PrescientDevices

Low-Code

The Most Disruptive Trend in IoT, Edge Computing and AI

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STEX 25
MIT STARTUP EXCHANGE

About the Speakers

Doug Levin

Business Leader, Technologist and Serial Entrepreneur

- Sole founder and first CEO of Black Duck Software
- Expert in enterprise software, security, IoT, and AI

Today

- Advisor and Investor of Prescient Devices, Inc.
- Executive-in-Residence (XIR) at Harvard Business School
- IoT / EC, cybersecurity and ML startup advisor / board member

Andy Wang, Ph.D.

Founder & CEO, Prescient Devices, Inc.

- Low-code IoT/AI design software

Founder & CTO, GTI IoT Technology

- Wireless IoT monitoring solutions
- Over 500,000 IoT devices in deployment

Technologist for 20+ years

Agenda

Part I
IoT and Edge Computing

- Data of today, and the future
- Today's infrastructure
- Industry case studies
- IoT deployment challenges
- Q&A

Part II
Low-code IoT development

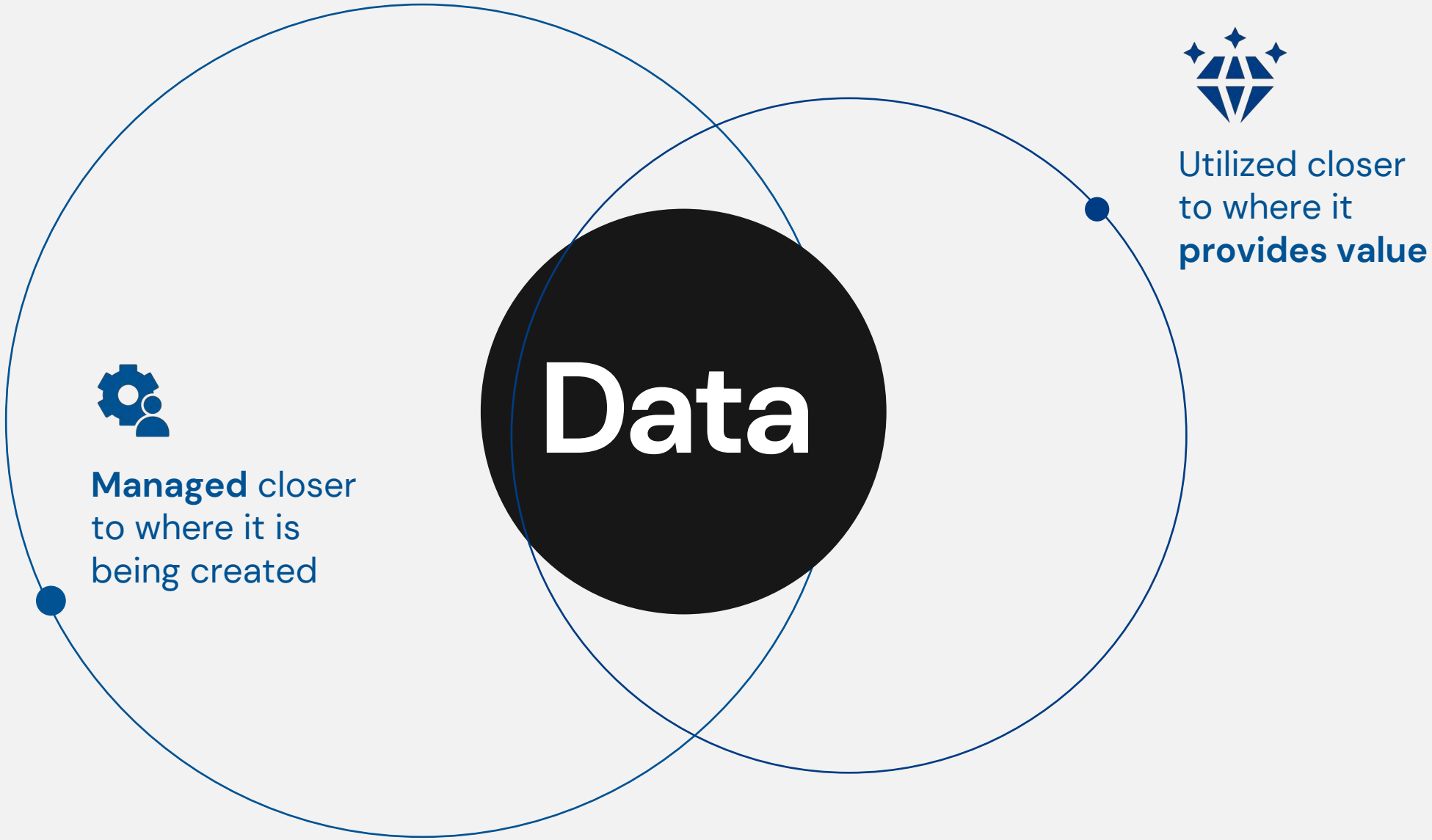
- The rise of low-code
- Why low-code
- Best use cases for low-code
- Prescient Designer
- Upcoming Webinars
- Q&A

