KONECRANES®
Lifting Businesses™

REMOTELY OPERATED RTG: WHAT'S UNDER THE HOOD?

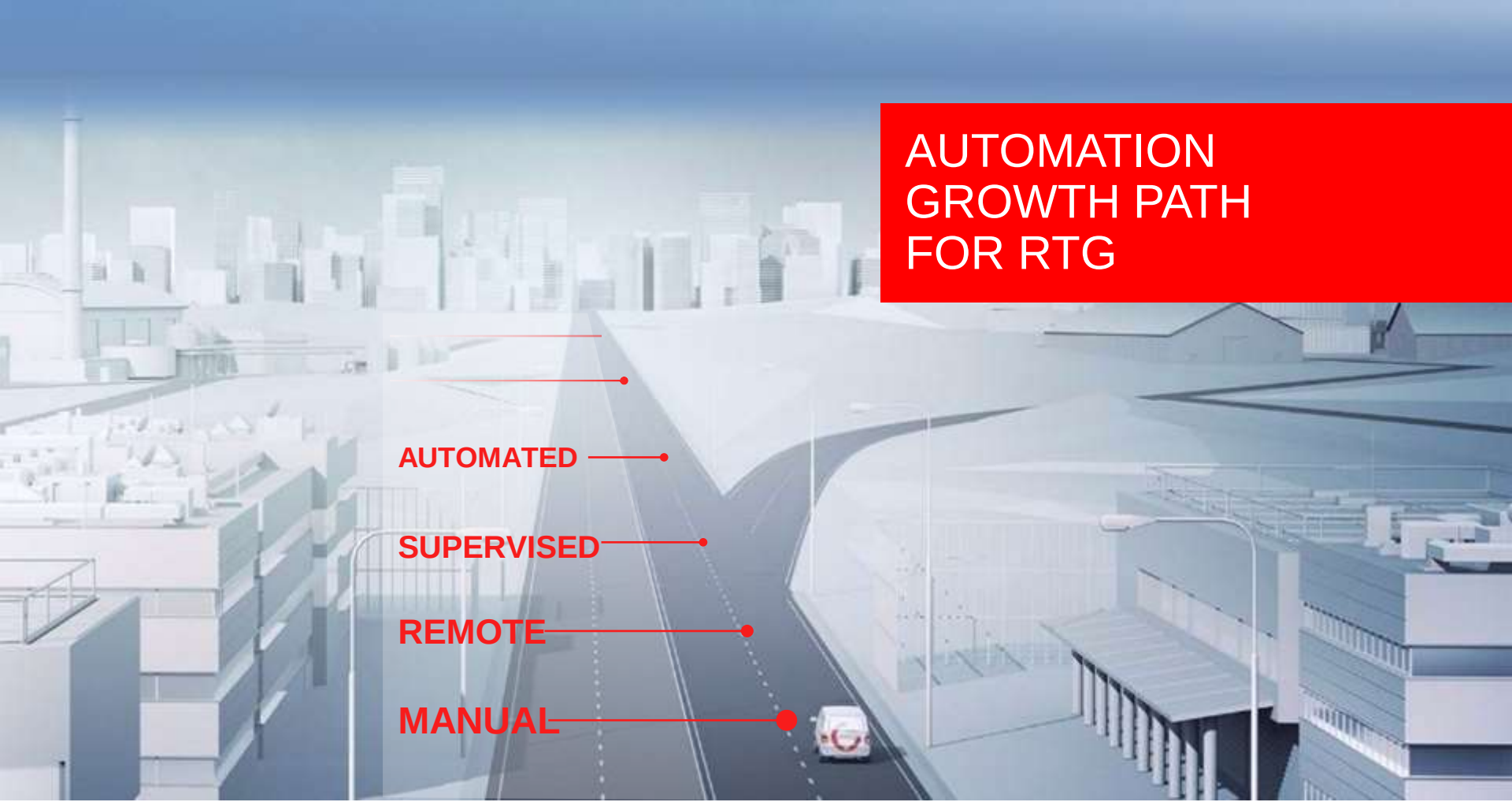
Charleston, April 17th 2018,

SAMPO PIHKALA
Product Manager
Industrial Internet
Konecranes Port Cranes

REMOTELY OPERATED RTG, WHAT'S UNDER THE HOOD?

