

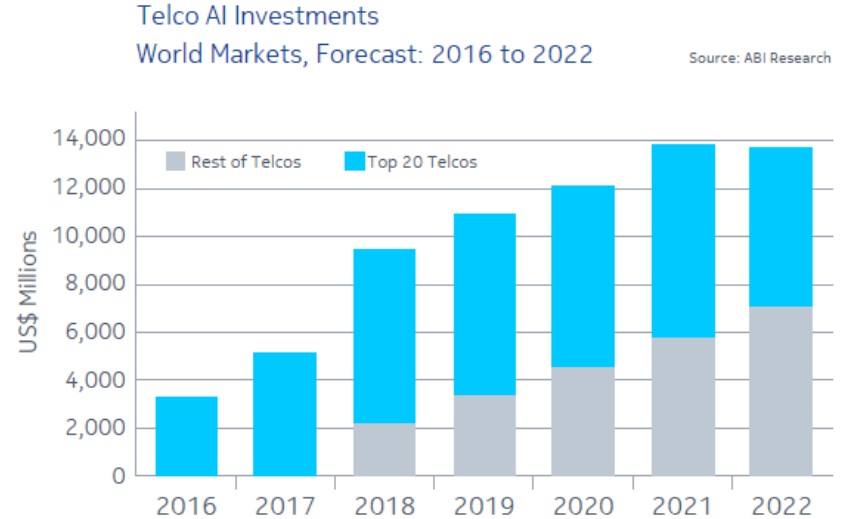
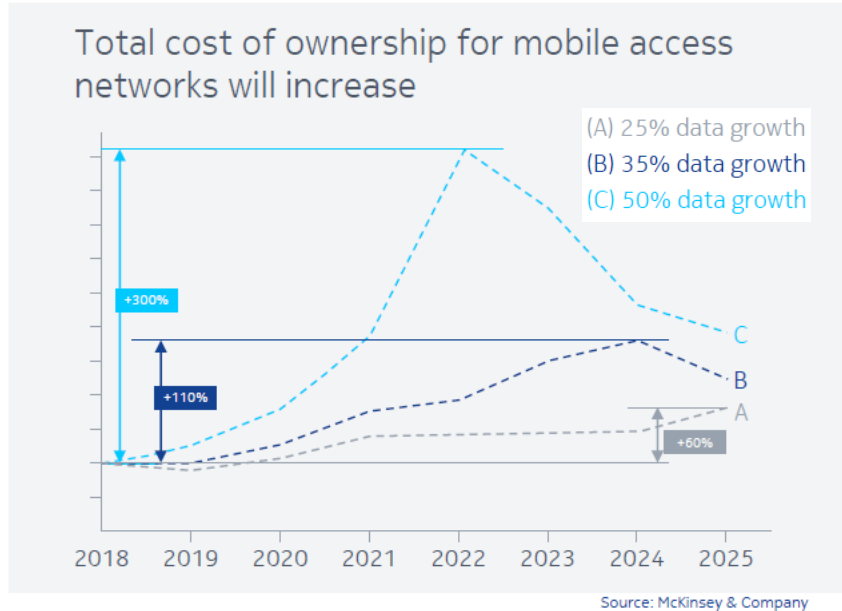
Acumos AI



