

Bot=Hive

Industry 4.0: Automation Deepdive

Building a new era in flexible automation

Jacques Bonfrer

BACKGROUND

Personal Introduction

The Automation Evolution

The Automation Ceiling

The Birth of Flexible Automation

TECHNICAL

Technical / IoT Architecture

Decentralisation

Flexible Interfacing

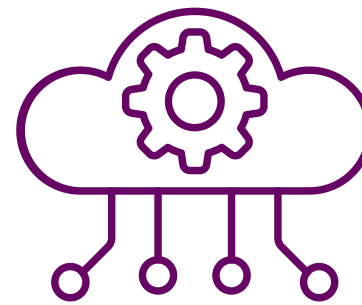
Building Flexibility

Personal Introduction

Bot=Hive



Footballing Youth



Digital Background



Founder of Bot-Hive

Bot-Hive Introduction

Bot=Hive

A new type of automation company

Based in Cardiff & Bristol, UK

**Team of 10 software developers,
automation engineers and digital nomads**

"Tech Startup"

Venture backed

**Our customers are system integrators,
universities, manufactures & logistics companies**

The Automation Evolution

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1960s

First programmable logic controller

1970s & 80s

Field Device Networks &
Mother Control Systems

1990s

Enterprise IT
Networks

Last 20yrs

Batch Size One Principle



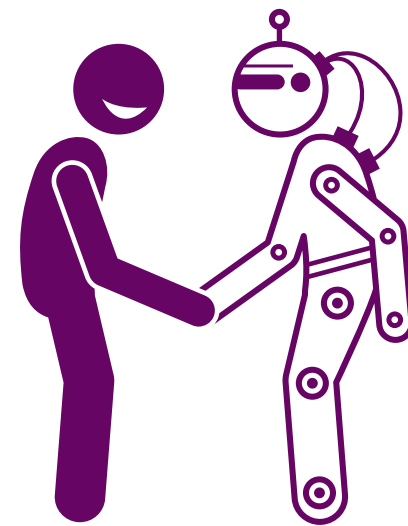
The Automation Ceiling

Q. How Smart is Automation?

The Automation Ceiling

A. Not Very

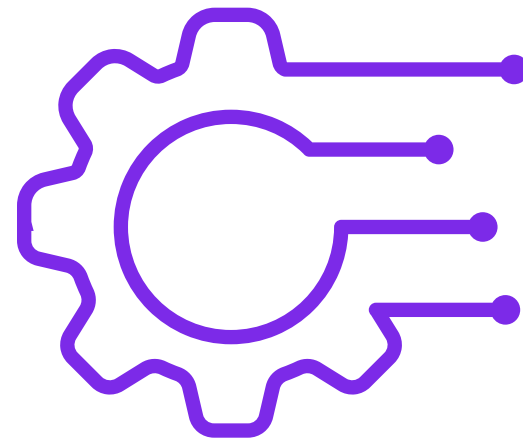
(When compared with humans)



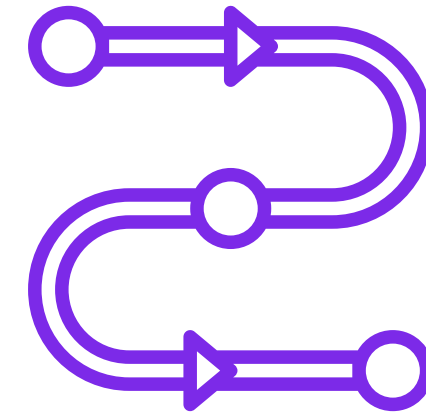
The Automation Ceiling



**Expensive to implement
& maintain**



**Requires bespoke
engineering**



Single Usage

The Automation Ceiling



Fixed Hardware

- Highly immobile
- Difficult to change the hardware
- Drilled into the ground
- Requires a lot of floor space
- EoA Tooling is purpose built