By 2025

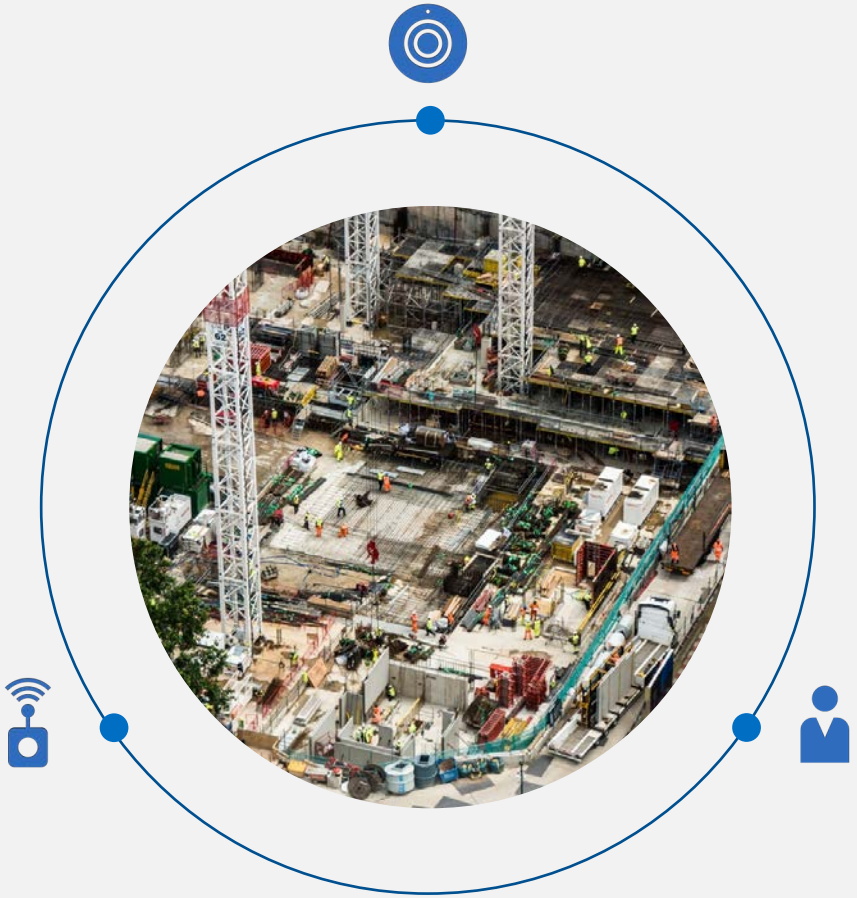
75%

of data will be processed outside the traditional data center or cloud

Gartner


Data
Managed closer to where it is being created
Utilized closer to where it **provides value**

Taken together, these new locations, data and devices are called the **edge**.



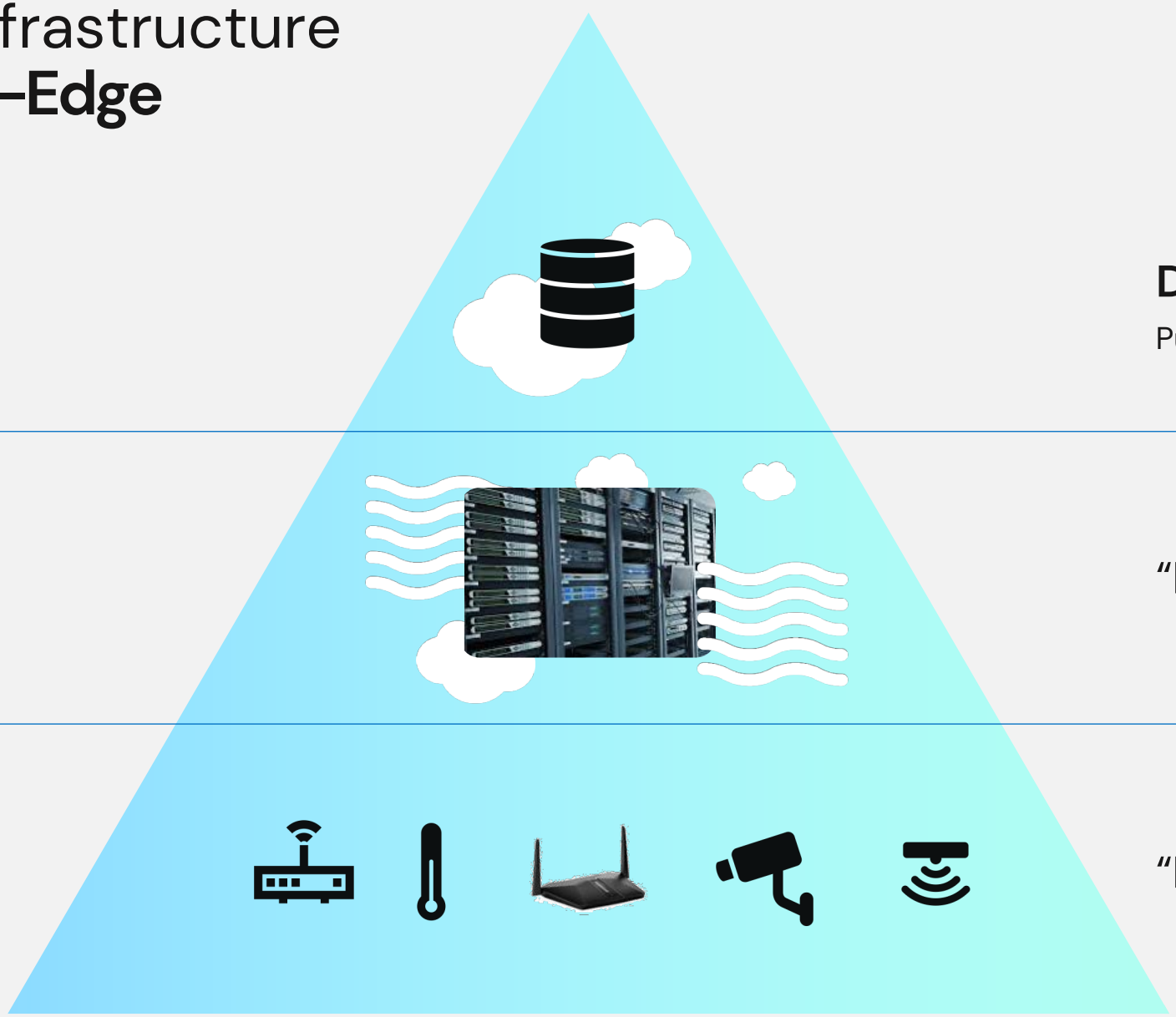
That's the part of the network near the end users, where data is created by sensors, cameras, people with mobile devices, and the entire Internet of Things (IoT)

Today's Infrastructure
Cloud–Fog–Edge

Thousands
of devices

Millions
of devices

Billions
of devices



Data Center – Cloud
Public / Private / Hybrid

"**Fog**" Nodes

"**Edge**" Devices

Example
Content delivery network

Goal

High **availability** and **performance** by distributing the service spatially relative to end users.