Nokia Bell Labs CTO, Open Source Initiatives  
– September 2019

# AI and Telecommunications

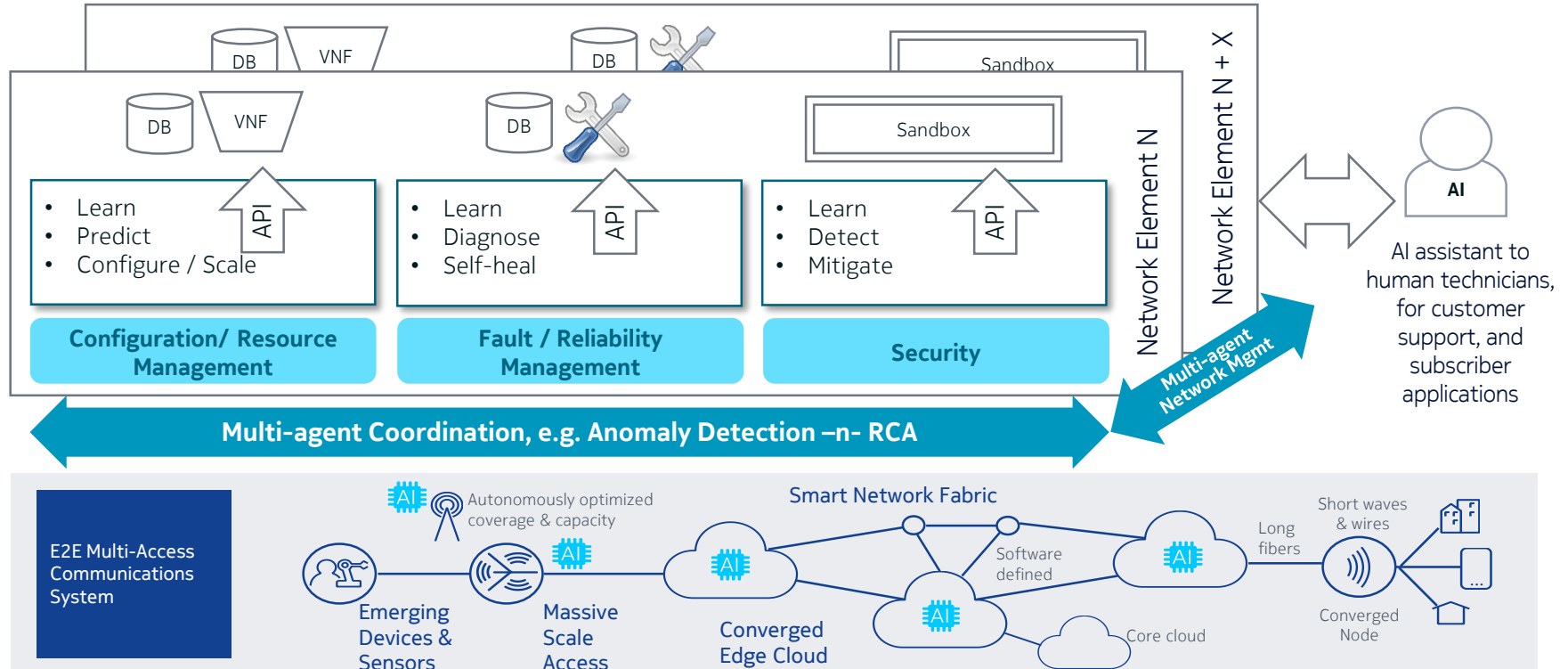
## Why Artificial Intelligence?



**Dramatic increase in technical complexity and/or costs**  
**Automation and Artificial Intelligence - not optional**

# AI and Telecommunications

## Subsystems and functional areas: operations



# AI and Telecommunications

## Subsystems and functional areas: real-time optimization

- Self-Organization
- Capacity Management
- Parameter Optimization
- Performance Management
- Energy Savings



### OPTIMIZE via AI-enabled

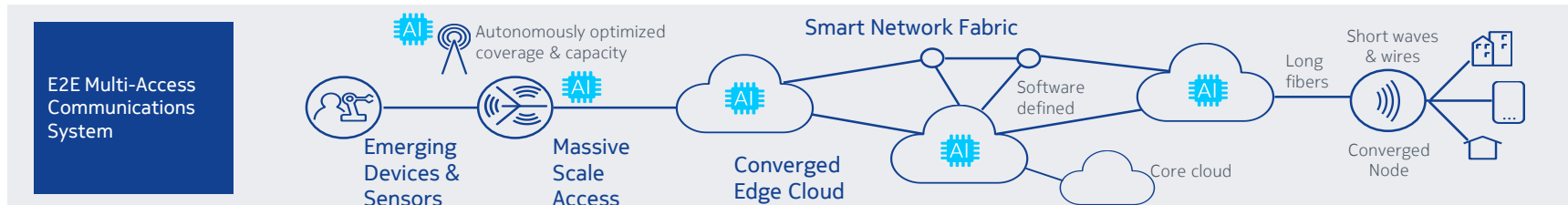
- Spectrum sharing
- Smart carrier aggregation
- MaMIMO beam pattern selection – tilt, azimuth, vertical/ horizontal width
- Handover decisions
- Parameter tuning
- Load prediction and balancing
- VoLTE optimization, CSFB
- WAN path selection

### ACTIONS triggered from AI

- Optimized beam combinations for signaling and common channels - # beams, periodicity, pattern
- Minimized inter-cell interference, optimized neighbor relationships
- Batch latency-insensitive transmissions
- De-activate power amplifiers, transmissions during low traffic periods

### GOALS achieved through continuous, real-time AI-enabled re-tuning

- Maximize usage of least amount of resources
- Maximize QoS/QoE per subscriber including throughput
- Minimize manual intervention



# AI and Telecommunications

## Subsystems and functional areas: subscriber

### Subscriber Acquisition & Retention

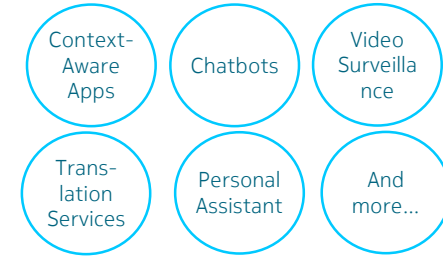
- Subscriber insights
- Churn prediction
- Application and content recommendations
- Service personalization
- New feature identification
- Zero-Touch automated new customer enrollment, existing customer modification workflows