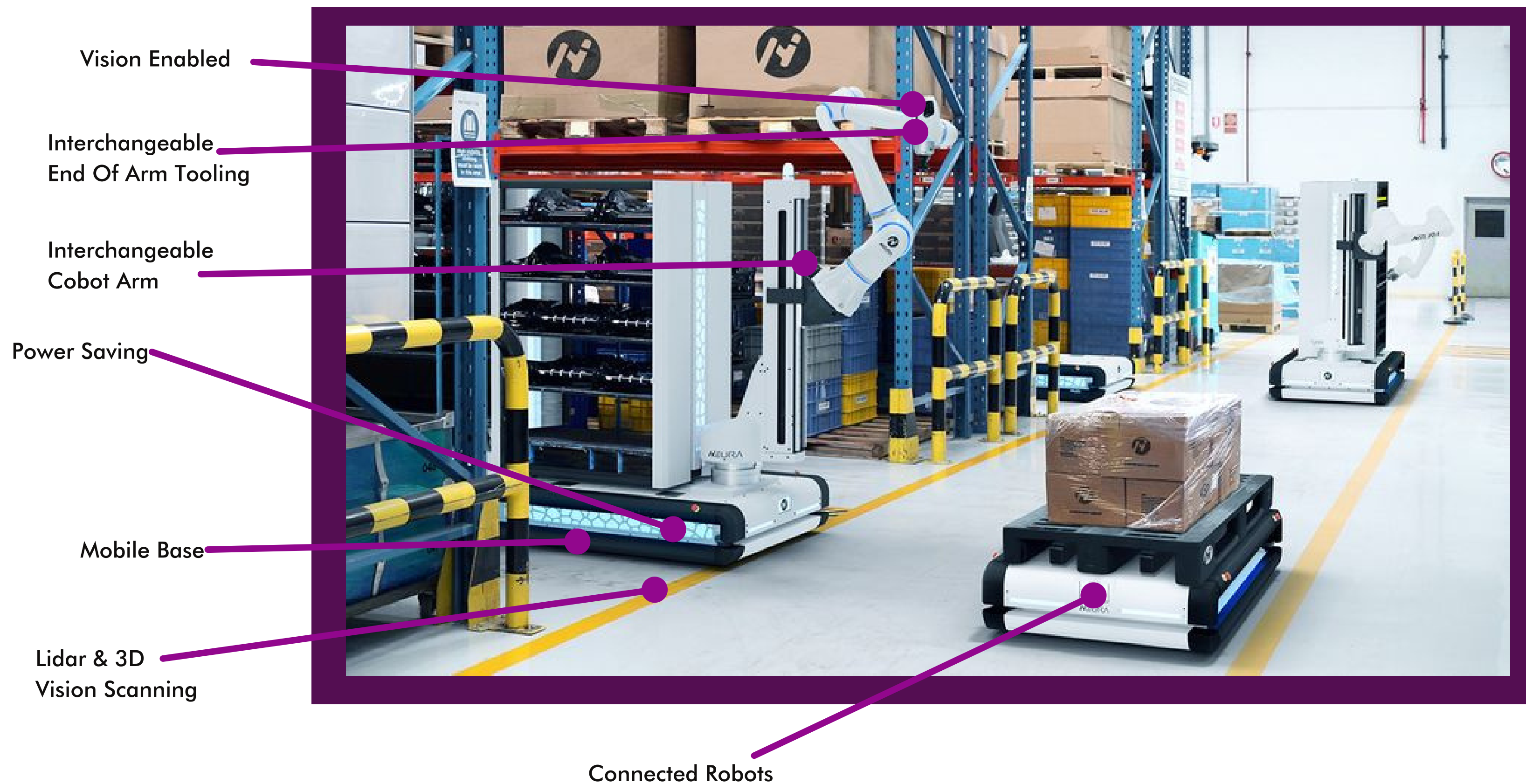
Fixed Logic Architecture

- Requires a robust PLC hierarchy
- Communication protocol interfacing
- Fragmented operating control systems

Software Deficiencies

