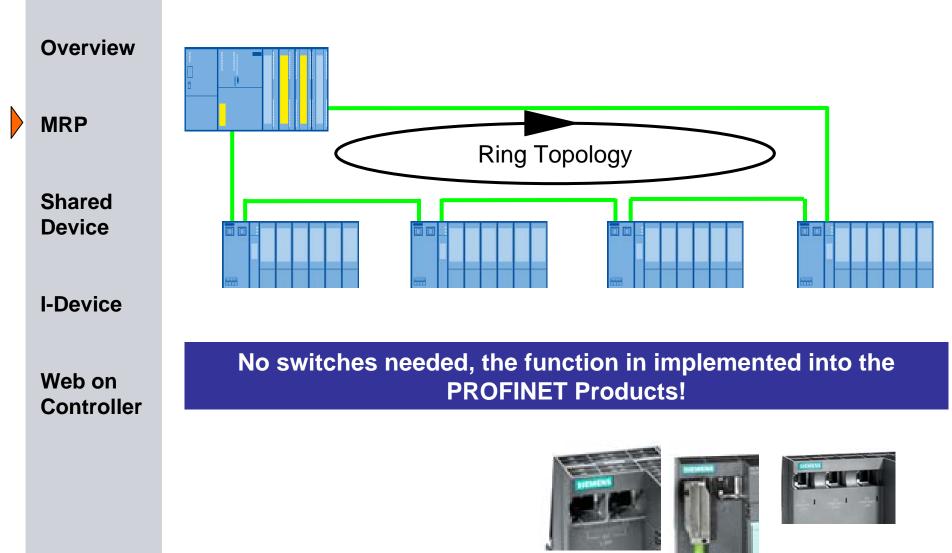


# Todays configuration possibility

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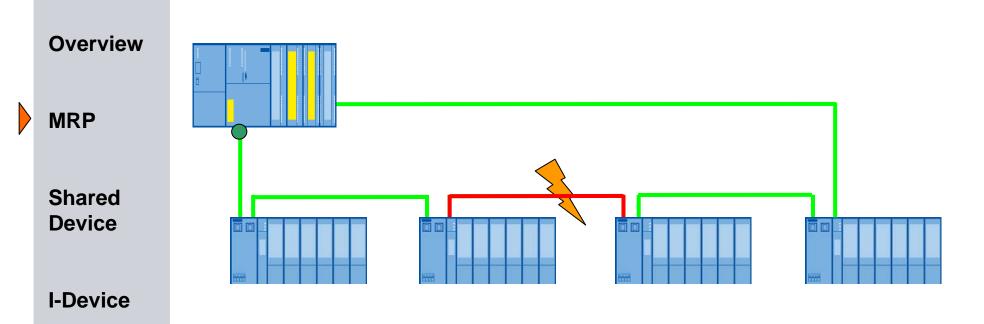




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#### Now MRP comes in....

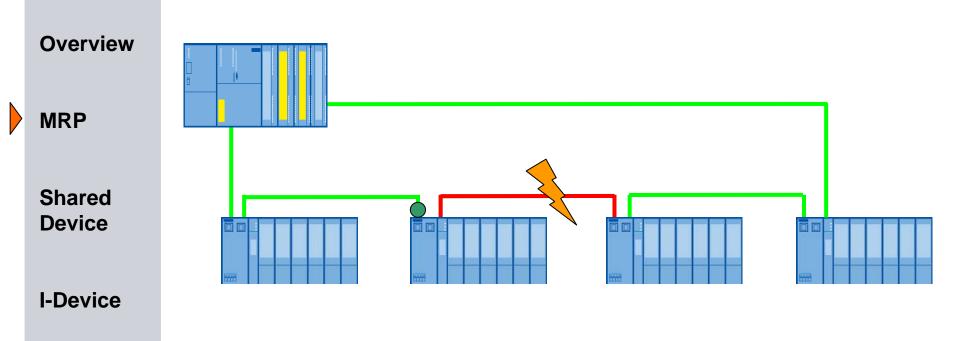


Web on Controller Most of PROFINET Devices are equipped with a built in Switch on Board! Line Structure is possible!



