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Robotics: The Era of Artificial Intelligence & Autonomy

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12.03.2020 United States

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Robotics: The Era of AI and Autonomy

Key drivers for using AI in robotics applications

Challenges presented by the emerging AI-enabled robotics

What level of security is needed to prevent disruption

What you should look for in your real-time technology stack

I'll take questions

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A detailed view of an automated manufacturing process for face masks. The scene shows a conveyor belt system with several blue fabric masks in various stages of completion. Some masks are fully formed with white elastic loops, while others are just pieces of fabric. The machinery is made of stainless steel and includes various rollers, guides, and a green spool of thread. The background shows more industrial equipment and a clean, well-lit factory environment.

ROBOTS ARE PROGRAMMABLE MACHINES



AUTONOMY IS
INTUITIVE AND ABLE TO DO THINGS ON ITS OWN

The background is a dark blue gradient filled with a dense pattern of binary code (0s and 1s) in a lighter blue color. Overlaid on this are several glowing, wavy blue lines that resemble data paths or neural connections. These lines are punctuated by small, bright, multi-colored dots (yellow, orange, and blue) at various points, giving the impression of active data flow or processing nodes.

ARTIFICIAL INTELLIGENCE

THE SIMULATION OF HUMAN INTELLIGENCE IN MACHINES

**ARTIFICIALLY INTELLIGENT
MACHINES**

CAFEX

ARTIFICIALLY INTELLIGENT MACHINES

Courtesy: San Jose Airport

DATA POINTS YOU NEED TO KNOW

**THE GLOBAL
SMART ROBOT INDUSTRY IS
EXPECTED TO REACH**

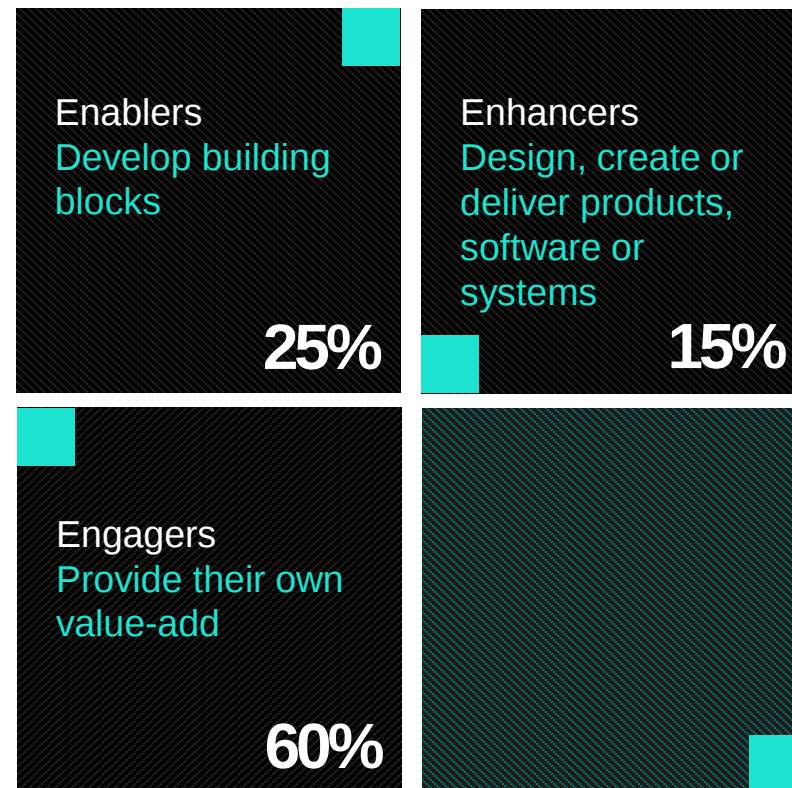


\$14.3B

**ALMOST TRIPLING FROM ITS \$4.9B
VALUATION IN 2018 BY GROWING AT A CAGR
OF 23.7% OVER THIS FIVE-YEAR PERIOD**



CTA ARTIFICIAL INTELLIGENCE & ROBOTICS INDEX



AI IMPACTS EVERYTHING ON A MACRO LEVEL, NOW



A large, diverse crowd of people walking in a city street. In the foreground, a man with sunglasses is slightly out of focus. The background is filled with many other people of various ages and ethnicities, some looking towards the camera and others looking away. The scene is brightly lit, suggesting daytime.