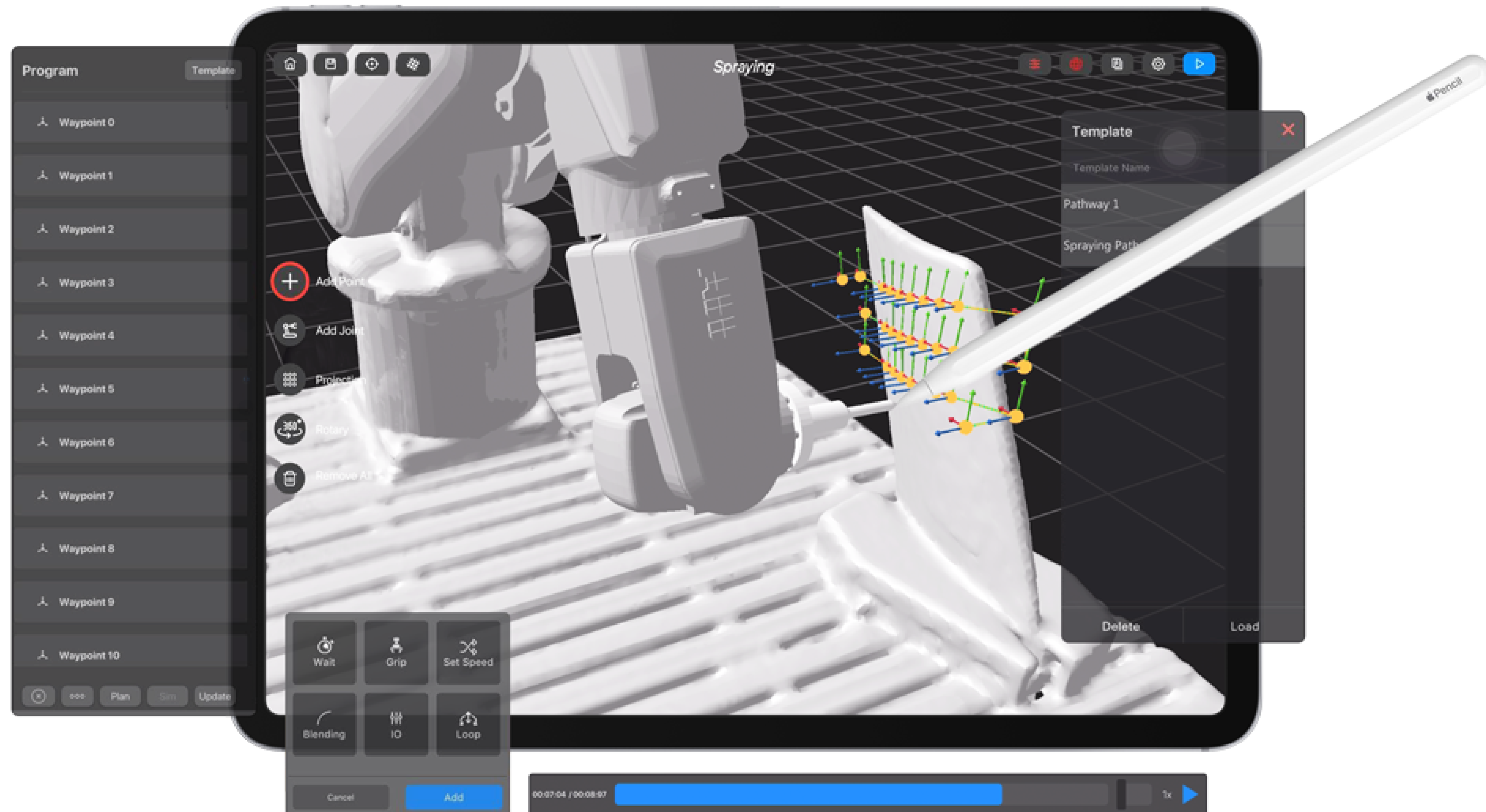
- Complex programming querying
- Interpolation & actuation requires trial & error
- Different programming environments between supplier across cellular ecosystem