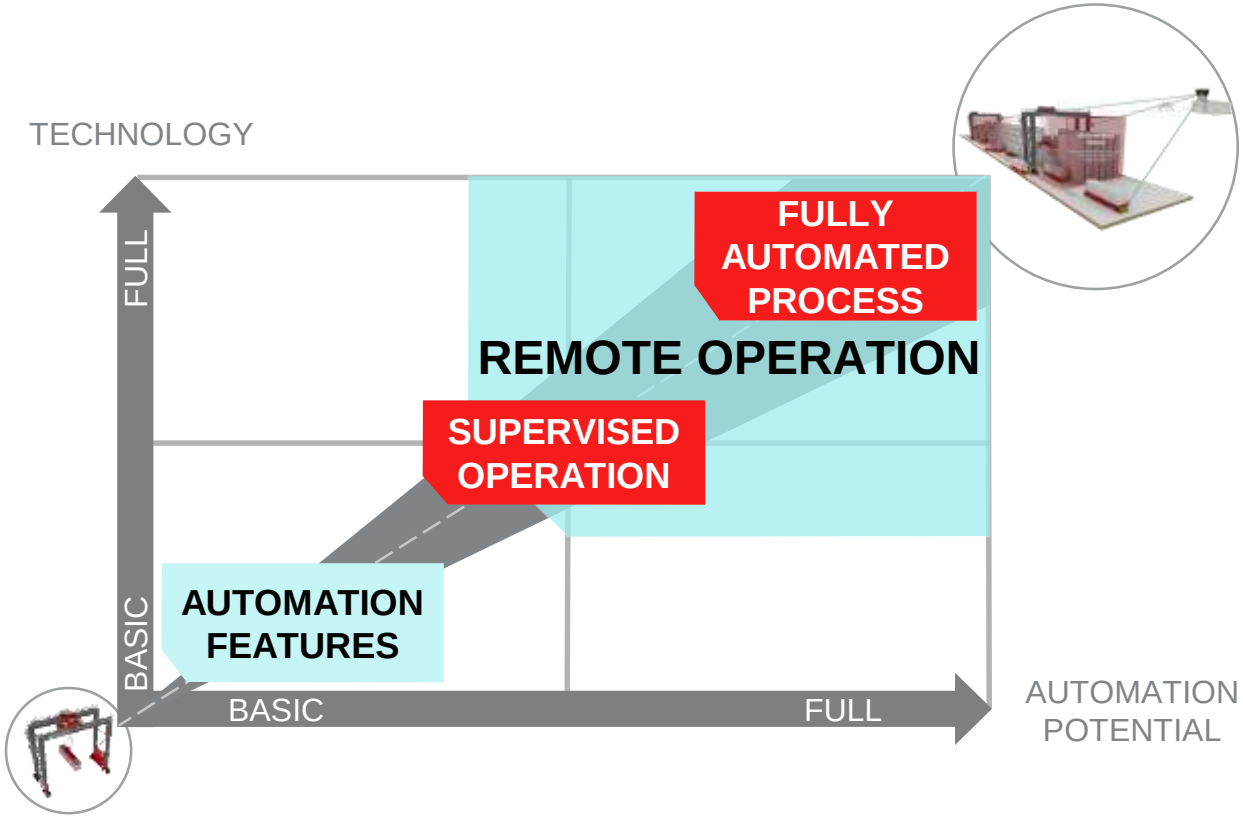
CONTENTS

AUTOMATION GROWTH PATH FOR RTG



KONECRANES®

GROWTH PATH INCLUDED



KONECRANES

WHAT'S NEEDED TO REMOTELY OPERATE AN RTG?