PEOPLE...



MAKE A STATEMENT

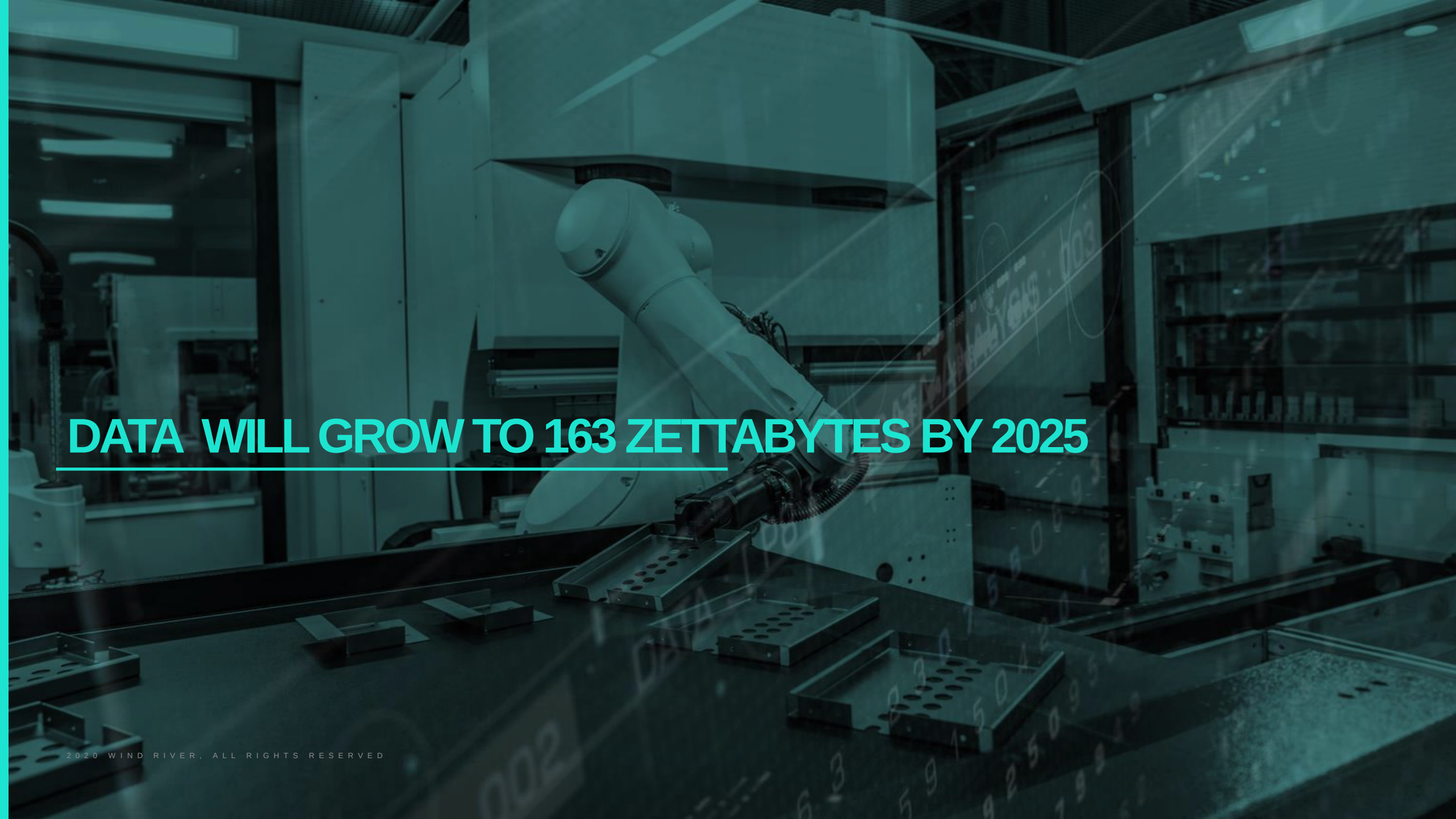
AI AND HUMAN NEEDS



INNOVATE AND CREATE NEW TECHNOLOGY

A teal-tinted photograph of an industrial robotic arm in a factory. The arm is positioned over a workbench with several metal trays. Overlaid on the image are faint, semi-transparent digital elements: a grid of numbers (0-9) and the word "DATA" in various orientations and sizes, suggesting a data-driven or digital manufacturing environment.