The Birth of Flexible Automation



Intuitive Programming

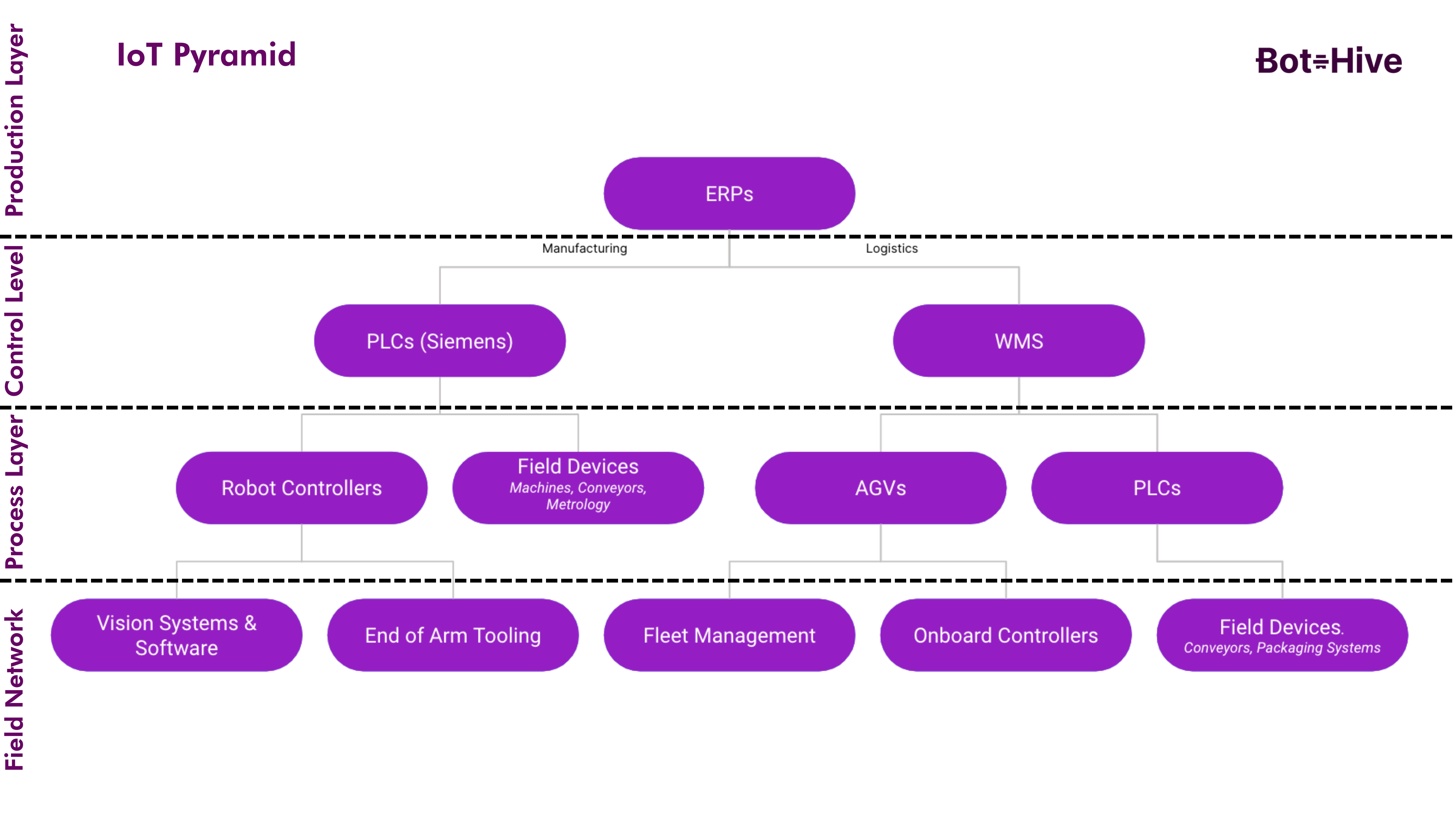
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Bot-Hive Introduction