- Support for a geographically distributed network
- Uses the cloud, proxy servers & data center(s)

Publisher's Remote Office
Santa Monica, CA

Headquarters Offices
Outside of Seattle, WA

Example
Smart Manufacturing

Connect devices capabilities

- Sensing
- Identification
- Processing
- Communication
- Actuation
- Networking

Network control and management of

- Manufacturing equipment
- Asset and situation management
- Manufacturing process control

IoT Deployment Challenges

Complexity

Project Roadmap

Cloud combinations

"Last-mile" End-User Requirements

Difficulties processing voluminous quantities of data

Recruitment & Coordination

Difficulties sourcing parts

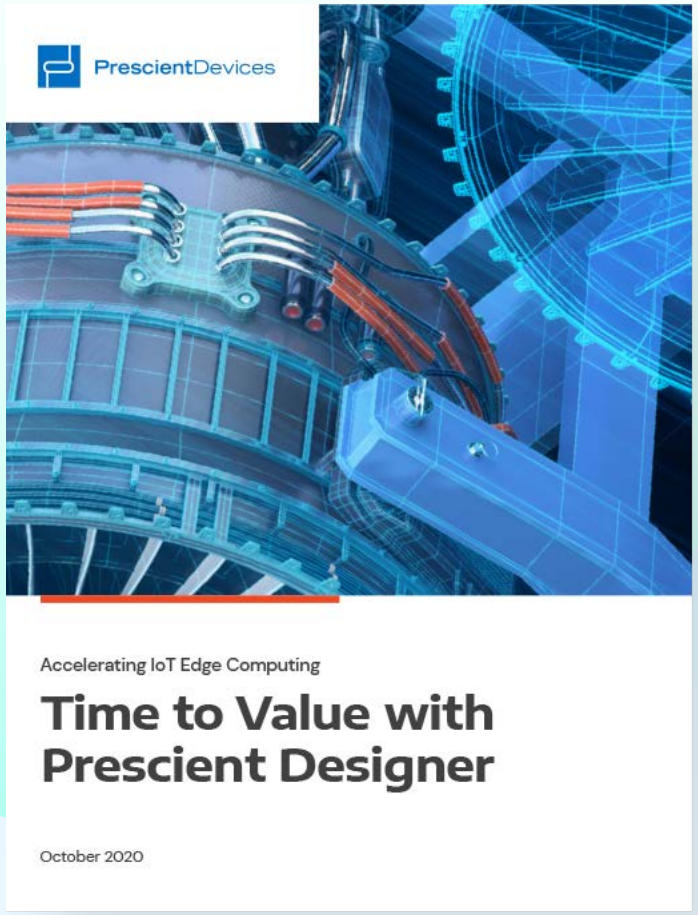
Support for CI/CD

Solve with Low-Code and Automated Design

Q&A

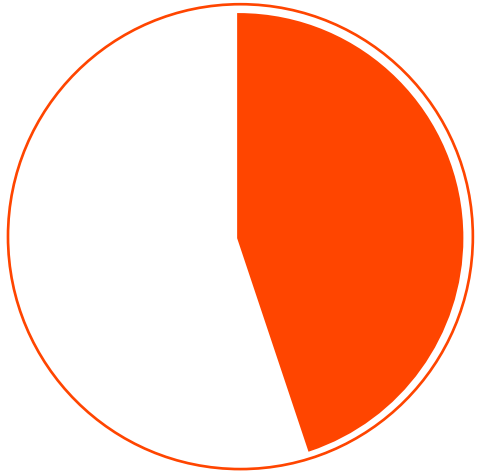
Whitepaper

Accelerating IoT Edge Computing: Time to Value with Prescient Designer



tinyurl.com/pdi-lowcode

Rise of Low-Code Application Development



41%

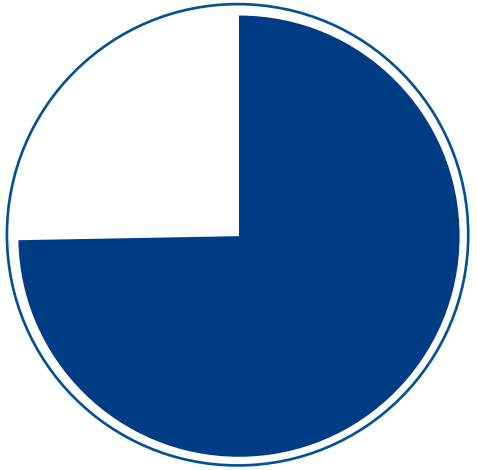
CAGR