DATA NUMBERS

A photograph of an industrial robotic arm in a factory setting, overlaid with a teal tint. The arm is positioned over a workbench with several metal components. In the background, there are shelves with various parts. The image is decorated with faint, glowing binary code (0s and 1s) and geometric lines, suggesting a digital or data theme.

DATA WILL GROW TO 163 ZETTABYTES BY 2025

A teal-tinted photograph of an industrial robotic arm in a factory. The arm is positioned over a workbench with several metal trays. Overlaid on the image are faint, semi-transparent digital elements: binary code (0s and 1s), the word 'DATA', and a circular graphic with the number '003'.

COMPUTE / CONNECTIVITY / DATA

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A KEY PIECE IN THE EQUATION IS DATA

Sensors to
operate

Improve
effectiveness

Provide
services

Connectivity
to other
machines

Connectivity
to the cloud

WHAT BINDS DATA AND CONNECTIVITY: SECURITY



CAN I AFFORD SECURING MY DEVICE?



SECURITY

The background features a dark blue field with a network of white lines and dots. Overlaid on this is a large, semi-transparent padlock. The padlock's body is covered in a white circuit board pattern, while its shackle is a solid, metallic blue. Scattered throughout the background are strings of white binary code (0s and 1s).

**WHERE IS
THE DATA CONSUMED?**

75%

Of all data will be consumed at the edge

WHAT DATA REMAINS LOCAL?

Operational
sensory
information

Supervisory
control

M2M
communication

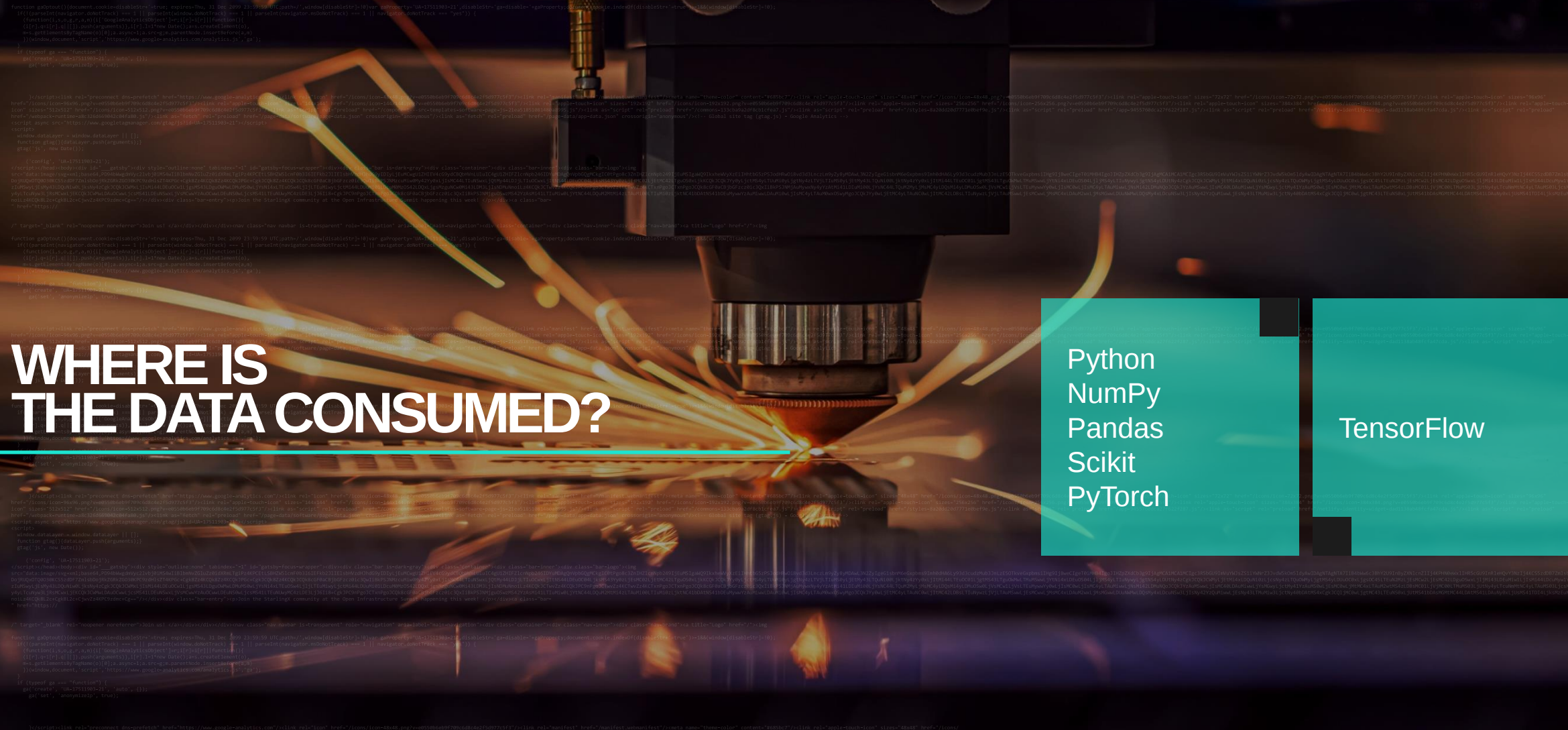
WHAT DATA GOES OUT?

