

INNOVATE WITH YOUR DATA

On-prem and Hybrid/Edge Computing practices for new generation NPM and APM

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Introduction

- Introduction of the workshop
- Introduction of the speaker

Network Performance Monitoring with

- Presentation of the Skylight platform
- Accedian's claims to fame in numbers

Turnkey Integration of market-leading solutions with

- Presentation Infinite INIn A in BEBAX platform
- Mind in a Box Secure
- Mind in a Box Connect for On-Prem & Air Gap requirements

Use Cases

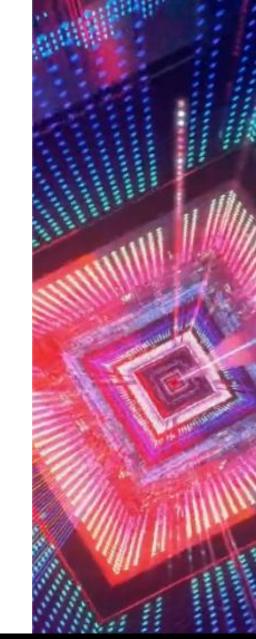
Questions?







Jérémie Farret CEO / CTO & Co-Founder

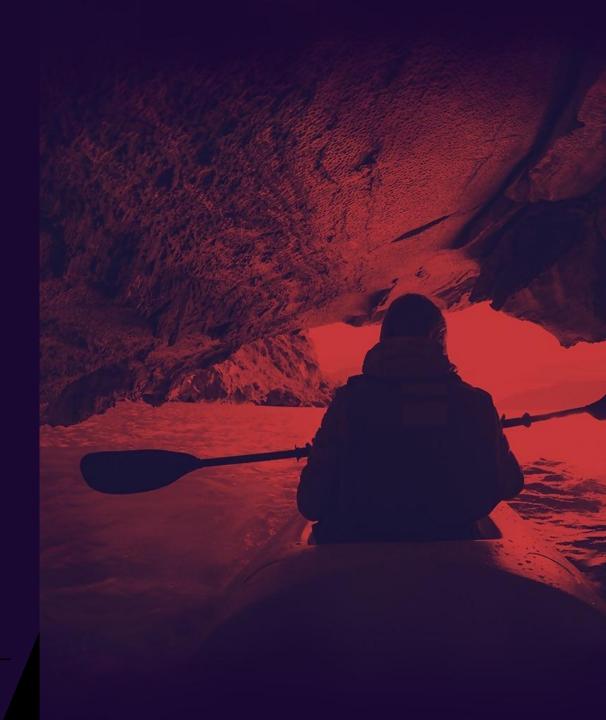


On-prem and Hybrid/Edge Computing practices for new generation NPM and APM

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Accedian Skylight

Network and Application Performance Monitoring



SKYLIGHT

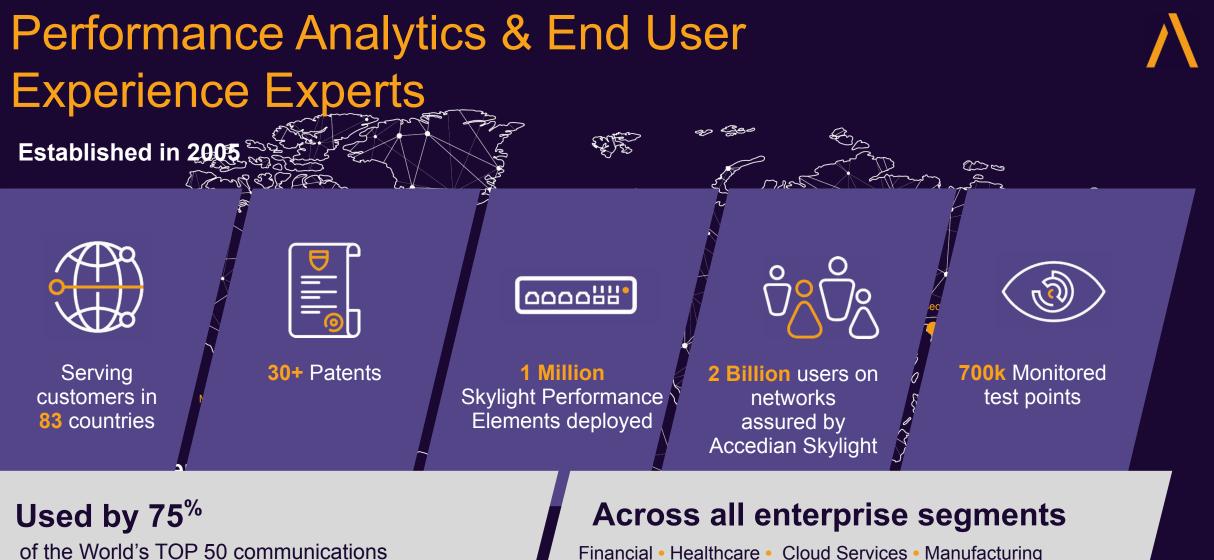


5 Confidential information of Accedian

SKYLIGHT







of the World's TOP 50 communication service providers

Financial • Healthcare • Cloud Services • Manufacturing Government • Insurance • Retail & Hospitality • Utilities & Energy



700+ Accedian Service Provider and Enterprise Customers...

Λ

Including our service provider clients who provide connectivity to millions of subscribers around the world



Ways analytics can make a difference



Alert notification protection (FUTURE)

Alerts are supposed to mean something, but tend to be a little too verbose

Analytics will be introducing features to protect against adding more noise to the NOC via notification preferences, raise and clear times, alert flapping avoidance (i.e. cool down times), and topology fault isolation techniques.

Ways analytics can make a difference



Metadata correlation

Proper tagging of monitored objects with Analytics allows for correlation across the data set to look for similarities and trends

Tools such the Analysis module make great use of metadata to enhance investigations and find a probable root cause quickly

Ways analytics can make a difference



Metric baselines and Dynamic Thresholds

Skylight Analytics will maintain the historical baseline for each metric of every monitored object in the system. This equates to understanding the hourly average for each day of the week.