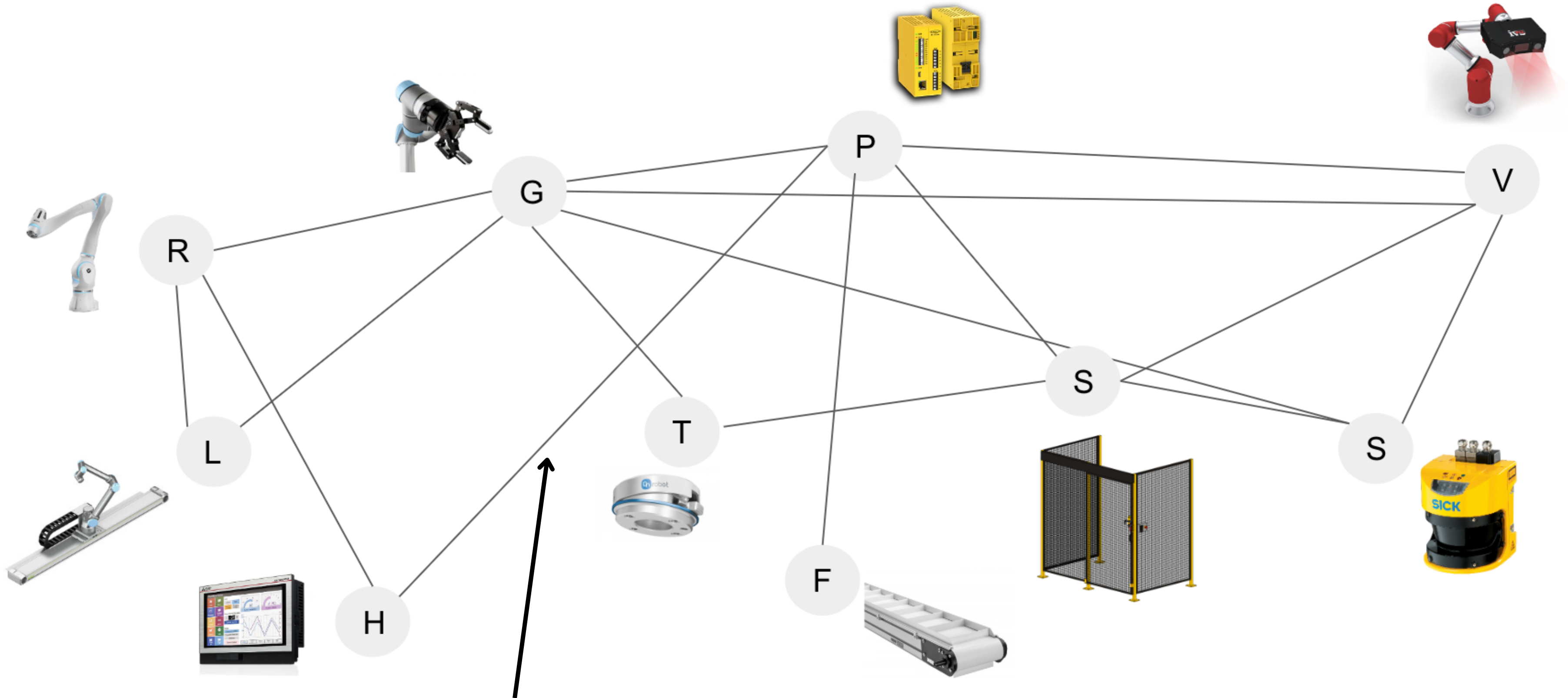
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Technical Deepdive



Decentralising the Automation Pyramid

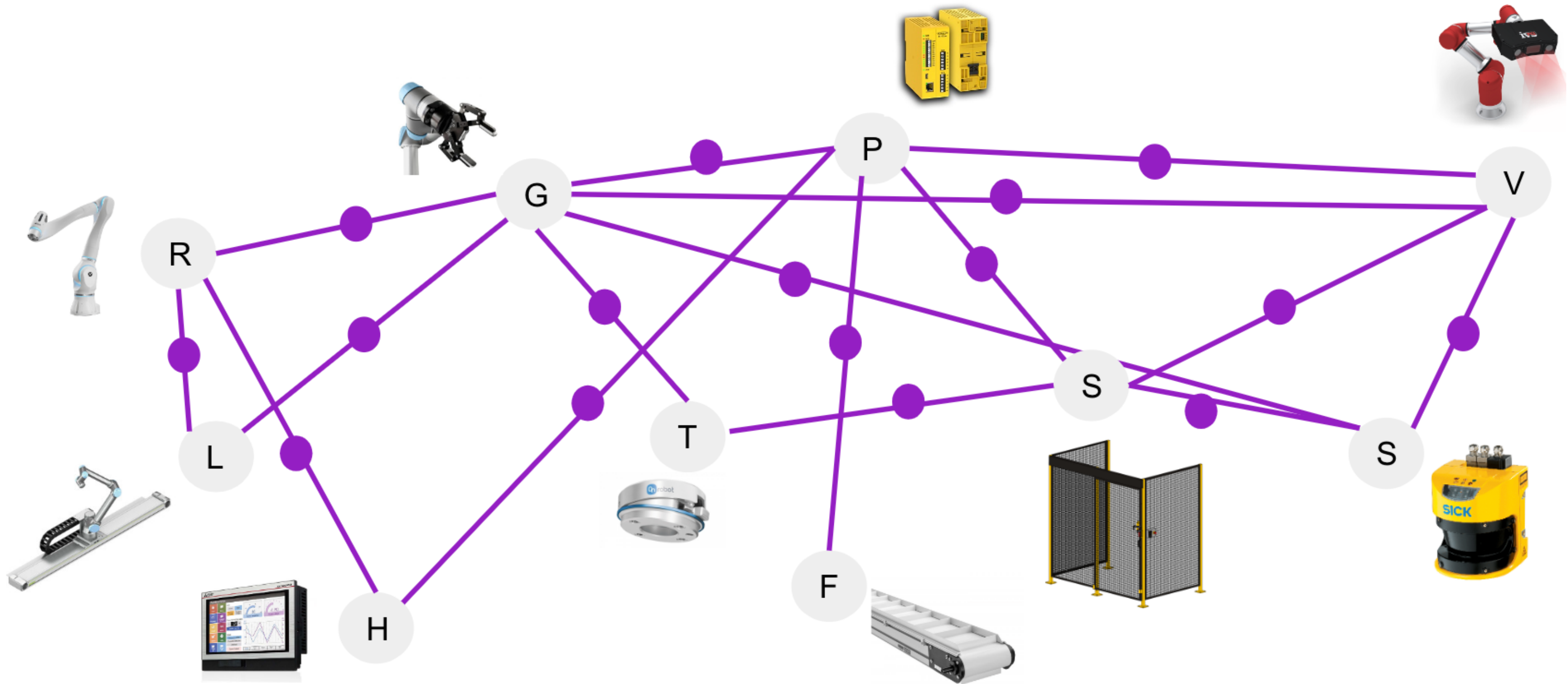
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Each connection requires "Blackbox Engineering"