CAGR for Low-code platforms 2017-2022

65%

App Development

Application development in low-code by 2024



75%

Large Enterprises

Large enterprises adopting 4 or more low-code software by 2024

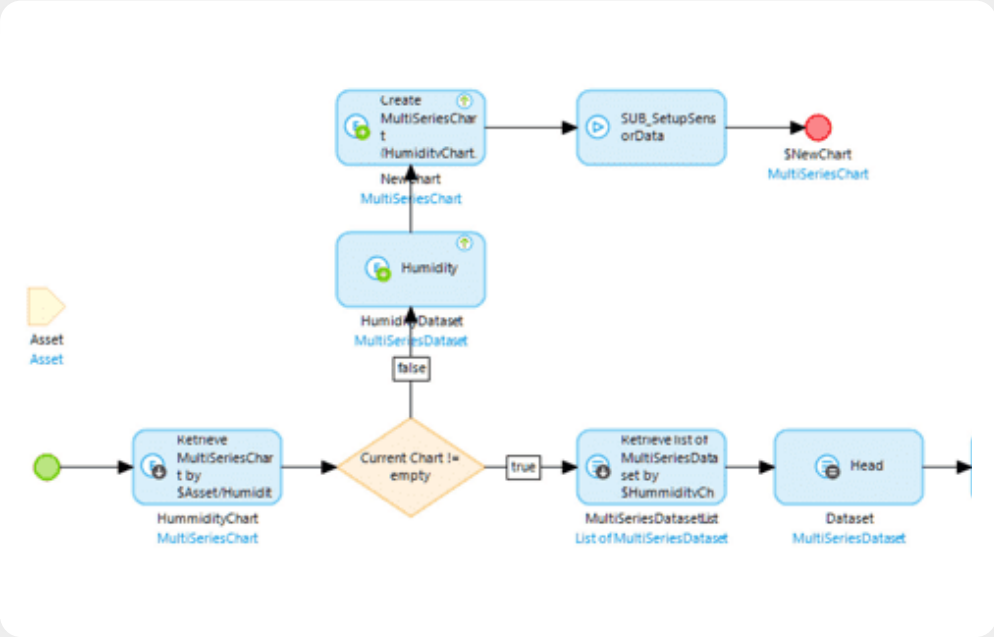
[Source: Gartner]

What is Low-Code?

Application development with **minimal coding**

Most popular form: **functional block programming**

Model-driven: **separation of application** from underlying platform

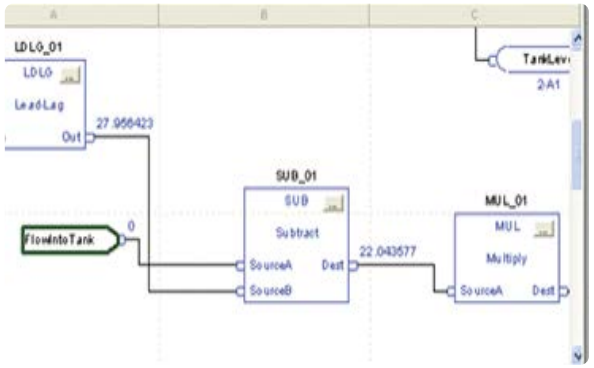


[Sources: Mendix]

Low-Code is everywhere

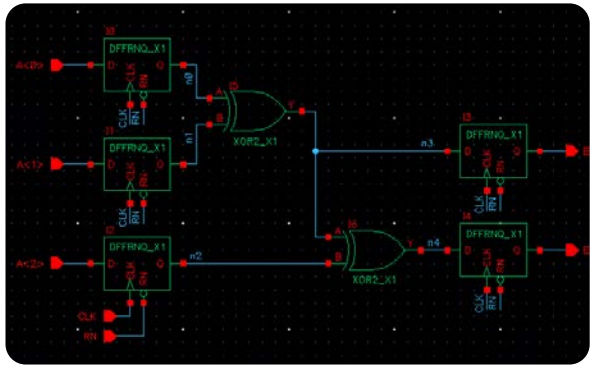
Industrial Automation

Rockwell Automation®
RsLogix™



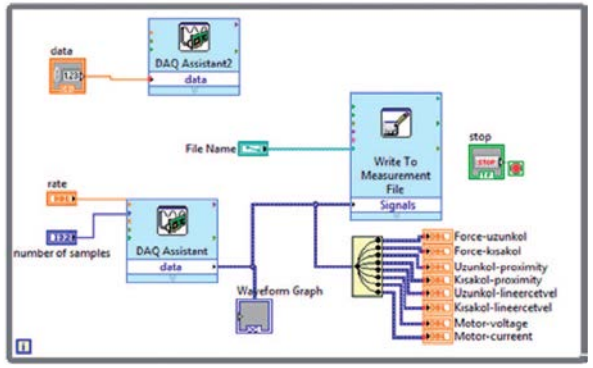
Integrated Circuits

Cadence® DE



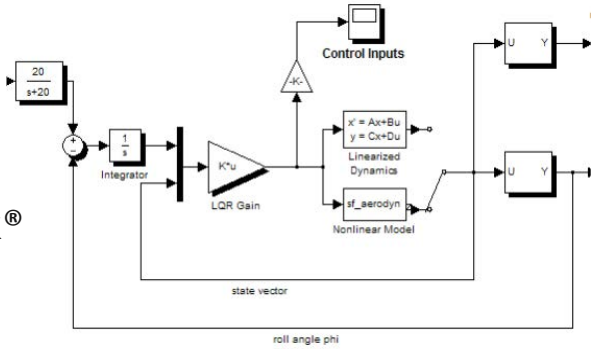
Product Test

NI™ LabVIEW™



System Design

MathWorks® Simulink®



Low-Code Benefits

Simplicity

- Reduced expertise 
- Reduced training 
- Increased efficiency 
- Consistent quality 

Modularity

- Easy to understand 
- Easy to reuse and share 
- Improved collaboration 
- Improved scalability 