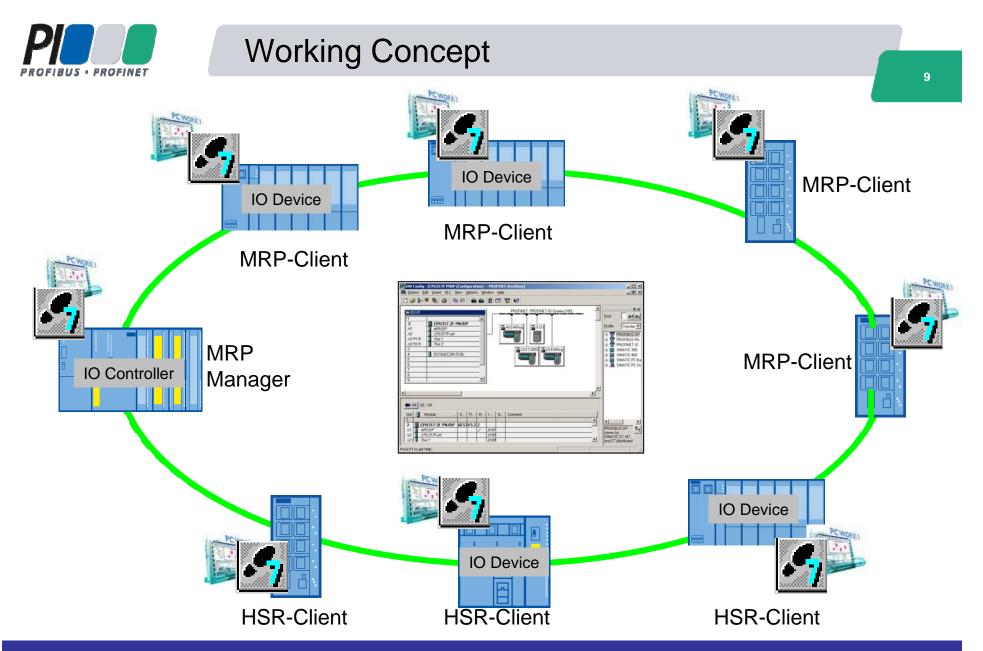


#### Now MRP comes in....



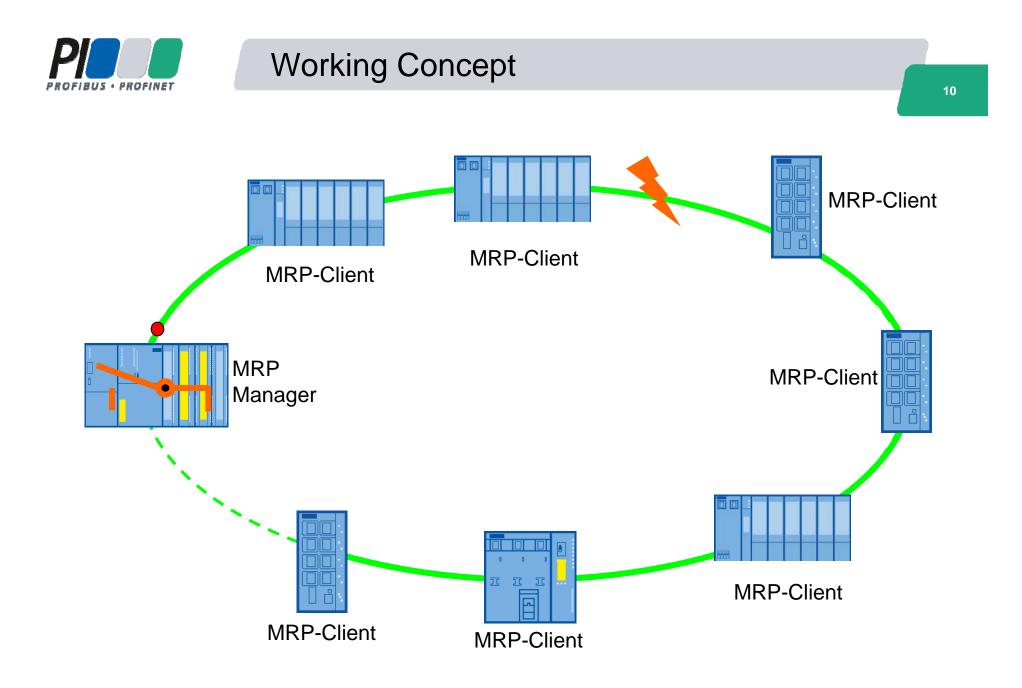