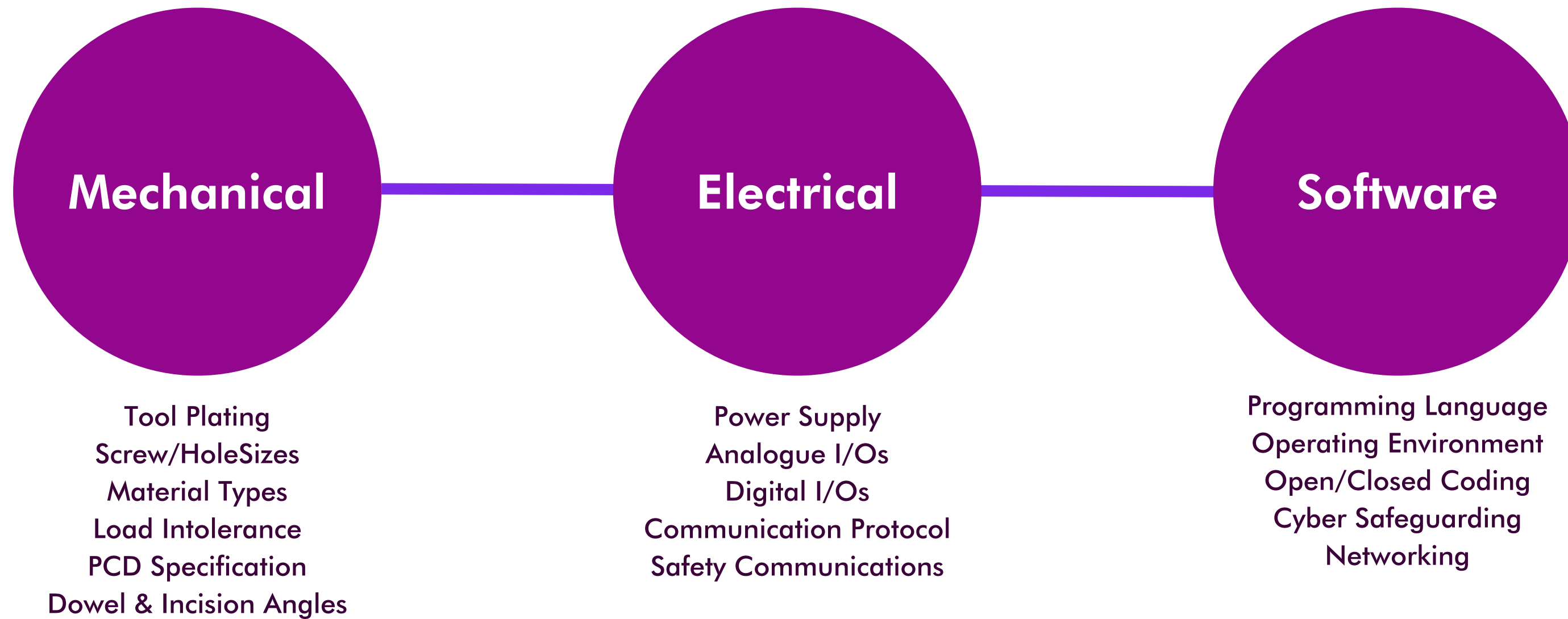
Decentralising the Automation Pyramid

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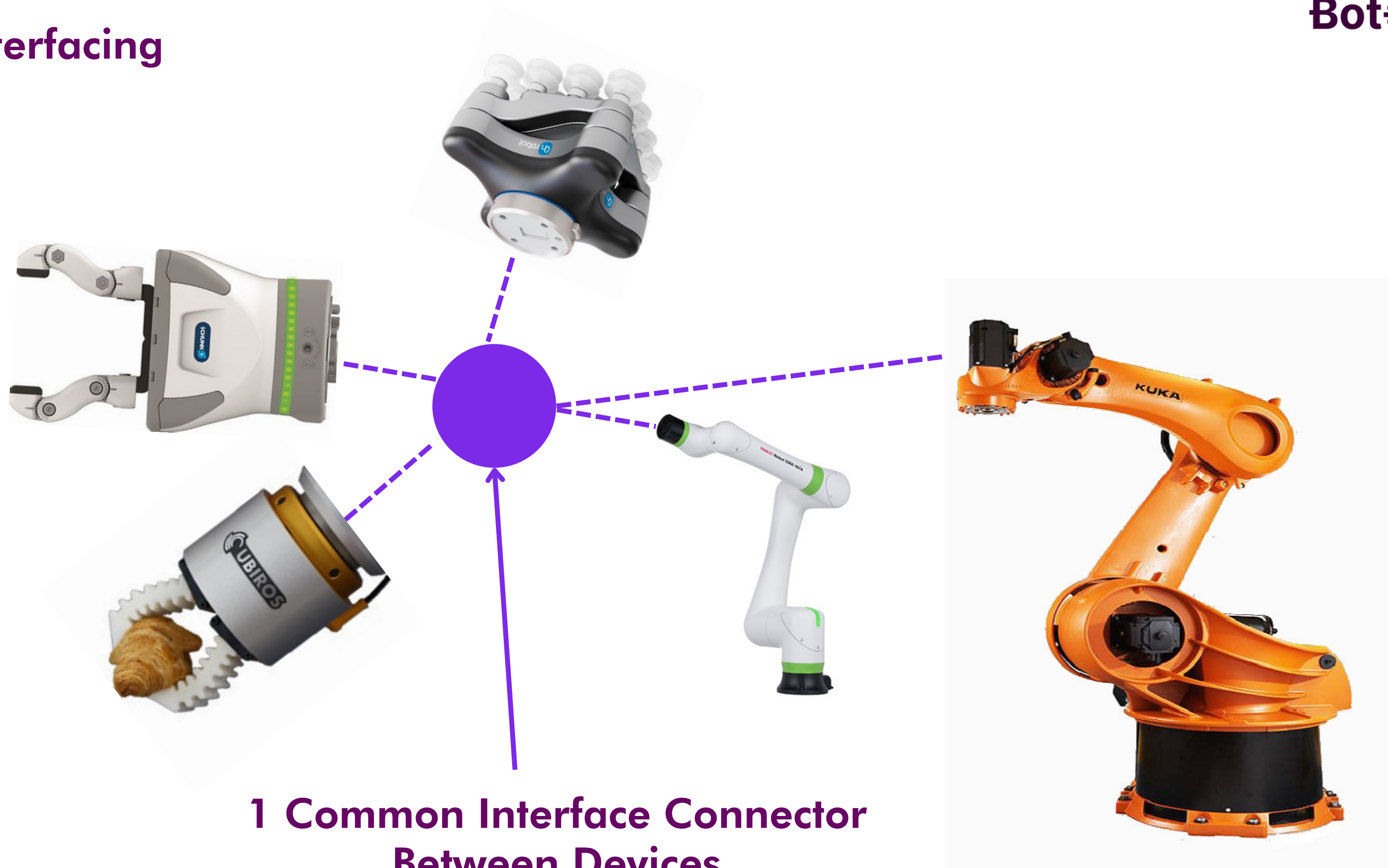
Standardised Interfacing