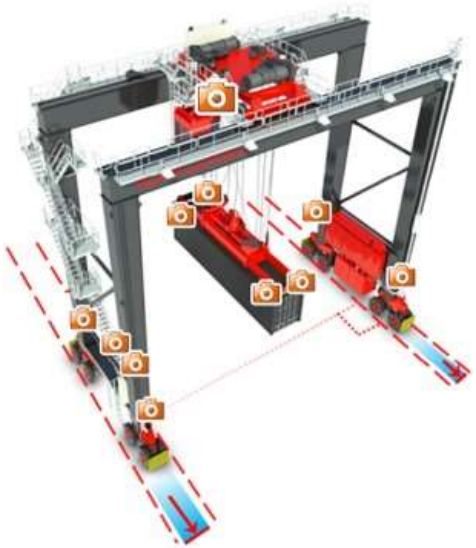
On the crane:

- Auto-steering
- Cameras

In the yard:

- Nothing

WHAT'S NEEDED TO REMOTELY OPERATE AN RTG?



RTG with cameras

Local connectivity and remote service

Central units and Remote Operating Station (ROS)

KONECRANES®

YOU NEED GOOD CONNECTIVITY

RTG powered by cable reel

With fiber-optic connectivity: easy transition to remote operation

WAVEGUIDE

RTG powered by busbar

With WAVEGUIDE communication system: can be operated remotely with some limitations

RTG powered by diesel

With wireless connectivity: good solution for remote operation but traditional WiFi is not enough

YOU NEED AN OPERATING CENTER

…depending on size of RTG fleet

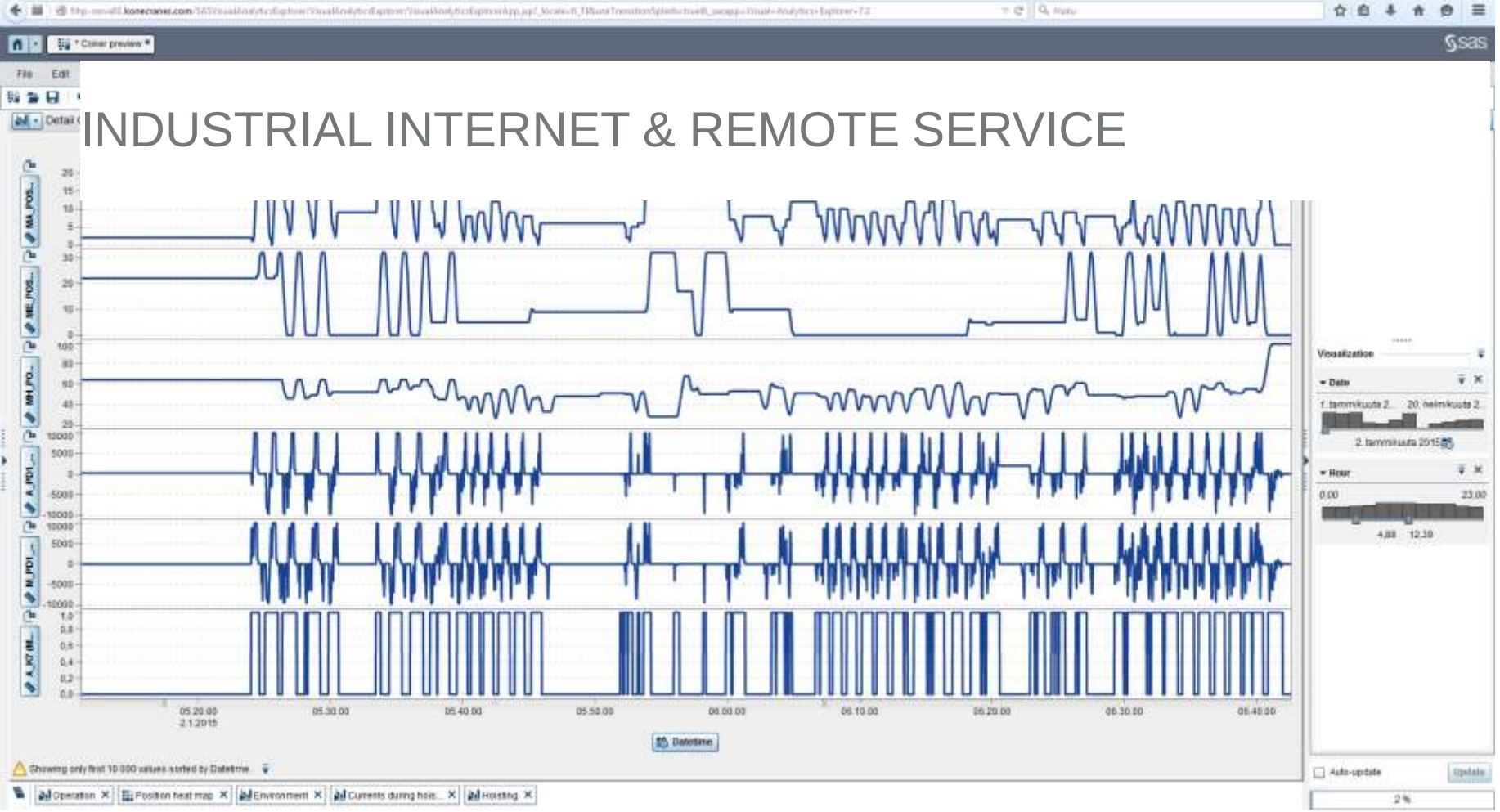
…or at least one Remote Operating Station (ROS) with:

- CPLC
- Servers

OPERATING CENTER

- Remote control and supervision of container handling operations
- Equipment Control System (+TOS client)

INDUSTRIAL INTERNET & REMOTE SERVICE



BROWNFIELD CHALLENGES

BROWNFIELD CHALLENGES

- RTG
  - Spreader cable FO's?
  - GPS for Auto-Steering existing?
- Central Operating Center / ROS
  - Existing IT environment/buildings
  - Capacity/space
- Connection
  - Cable reel FO's?
  - Wireless infrastructure
- Remote service
  - Existing internet

LESSONS LEARNED

KONECRANES®

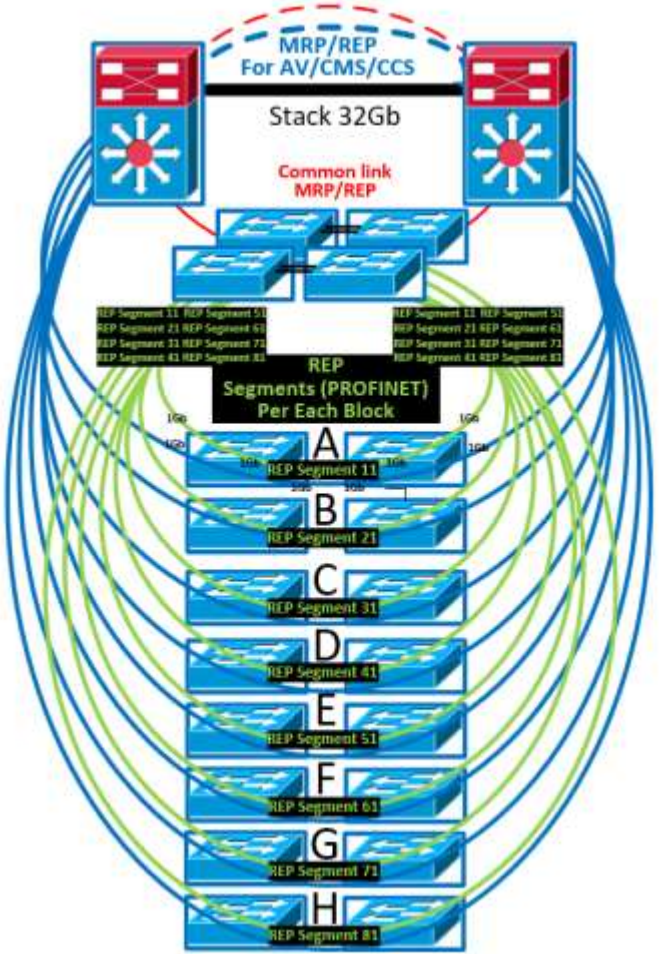
PUT YOUR IT PEOPLE TO WORK EARLY

- Involve them in the project from Day 1
- Not just TOS specialists, Network Admins too
- Encourage them to step into the operational technology

IT NETWORK DESIGN

IT network is the foundation of remote operation and automated container handling