Dynamic thresholds can be evaluated off of these baselines at query time as an alternative to static thresholds, which allows for observation of potential deviate behavior

Ways analytics can make a difference



Anomaly detection (IN PROGRESS)

Leveraging machine learning to constantly update its understanding of what's normal for a monitored object and proactively alert when it starts tracking outside those bounds

Ways analytics can make a difference



Prediction (FUTURE)

For capacity planning, Analytics will be able to use the historical baselines it maintains to track into the future (with a certain degree of confidence)

For incident avoidance, Analytics will use anomaly detection and precursor shape identification to alert ahead of time

Ways analytics can make a difference



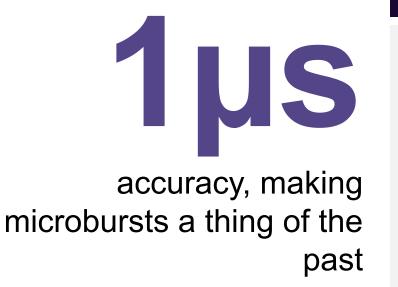
Alert integration

Analytics generates alerts natively in MQTT format, and makes them available via an MQTT broker. External systems can be integrated and subscribe to portions of these alerts, which can enable closed look orchestration use cases Alternatively, alerts can be delivered in SNMP format to specific targets

Integrate them into your existing tools with Accordian

Unprecedented Accuracy

Accedian gives you the most detailed, fine-grained insight available today



Outcome: Slow is the new down...

Don't be slow

What happens in a microsecond?

_=≸ second = 1,000,000 μs

 $350,000 \mu s =$ Time for a human to blink

 $(3,000 \ \mu s = G.8032 \ ring \ switch \ spec$

9,000 µs = Flap of a hummingbird's wing

5**(5,000 µs =** Max one-way latency for 5G

10.1 000 µs = Granularity of Skylight flowmeter

30 μ s = Latency of radio to hub site for 5G

 μ s = Accuracy of Accedian Skylight

Ultra Reliable, Ultra Flexible

When flawless user experience becomes the ultimate goal and the new normal

 $\boldsymbol{\Lambda}$

99.997% uptime, and 100%

restored within SLA

Based Skylight customer analysis: 6 month analysis 800K PM sessions 1,300,320 total hours 40 outage hours due to Skylight Sensor: control

All Service Providers

Solution: Fully monitor and control their asymmetric network performance, with complete reliability.