Low-Code Users

Enterprise IT/OT teams

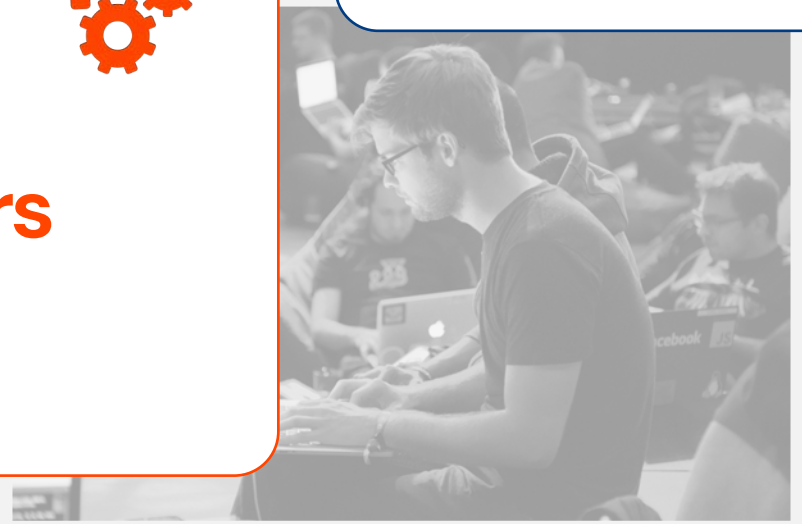
Internal solution development

System Integrators

Quick-turn applications

Citizen Developers

Crowd-sourcing projects

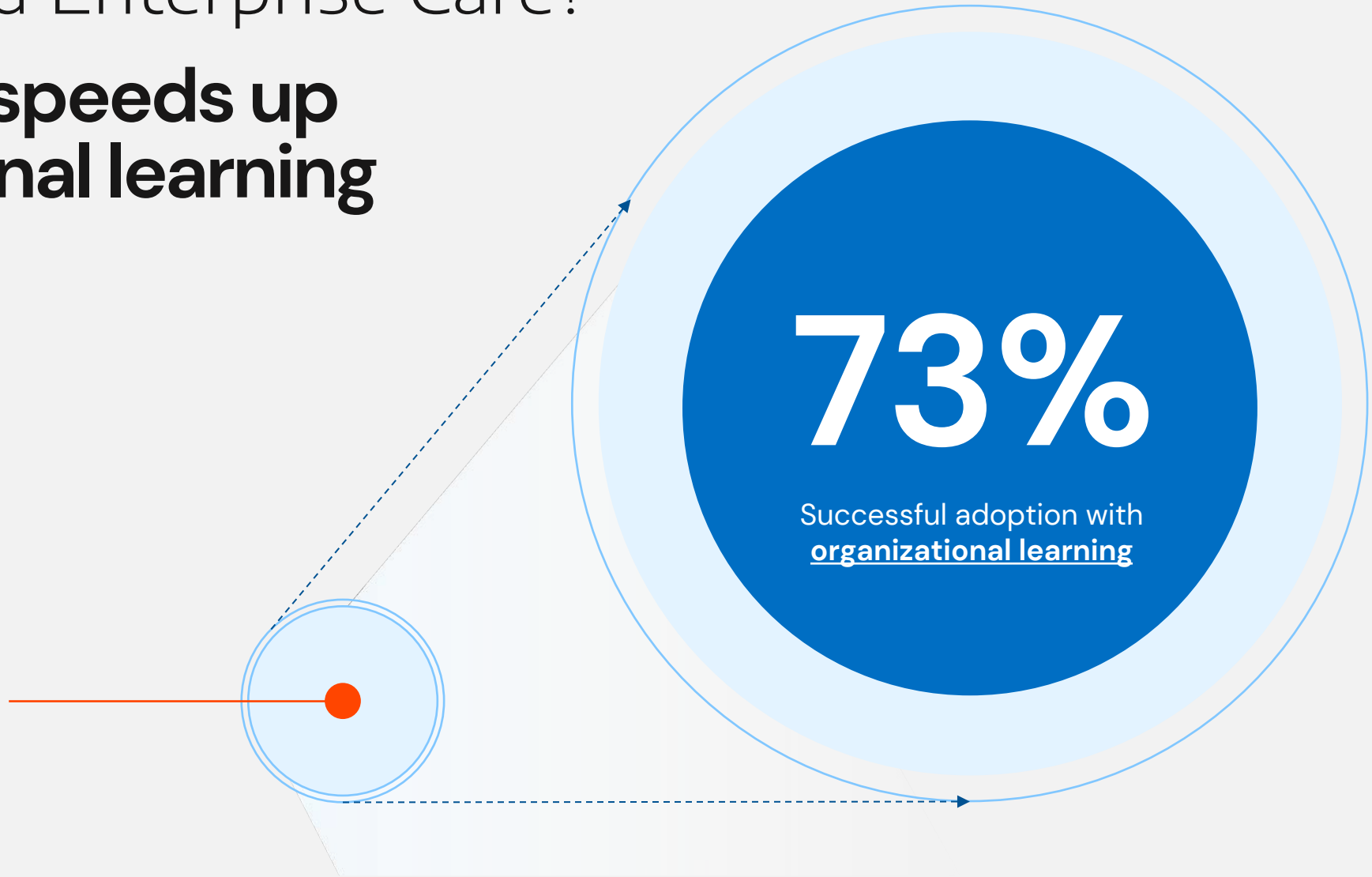


Why Should Enterprise Care?