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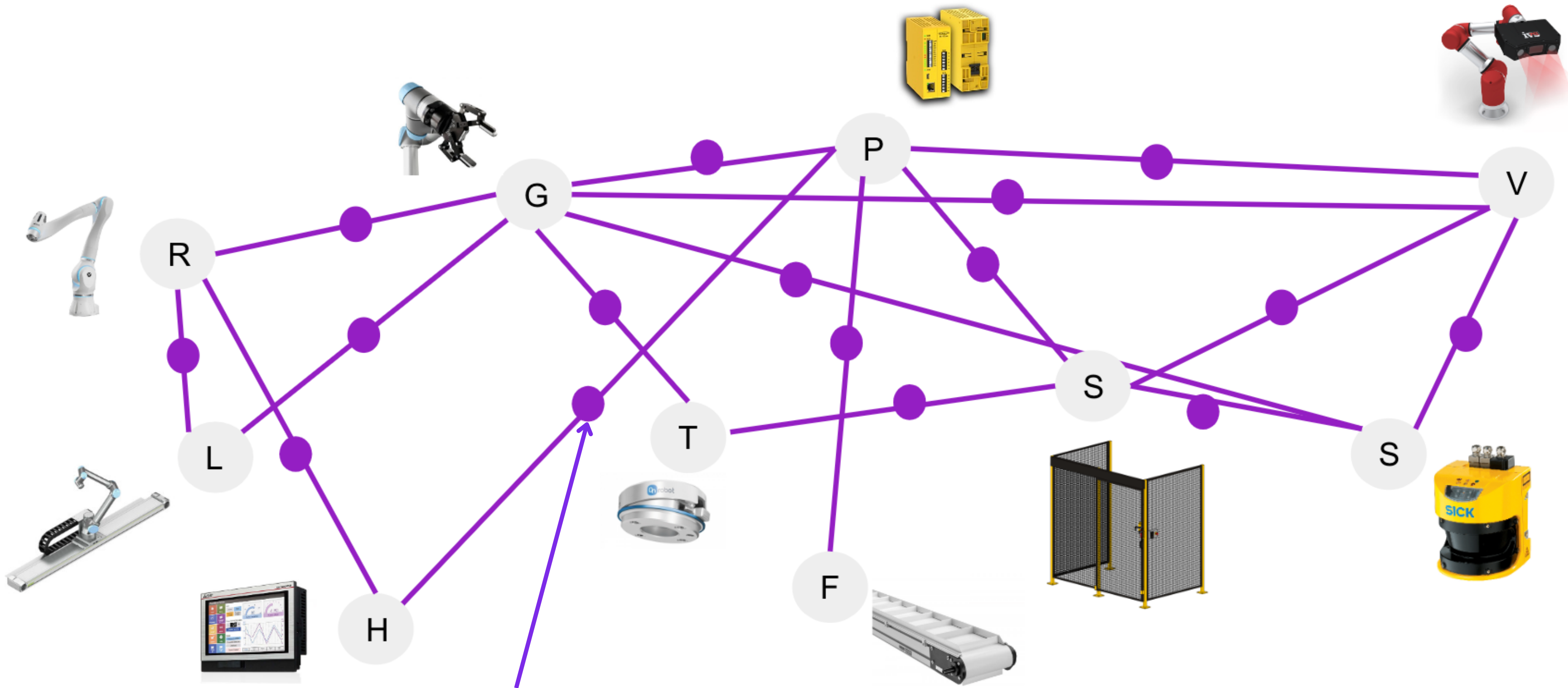
Flexible Interfacing

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Building Flexibility

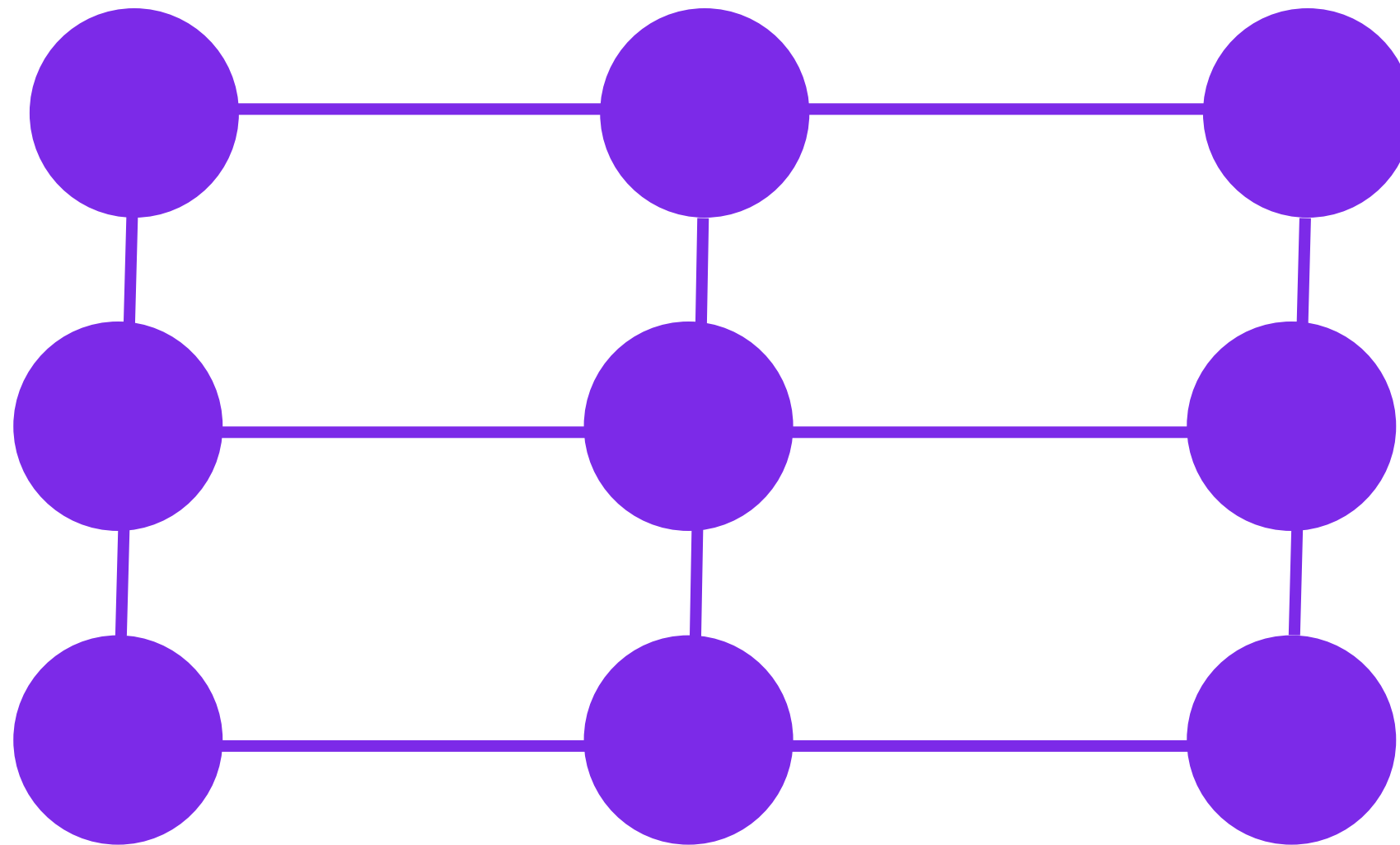
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Each interface connection is a module