### Customer Experience Management

- Telecom-focused (i.e. context and semantics) AI assistant to subscribers
  - General inquiries
  - Device provisioning
  - Equipment troubleshooting
- Find best fit support team for issue

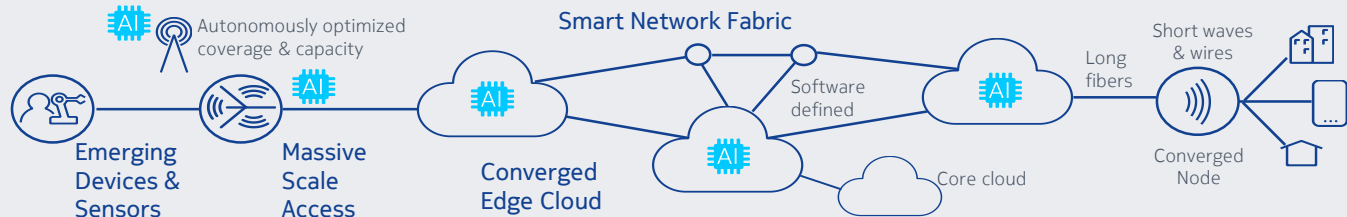
### Contact Center

### Subscriber Applications



APIs

E2E Multi-Access Communications System



# AI and Telecommunications

## Subsystems and functional areas: vendor

### Research & Development

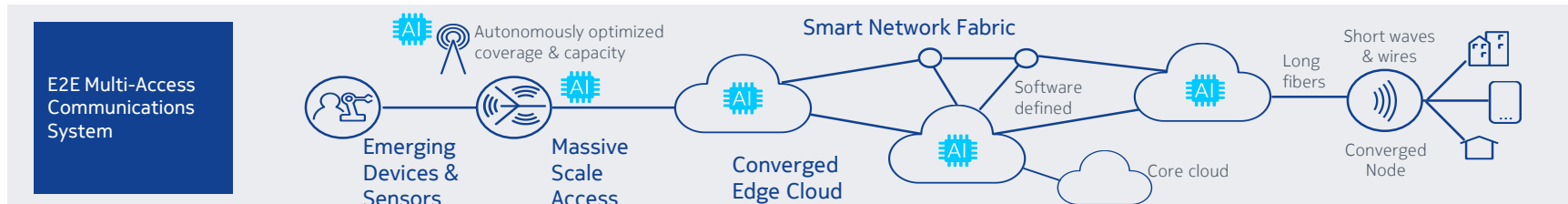
- Automated model selection, hyperparameters tuning, feature engineering
- AutoML, AutoKeras, code reuse recommendation engines, transfer learning
- AI tools to find defects and security holes in code early

### Customers & Contracts

- RfX response tools
- Executive approval workflow process
- AI assistant to human technicians for troubleshooting

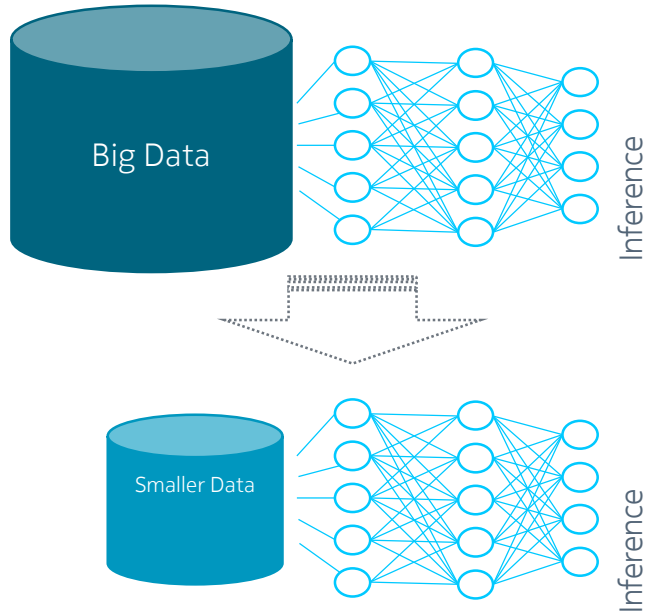
### Continuing Education

- AI-enabled hands-on exercises
- Personalized education
- Education recommendations
- New product training





# Acumos and .... Data



- **Models:**

- Dataset use on the Acumos platform, sharing between models
- Data storage / many lakes / data warehouse

- **Proposal:**

- More emphasis on data and licensing data in Acumos



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