Low-code speeds up organizational learning

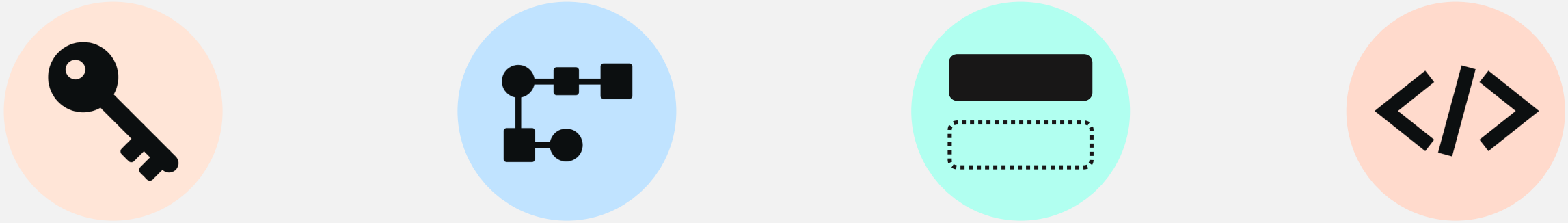
11%

Successful IoT & AI adoption in enterprises



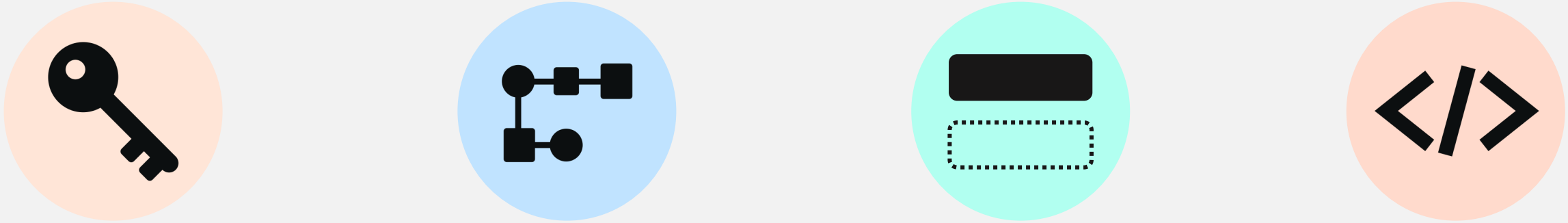
[MIT Sloan, BCG]

The Full Landscape



	Characteristic	Adopt to
Turnkey	Fixed solution	Solve a peripheral need
No-code	Programmable, constrained to a narrow space	Optimize a sequential task
Low-code	Programmable, widely applicable, constrained to a technology framework	Optimize an application
Full-code	Complete freedom	Optimize technology performance

Choose the Right Framework



	Adopt to	Example
Turnkey	Provide quick fix	Construction company adopts work safety monitoring solution
No-code	Customize sequential task	Manufacturing company builds operator workflow
Low-code	Enhance core competency and competitive advantage	Equipment manufacturer integrates IoT into product
Full-code	Optimize technology performance	Technology company builds IoT product

Example IoT Application

Dashboard

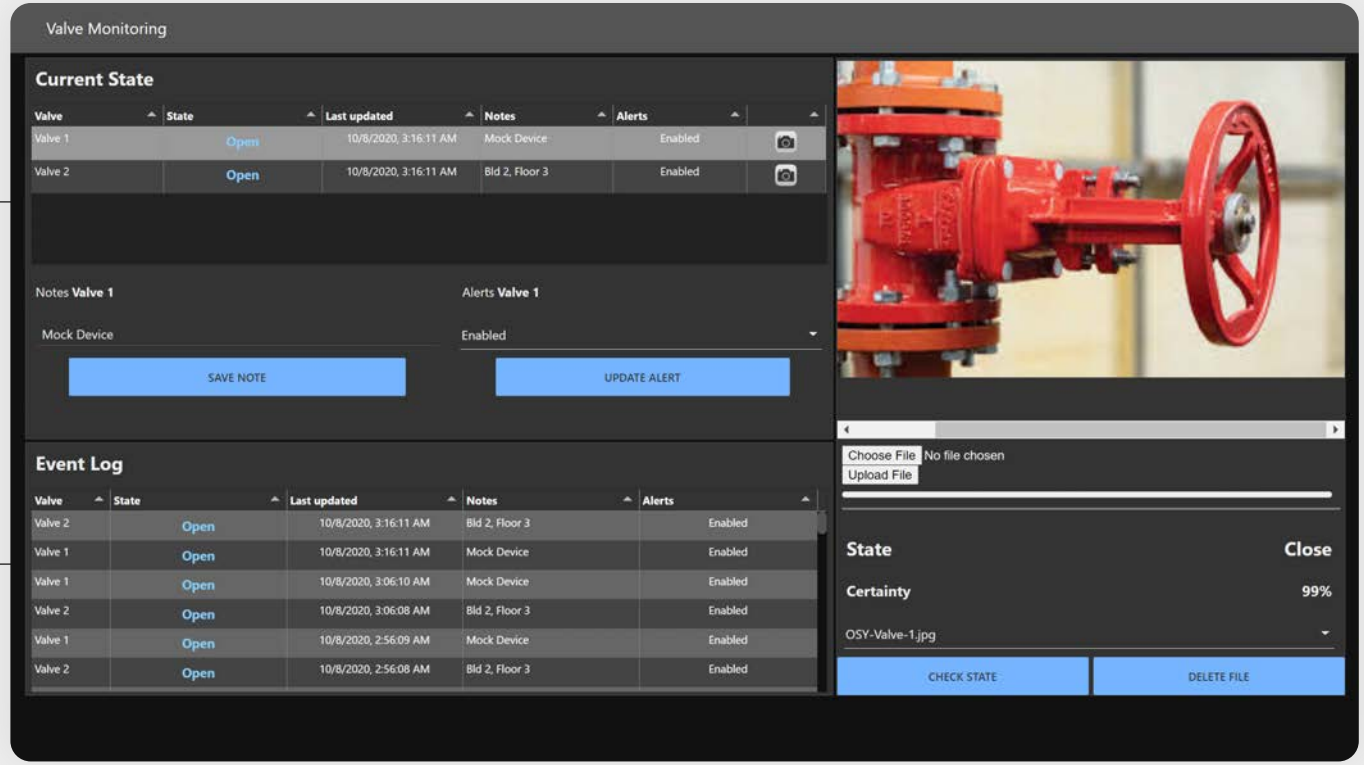
Visualization: charts & alerts
Interactive: forms & buttons