- PPDIOO network cycle by Cisco Systems:
  - Prepare
  - Plan
  - Design
  - Implement
  - Operate
  - Optimize



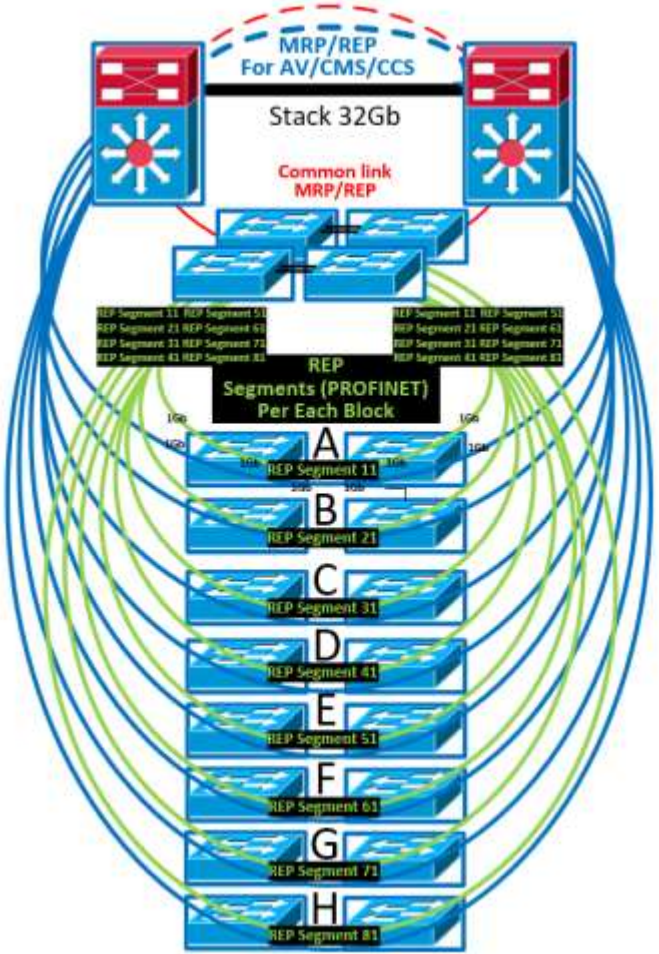
KONECRANES

IT NETWORK DESIGN

REDUNDANCY OF EVERYTHING

IT network must always work

- Use robust, state-of-the-art technology
- Rely on off-the-shelf, proven products from technology leaders

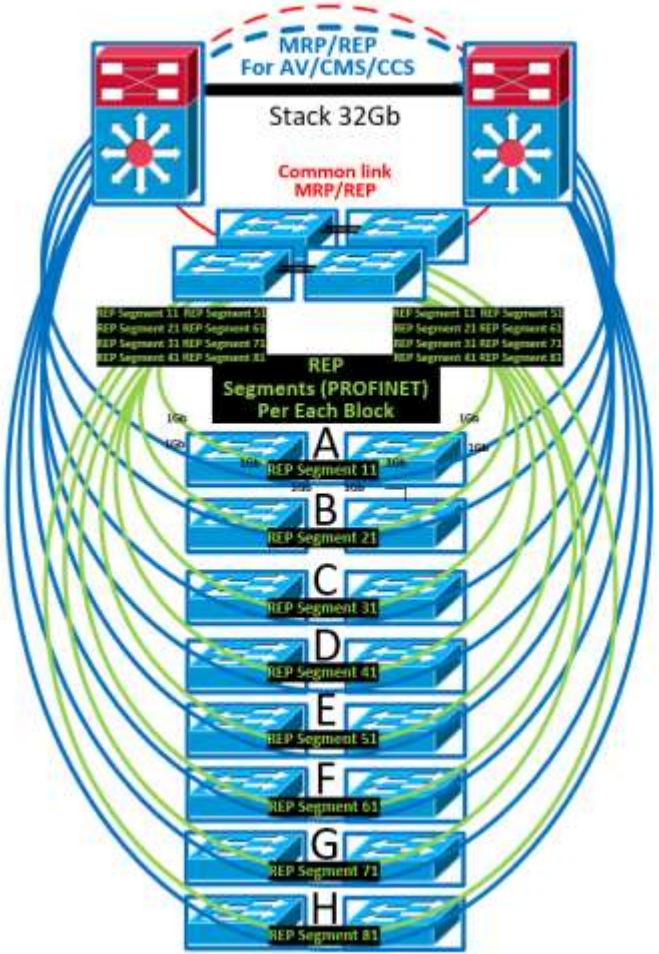


IT NETWORK DESIGN

APPLICATIONS

The network needs to be a perfect fit for the application:

- Critical controls and safety
  - Prioritized real-time I/O BUS communication
- Audio and video
  - Real-time with enough bandwidth



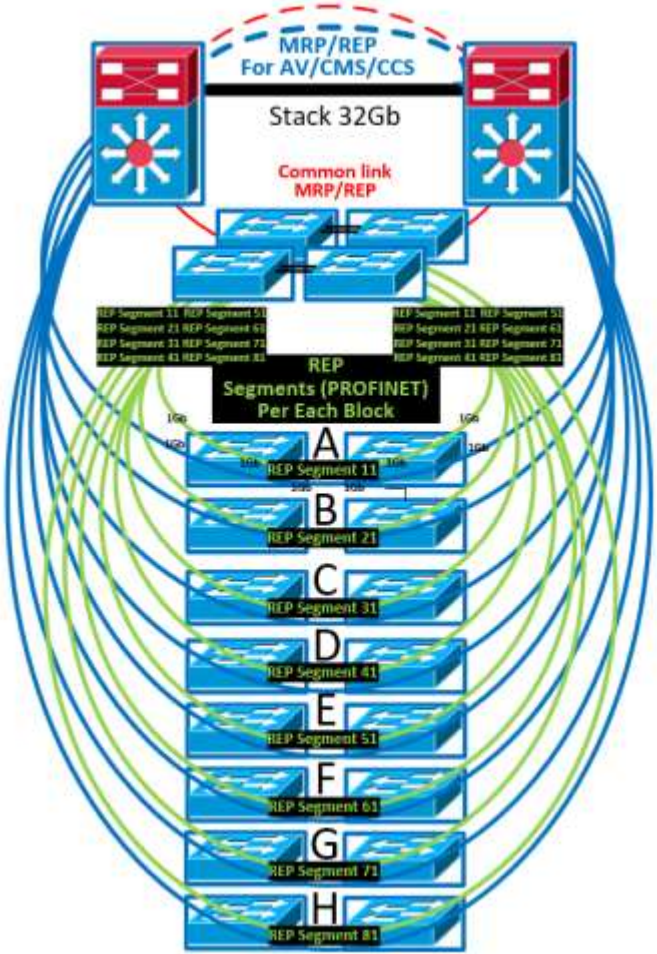
KONECRANES

IT NETWORK DESIGN

SPEED

The network must be very fast

- Enough interface capacity
- Wireless handoffs
- Total bandwidth
- PNIO requirements met
- Scalable

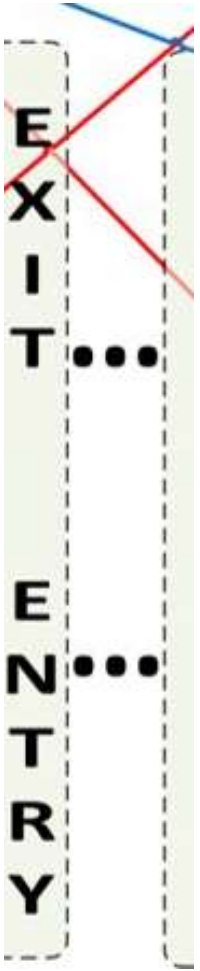


IT NETWORK DESIGN

SECURITY

The network must be secure

- Native network segmentation
- Isolation from unnecessary networks
  - Not just virtually, but physically
- L2/L3 ACL firewalls
- Encryption and authentication on application interfaces
- Datadiodes