Maintenance

Energy
consumption

Performance
management

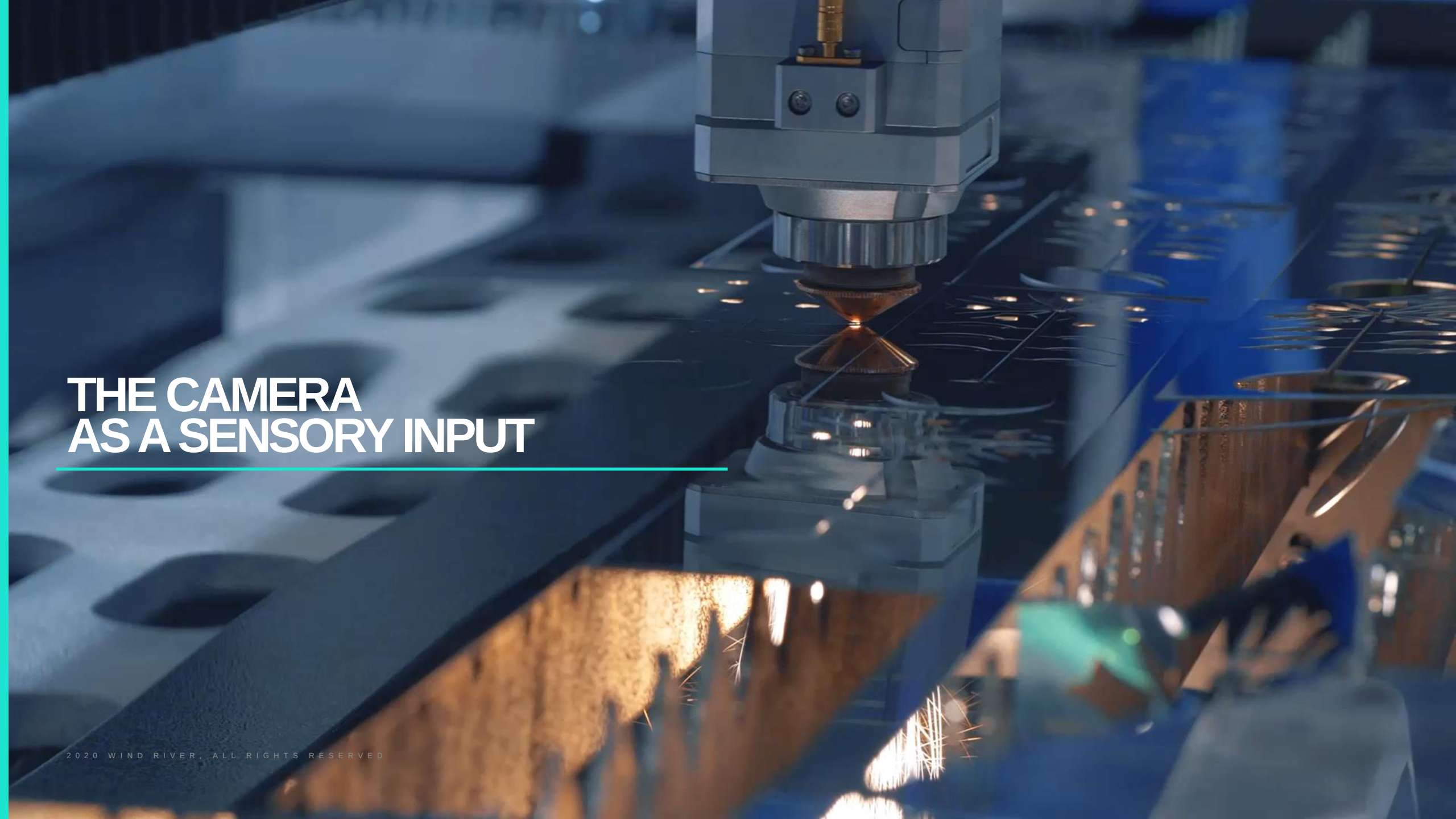
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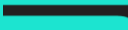
WHERE IS THE DATA CONSUMED?