Cloud

Receive data from 1000 edge devices
Data analytics & storage

Edge

Camera & edge computer
Machine vision & machine learning

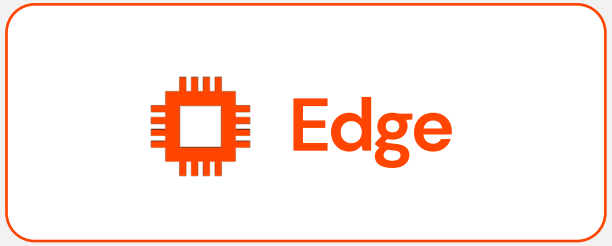


Full-code Development

Requires strong technology team

API

API



Visualization
HTML
CSS
JavaScript

App
Node.JS / Django

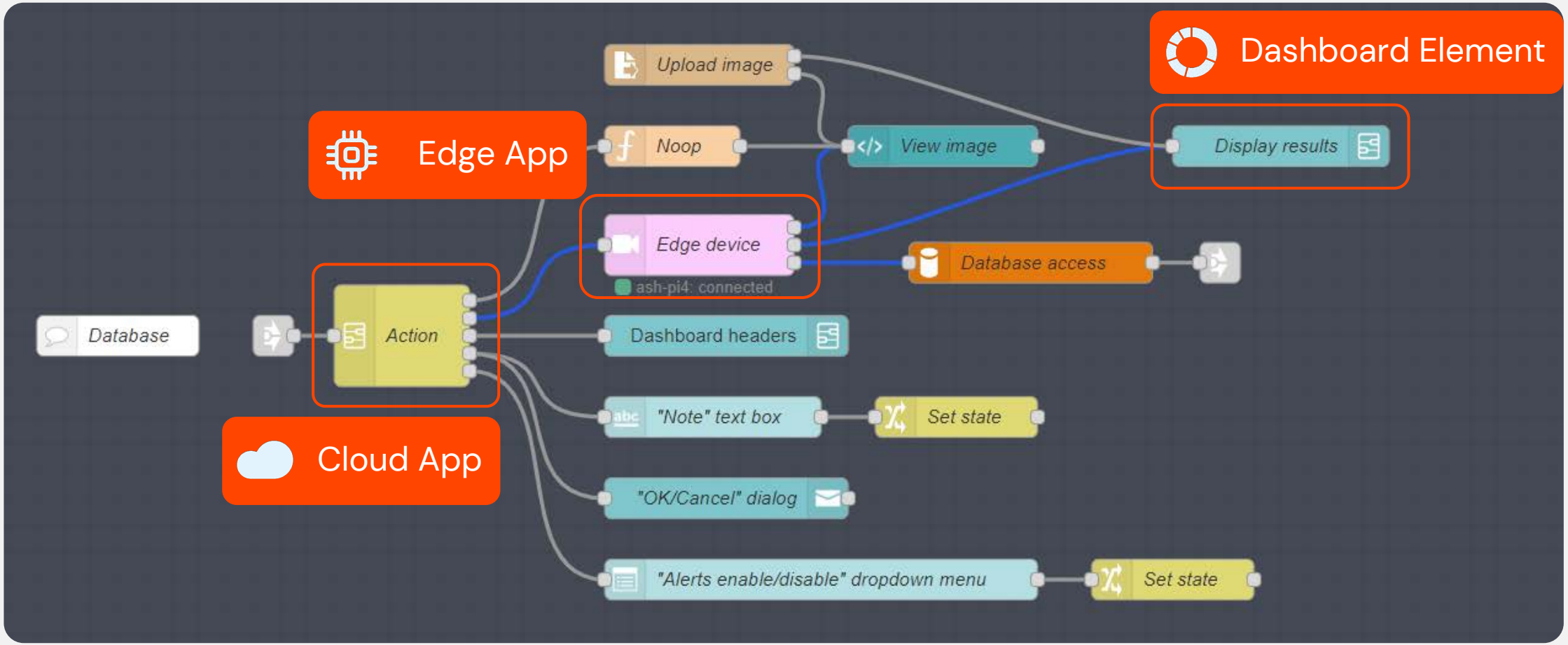
DevOp
Containers, CI/CD
Microservices
NGINX, Cookies