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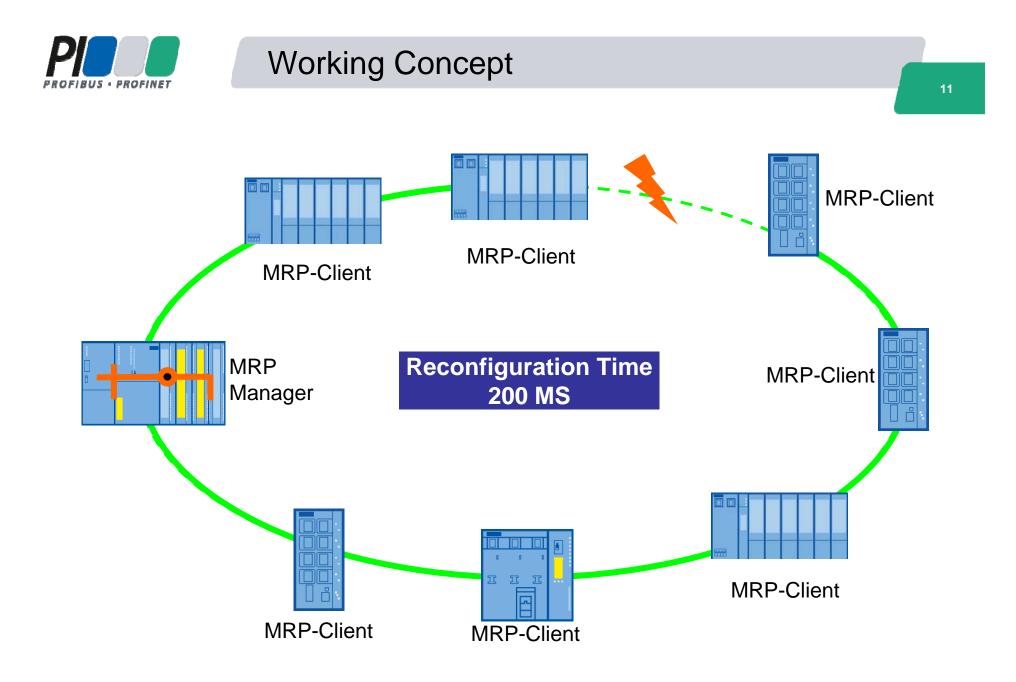