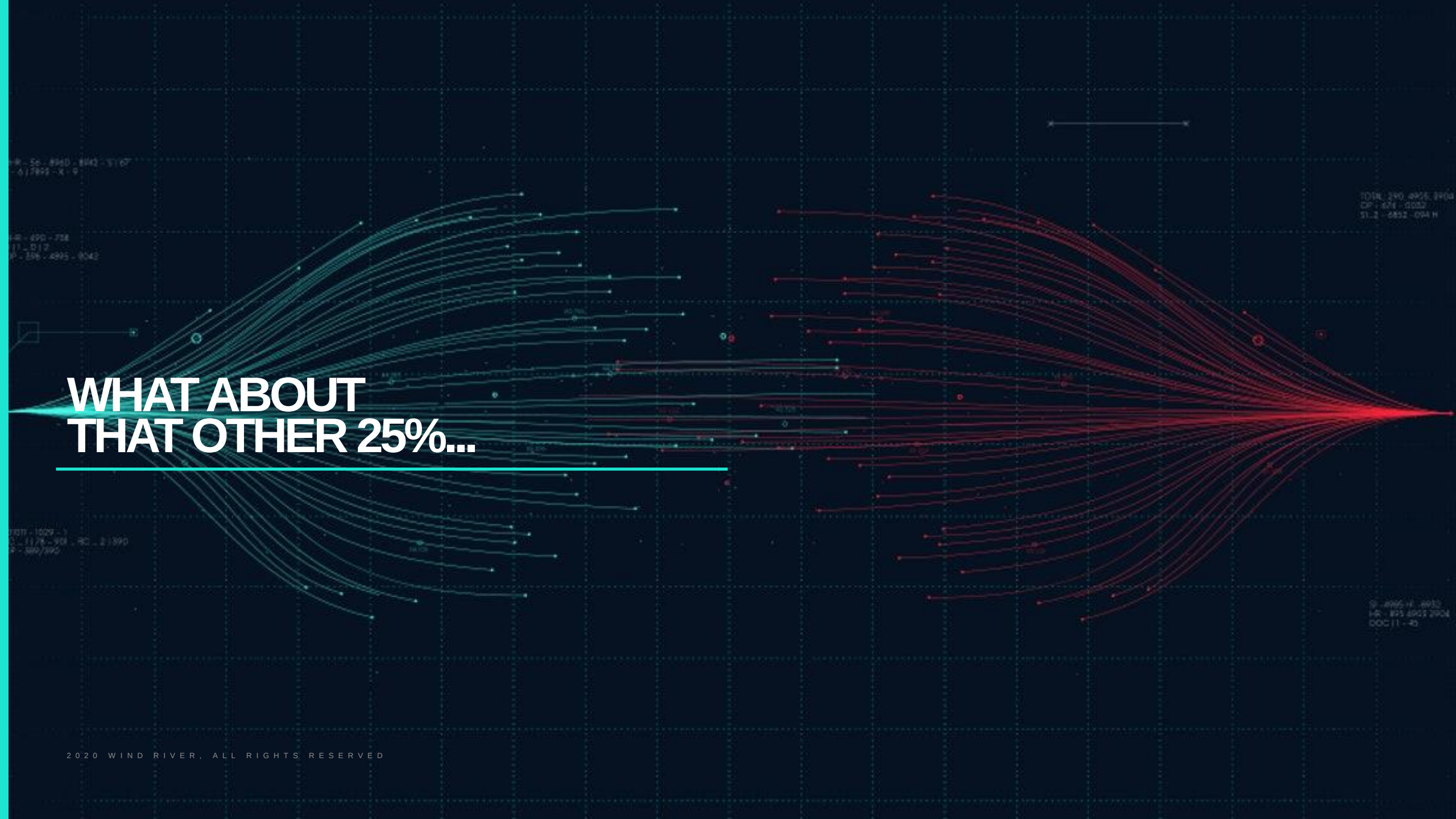
Python
NumPy
Pandas
Scikit
PyTorch

TensorFlow

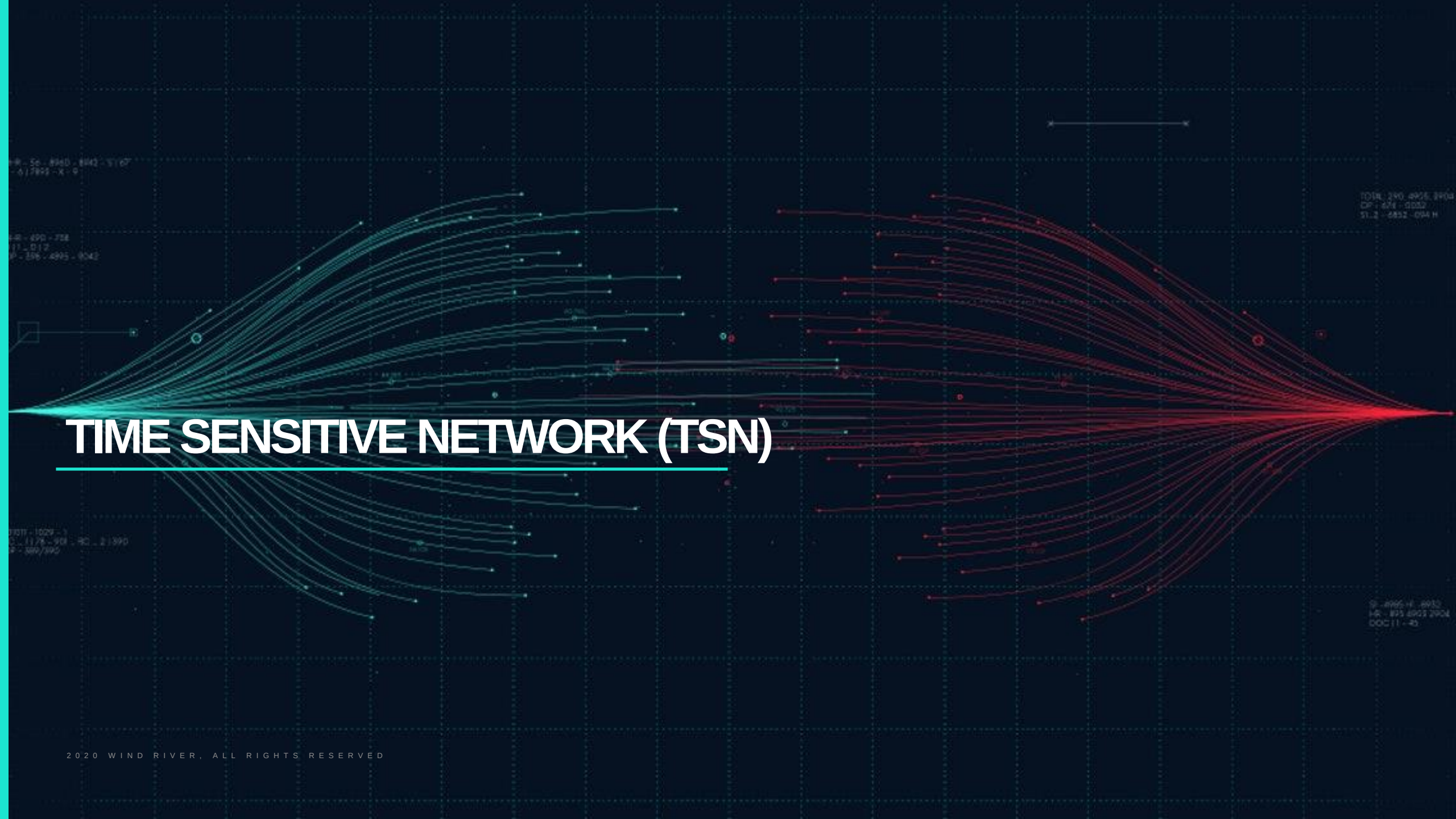


THE CAMERA AS A SENSORY INPUT

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The background is a dark blue grid with a series of