App
Python
C

Orchestration
Containers, CI/CD
Comm, I/O, Security,
System management

Low-Code Development
In Prescient Designer

1 Single app for the complete solution

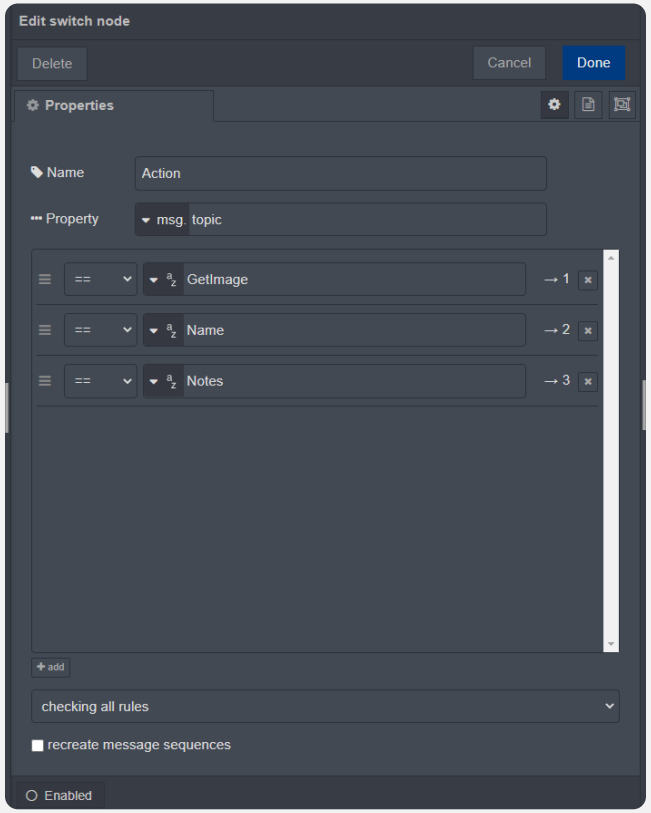


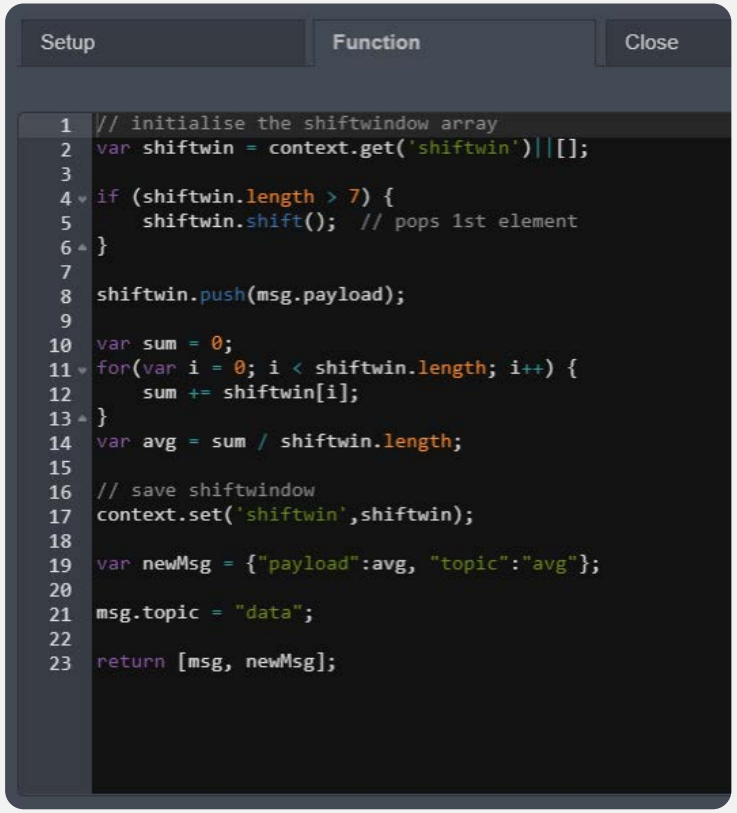
Multiple Development Modes

NO-CODE

LOW-CODE

FULL-CODE






```
<script type="text/javascript">
    RED.nodes.registerType('remote-server',{
        category: 'config',
        defaults: {
            host: {value:"localhost",required:true},
            port: {value:1234,required:true,validate:RED.validators.
        },
        label: function() {
            return this.host+":"+this.port;
        }
    });
</script>

<script type="text/html" data-template-name="remote-server">
    <div class="form-row">
        <label for="node-config-input-host"><i class="fa fa-bookmark
        <input type="text" id="node-config-input-host">
    </div>
    <div class="form-row">
        <label for="node-config-input-port"><i class="fa fa-bookmark
        <input type="text" id="node-config-input-port">
    </div>
</script>
```

Open Ecosystem

Builds on Node-RED and Node.js

Node-RED

- Low-code programming
- Powerful flexibility
- Strong community support

Node.js

- 98% of Fortune 500
- 200,000 code packages
- Support everything from web functions to ML

Pre-installed on devices from

Siemens, Samsung, Intel, GE, Schneider, Fujitsu, Advantech, Harting, Hilscher, Opto22, etc.

PDI improves on Node-RED

- Distributed programming & synchronization
- Crash recovery & rollback
- Sensor and hardware support
- Edge-to-cloud security

Use Cases

Best used for

- Applications requiring frequent changes
- Agile integration with core competencies

EQUIPMENT MANUFACTURER

Transform from hardware provider to service provider

OEM

Improve efficiency of manufacturing processes

ENTERPRISES

Integrate with existing processes to build competitive advantages

Turnkey Solution Templates

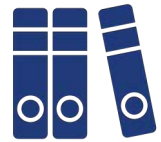
Fast deployment with programmability

Remote monitoring

Predictive maintenance

Industrial automation

Training and support



Software modules library

Machine vision

Dashboard

1

Day-1 deployment

Hardware library

and more

Outlook

IoT will be embedded in every product and process

- Edge computing will accelerate
- Low-code will continue to grow
- Learning and iteration are necessary
- IoT is transformative

Upcoming Webinars

MAR
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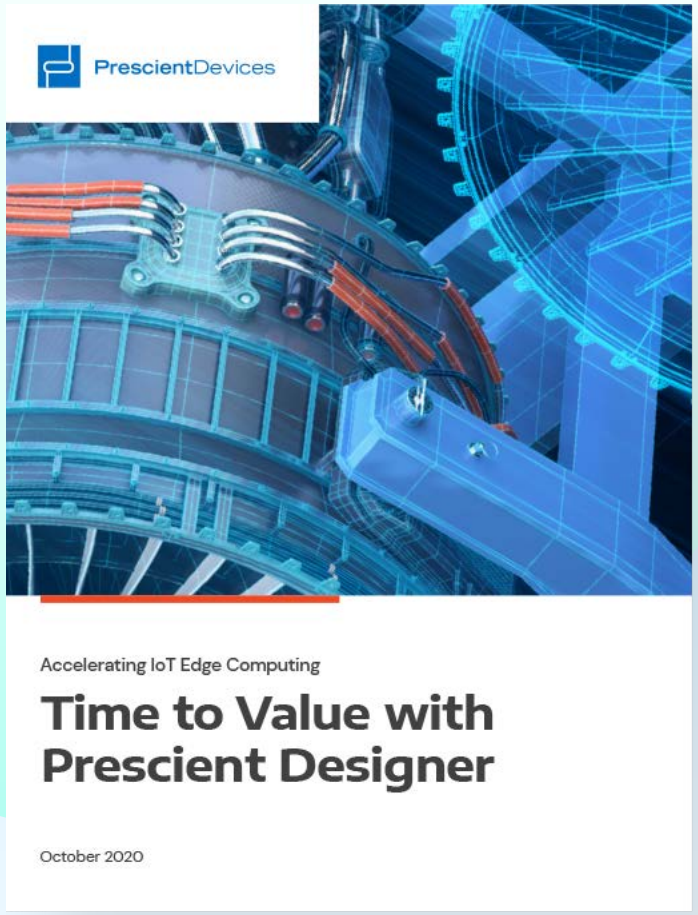
Prescient Designer for Node-RED users

https://tinyurl.com/**pdi-events**

Q&A

Whitepaper

Accelerating IoT Edge Computing: Time to Value with Prescient Designer



tinyurl.com/**pdi-lowcode**