Every Device in the Ring needs to have configured ports for the ring

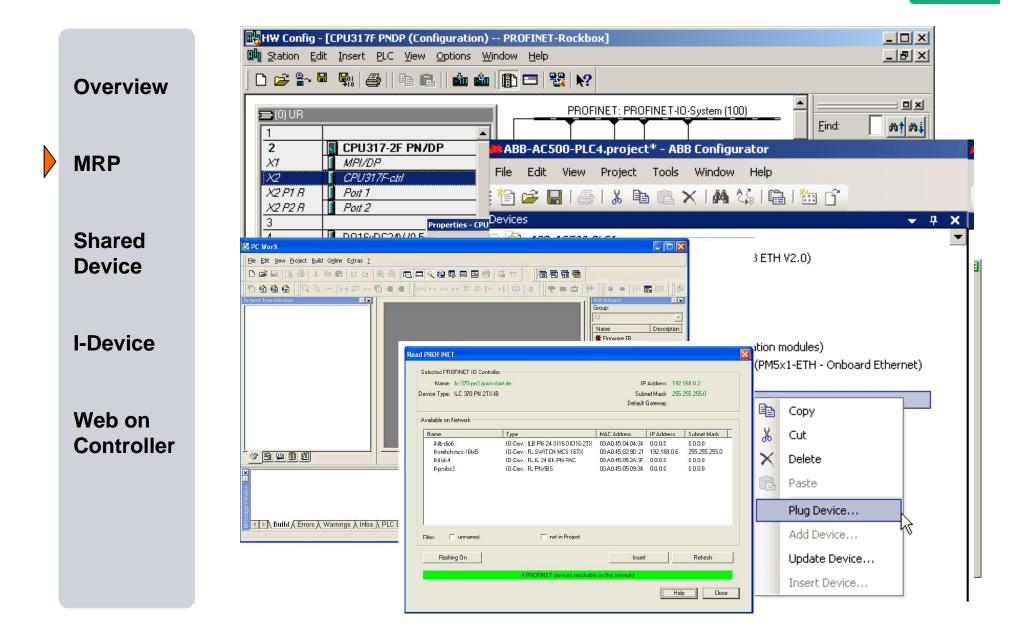
**Configuration via Engineering** 





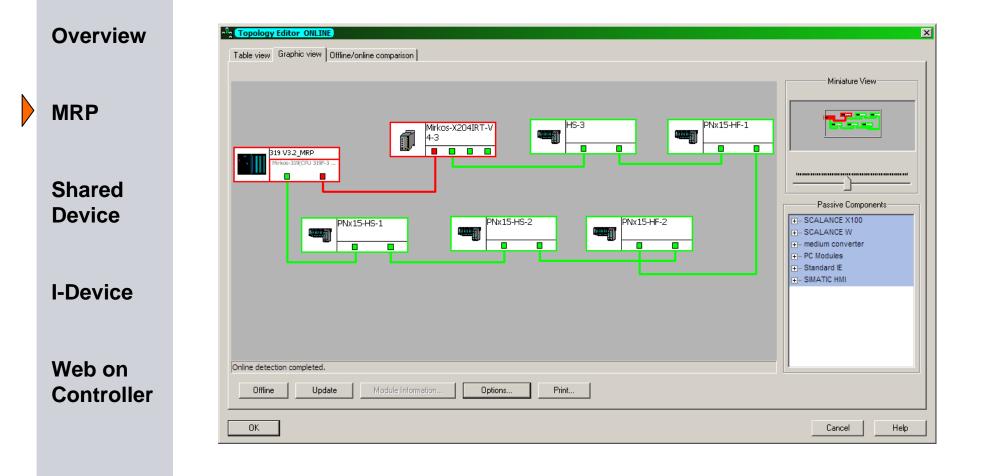


# **Configuration in Engineering**





### Fast error recognition





		,
		MRP
Overview	Standard	IEC 61158-5-10
	Max. Devices in a Ring	50
MRP		
	Reconfiguration time	200ms
Shared		
Device	Standby Redundancy possible?	No
I-Device	Configuration	Engineering Software (i.e. STEP7, PCWorkx) or Switch Management
Web on Controller		
Controller	Devices	Switches which are specified to IEC, IO-Controller, IO-Devices which support MRP and IEC