flowing, wavy lines that originate from the left and converge towards the right. The lines are colored in a gradient from light blue to red. There are also some small, faint text elements scattered across the grid, such as "P - 5e - 8940 - 8942 - 5167" and "P - 596 - 4995 - 8042".

WHAT ABOUT THAT OTHER 25%...



TIME SENSITIVE NETWORK (TSN)

OPC-UA





LOCAL OR REMOTE



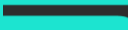
HTTPS



OPC-UA

MQTT

AMQP

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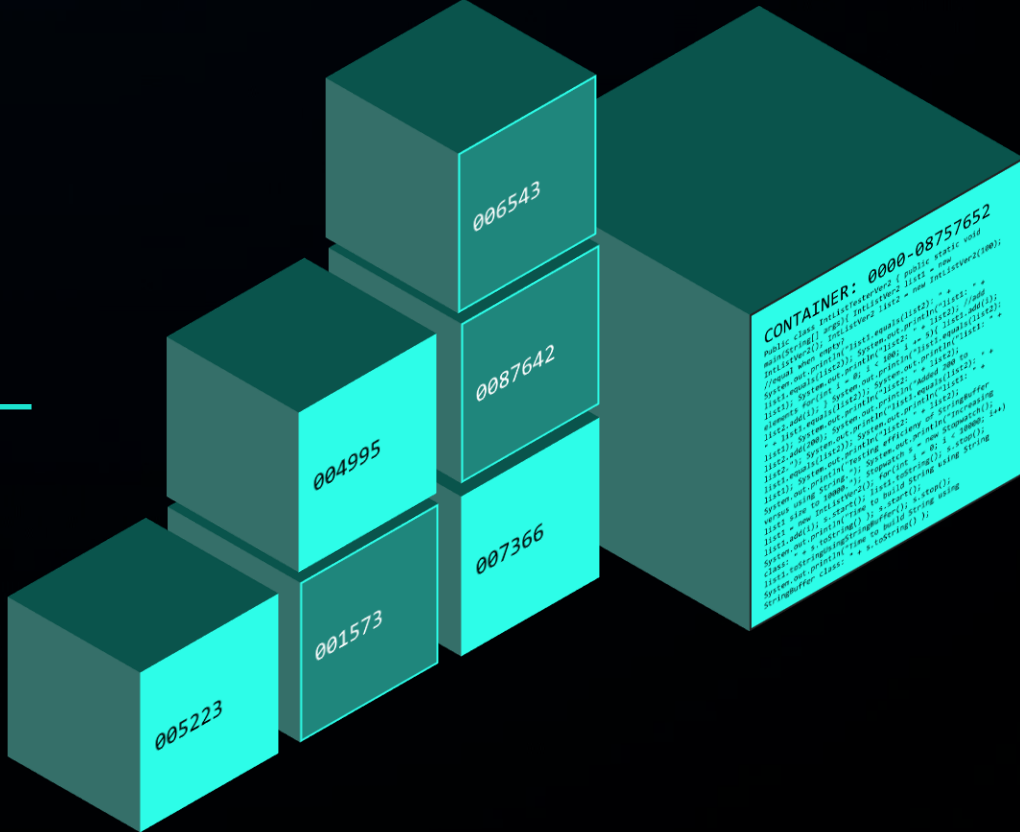