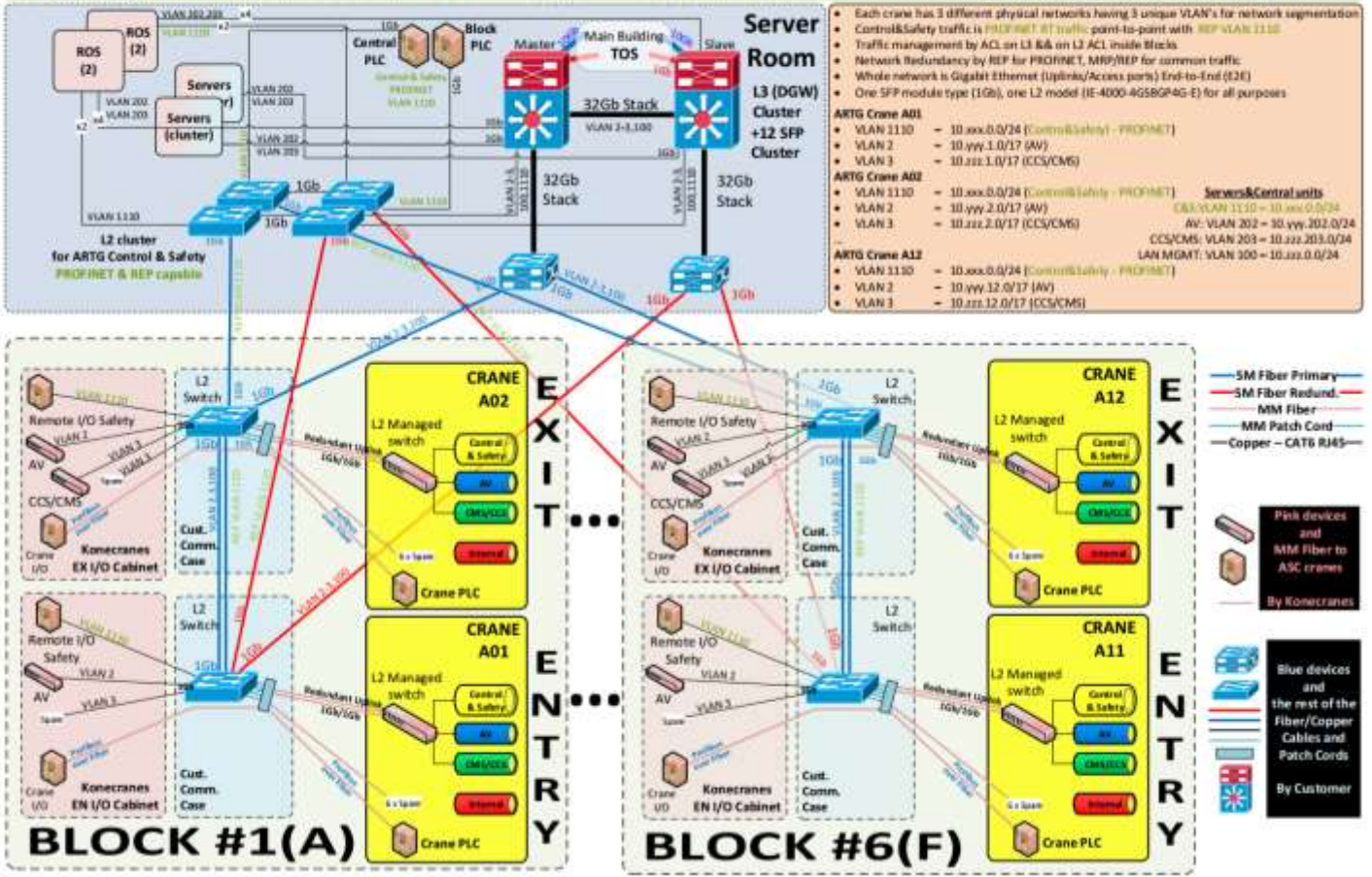
CYBER SECURITY

- IOTSMS (ITSMS and OTSMS)
- ARTG cyber security assessment 2018
  - Continuous process, part of the crane system delivery project

YARD Network Layout – ARTG Cranes communication by Blocks – Principal Drawing

General

April 10th, 2018 – Sampo Pihkala // Konecranes



KONECRANES®


NOT JUST LIFTING
THINGS, BUT ENTIRE
BUSINESSES