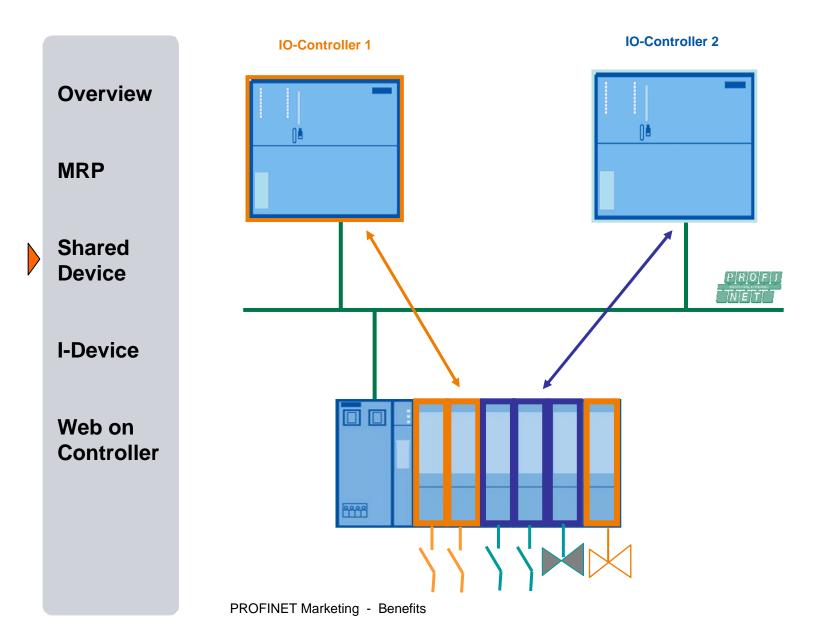




# **Shared Device**



### **Shared Device**





### **Shared Device**

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#### **Function Overview** flexible assignment of Submodules (I/Os) from one device to different controllers. **MRP** One Submodule is clearly assigned to one controller. Use Shared simpler and more cost efficient setup of plants. Device especially advantages in project where standard and F-technique is separated. **I-Device IO-Controller IO-Controller** Web on Controller PROF





# **I-Device and Web Services**



### I-Device - Use

	Overview	<ul> <li>IO-Controller and additionally function IO-Device</li> <li>Parallel operation Controller and IO-Device (I-E</li> </ul>		IO-Controller 1
	MRP Shared Device		)evice)	IO-Device 1 CPU2 IO-Controller 2
Þ	I-Device			IO-Device 2
	Web on Controller			
		I-Device	<ul><li>Connection</li><li>Connection</li></ul>	known IO-Connections of CPUs of CPUs in different Projects to third party controller possible oupler necessary



Overview	Controller and Device function at the same time			
MRP	Preprocessor in the IO-Controller 1 I-Device			
Shared	Distribute intelligence			
Device I-Device	Fast Controller-Controller communication (~1ms with 1440Bytes)			
Web on Controller	Easy to use PROFINET Communication between PROFINET-Controller from different Vendors (GSDML import) IO-Controller 2 IO-Device 2			