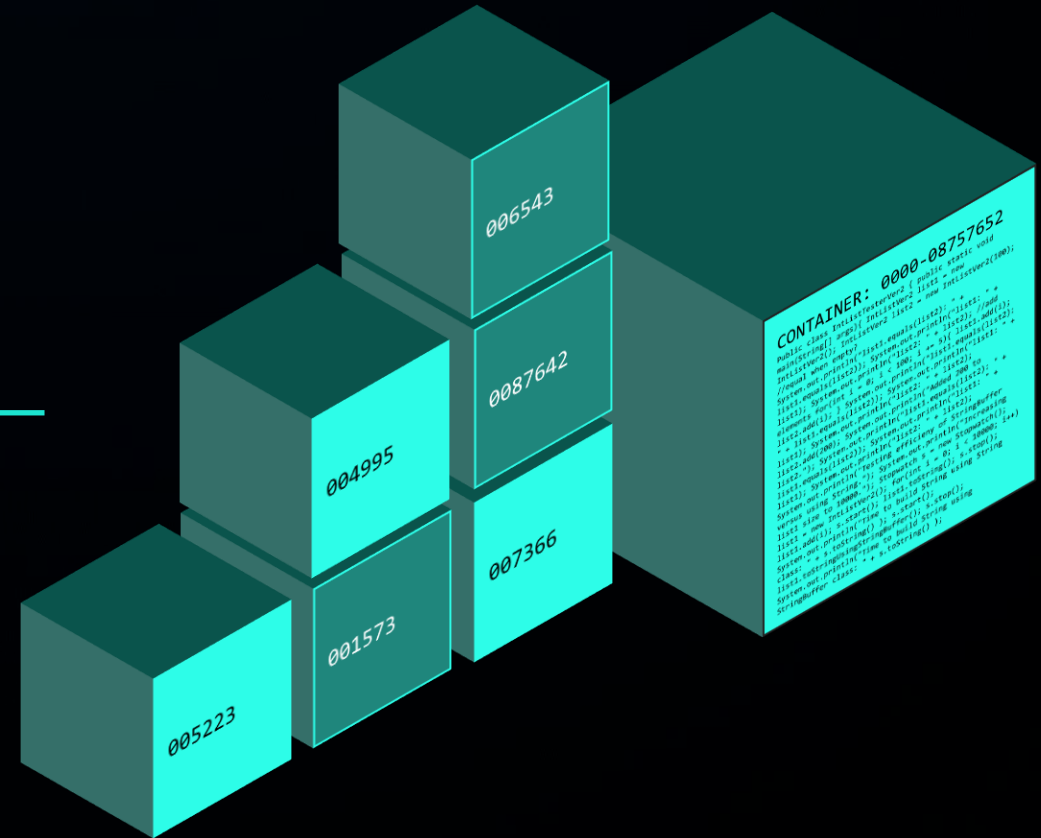


ENABLE SECURE BOOT

ENCRYPT IT!

MANAGE YOUR SOFTWARE







NETWORKING

PRIVACY



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EDGE CLOUD

WIND RIVER CLOUD PLATFORM

QUESTIONS



THANK YOU

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