Building Flexibility

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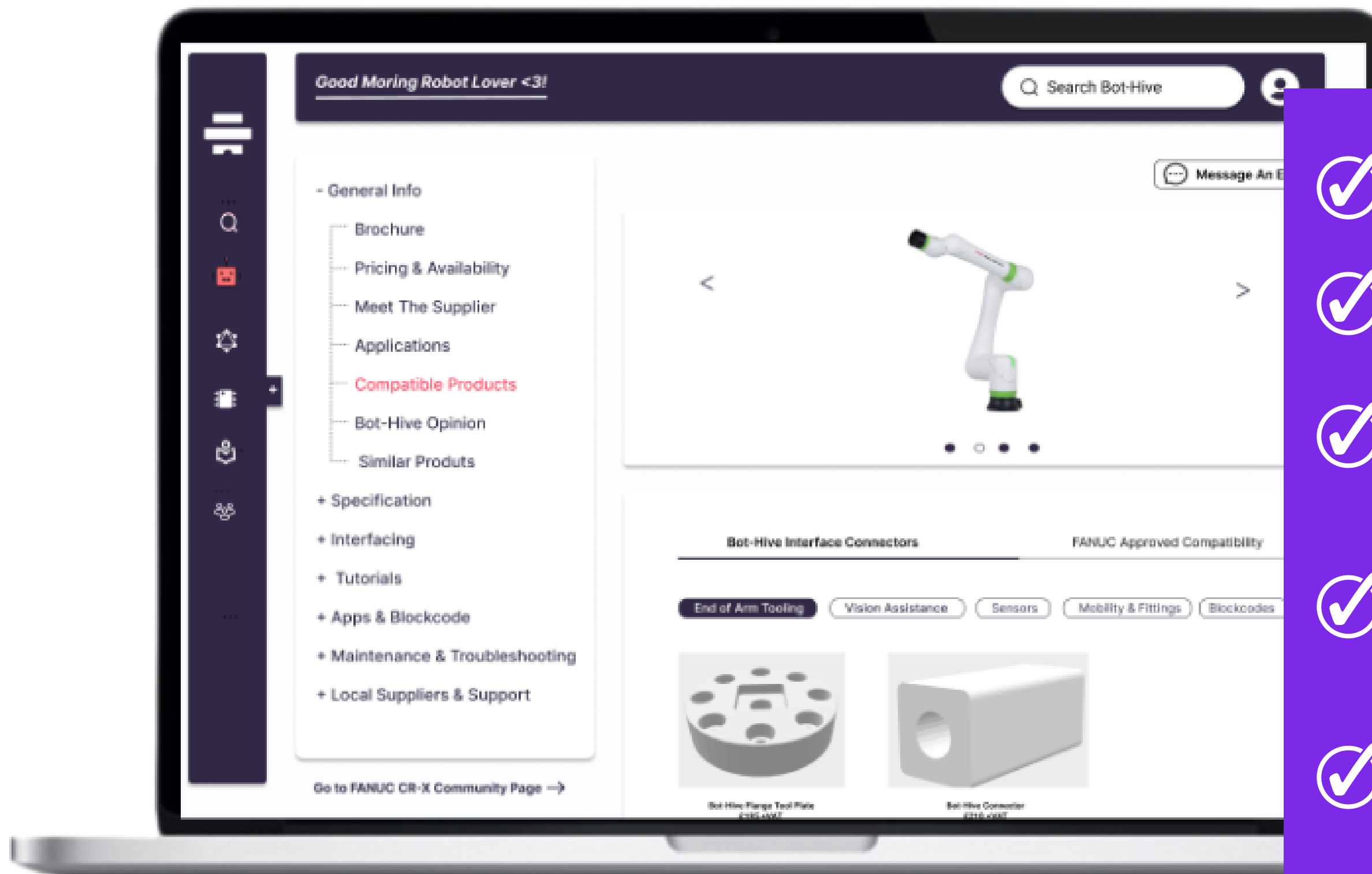


Modules can be bolted together to form full systems

- ✓ Palletising
- ✓ Machine Tending
- ✓ Smart Pick & Place

Standardised Interfacing

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An online library of products, data intelligence and purchasing information



A graph database operating the relationships between products



Listed and downloadable middleware solutions including API gateways, 3D printable connectors and electrical devices



Downloadable pre-configured flexible blockcode modules to perform functions in a programming environment



Modules which can be bolted together to form fully fledged systems



Paid users receives an edge device for module tracking & performance

Top Tips For Flexible Automation

- Select an application(s) which are likely to encounter operational changes
- Build an internalised capability roadmap. (A project team including stakeholder right across the business)
- Create a standardised architecture for device connectivity
- Make sure you assess the full recipe of process requirements
- Use discrete event simulation to run a full process map, VSM (Value Stream Mapping evaluation & FMEA (Failure Mode Effects Analysis before any procurement

And that's a wrap!

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