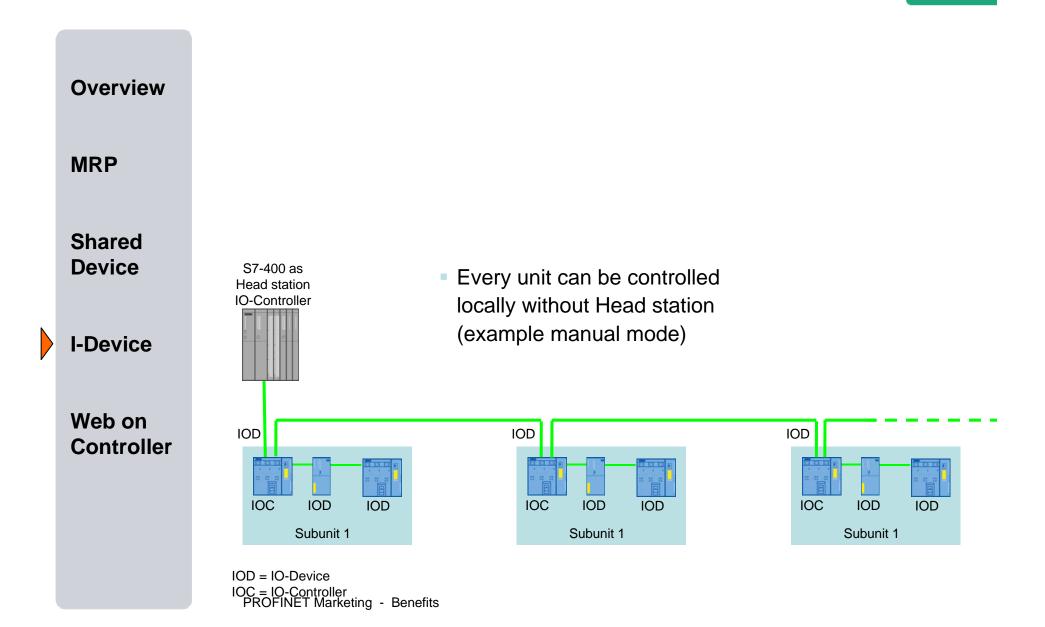
# **Example: Distributed Intelligence**

Overview	Distributed an local co Spread automation task	•	
MRP	Coordination of Head Preprocessor in the Sub	•	\$7-400
Shared Device I-Device	S7-400 as Head station IO-Controller		
Web on Controller	IOD	IOD	IOD
Controller	IOC IOD IOD Subunit 1	IOC IOD IOD Subunit 1	IOC IOD IOD Subunit 1
	IOD = IO-Device		

IOD = IO-Device IOC = IO-Controller PROFINET Marketing - Benefits



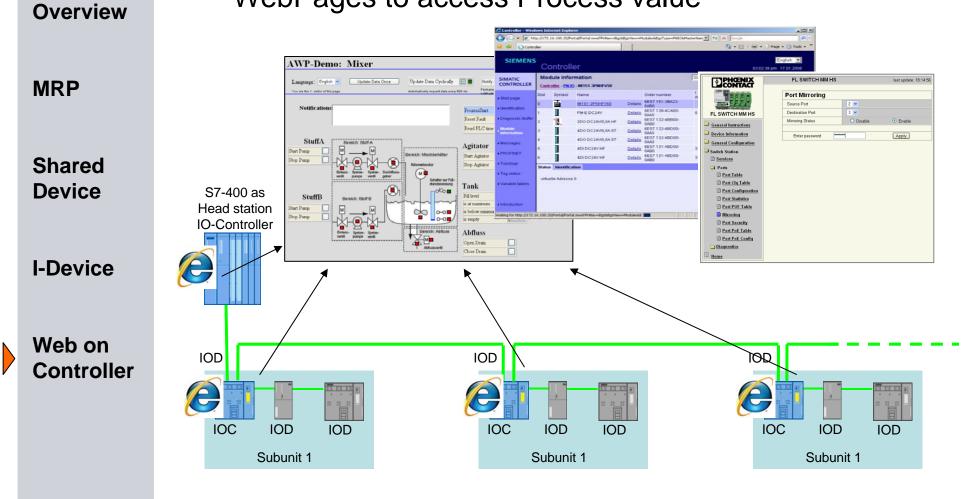
### **Example: Distributed Intelligence**





### Web mechanism

Webdiagnostics and Unser defined WebPages to access Process value





	No Knowledge of any E	Ingineerir	ng Software i	required
Overview	Only Web browser nee data (Internet Explorer,			ostic
MRP	Remote Service via Intervice	ernet		
Shared Device	Accessible with every F web browser	PC or Sm	artphone whi	ich has a
		PHŒNIX	FL SWITCH MM HS	last update: 18:14:56
		LICONTACT		
			Port Mirroring	
I-Device	Datei Bearbeiten Ansicht Eavoriten Extras 2		Port Mirroring       Source Port     2 •       Destination Port     3 •	
I-Device		FL SWITCH MM HS	Source Port 2 V	e ⓒ Enable
I-Device	Datel Bearbeten Arscht Eavoriten Egtras 2 → Zurück - → - ③ 2 ④ ④ ③Suchen ④Fevoriten ③Meden ④ □-	FL SWITCH MM HS	Source Port 2  Destination Port 3	e ⓒ Enable
	Datel Bearbeten Arsicht Eavoriten Egtras 2 → Zurück ~ → ~ ③ 2 31 ③ Suchen ⓐ Favoriten ③ Meden ④ □ Adresse ⓐ http://192.168.0.2/	FL SWITCH MM HS  General Instructions Device Information General Configuration	Source Port 2 V Destination Port 3 V Mirroring Status O Disable	
I-Device Web on	Datei Bearbeiten Ansicht Eavoriten Egtras 2 → Zurück • → • ② ② ① ③ ③ ③ ③ ③Suchen ⓐ Favoriten ③Meden ③ ⑤ • ④ Adregse ⑧ http://192.168.0.2/ SIEMENS	FL SWITCH MM HS	Source Port 2 V Destination Port 3 V Mirroring Status O Disable	
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# **Clocksynchronisation / IRT**



	Overview	<ul> <li>Isochronous data transmission through bandwidth allocation</li> <li>Configuration of the topology (routing)</li> <li>Automatic optimization of message frame traffic (scheduling)</li> </ul>				
	MRP	Cycle times up to 250µs with jitter <1µs				
	Shared	Unrestricted TCP/IP communication				
	Device					
	I-Device	Switch				
Þ	Web on Controller	Controller				
		Port1				
		*) 100% free for TCP/IP Device x Device y Device y Device z				
		PROFINET Marketing - Benefits				



Synchronisation, all times on the networks will be adjusted to a isochronous cycle **Overview MRP** Transparent Slave Master Transparent Clock Clock Clock Clock Shared Device **I-Device** Controller **Drive Drive** Drive Web on Controller Line topology with a high jitter logic (deterministic)



### **Axis Synchronization**

Close loop control via Network

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Synchronization of drive control within on buscycle

**Overview** 

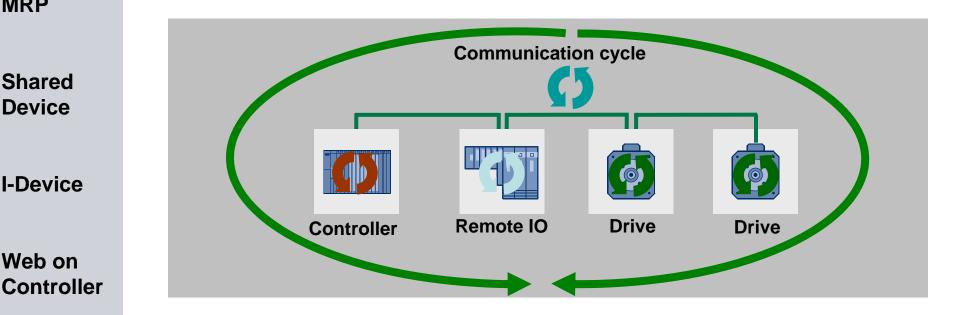
**MRP** 

Shared Device

**I-Device** 

Web on

- Isochron synchrized capturing of position setpoint
- Isochron synchrized activation of setpoints



**Perfect for distributed Motion control tasks like:** Synchronism, ... Multiple Axis applications



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Performance values for Motion Control applications with PROFINET and IRT				
Overview	Cycle time	1 ms	500 μs	<b>25</b> 0 μs
MDD	Number of nodes*)	272	128	56
MRP	Jitter	<1 µs	<1 μs	<1 µs
Shared Device	Reserved for open communication with standard IT protocols	50%	50%	50%
I-Device	*) Number of devices each with 40 bytes input data and 40 bytes output data on a controller with 4 ports The limits of a specified controller regarding I/O area, cycle time and number of nodes must be considered			
Web on Controller Reserve capacity is an advantage, e.g. for dynamic transfer of cam discs Parallel and unrestricted IT communication 				

Reserve PROFINET capacity is benchmark – and more than sufficient for the foreseeable future.



### Summery

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PROFINET is the solution for all automation tasks with only one communication medium which Industrial Ethernet!

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