How?: Accedian Skylight's patented one-way and full mesh active measurement technologies for modern and legacy environments.

Outcome: Full flexibility in monitoring capabilities with the highest reliability on the market.



MIND IN A BOX

Best of Breed Advanced Analytics and AI solutions from the Cloud to the Edge



MIND IN A BOX[™] Supports your digital transformation

<u>Turnkey, cost-effective solutions,</u> a proven excellence in accelerating:

 Data Intelligence (Advanced analytics & AI, including real-time and geo analytics)

- Intelligent Networks (cybersecurity, continuity of operations and quality of service)
- Edge Computing & Edge AI (including IoT & AIoT, Industry 4.0)
- Environmental Security & Safety EH&S (Simulation and Traceability)

MIND IN A BOX [™] provides its customers actionable intelligence to leverage the value and power of all their sources of data, in real-time, when and where their operations happen.

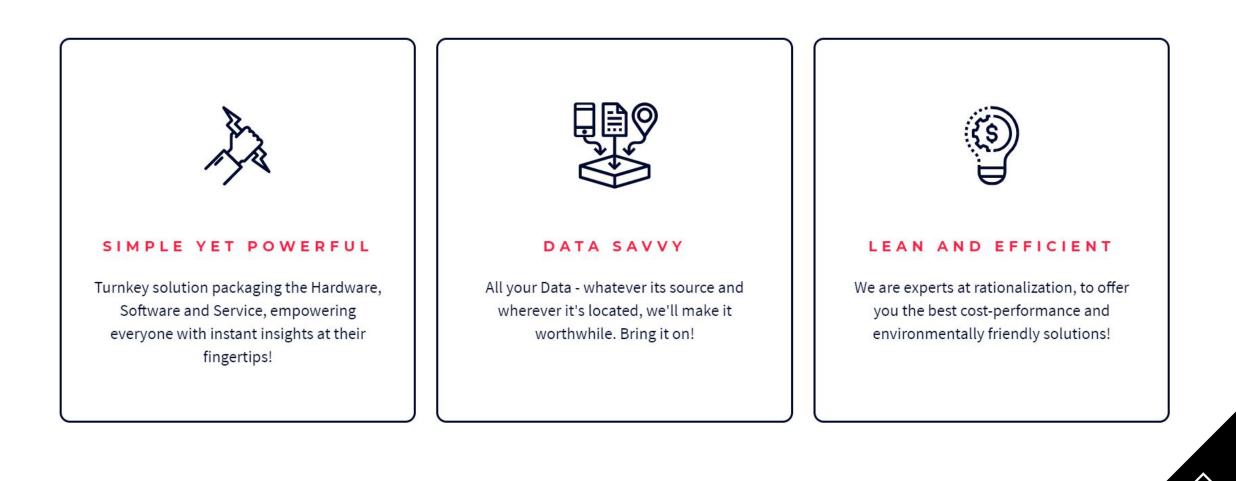
On-premises or on the Edge, with all the advantages of the Cloud, they get everything they need and pay only for what they use.



Four turnkey, cost effective solutions to jump-start your advanced analytics and AI.

Mind in a Box[™] – Value Proposition

INNOVATE WITH YOUR DATA



Mind in a Box[™] – Value Proposition

OPEN AND FLEXIBLE MAXIMUM AVAILABILITY BEST OF BREED You need the best - that's why we are only Our Open-source DNA is your guarantee Production ready, always active, always partnering up the best hardware and for fast to deploy, cost-effective, up-to-date and always watching over your infrastructure and data for maximum solution providers in the world! customizable and future-ready solutions that fit right your needs! reliability!



M/B ZEN

EDGE & ON PREM ANALYTICS, AS EASY AS THE CLOUD



M/B BIoTOPE 2000+ PRE-CONFIGURED DATA SOURCES



M/B MAKE

IOT, SMART TAGGING, INDUSTRY 4.0 & IPS



M/B TRACE

BLOCKCHAIN TRACEABILITY AND PROOF OF LOCATION



M/B FIELDOPS

MANAGE YOUR FIELD OPERATIONS IN REAL TIME



M/B CATALYST ACCELERATING AI WITH NVIDIA GPUS



M/B TRACK MOBILITY, GEOANALYTICS & GPS



M/B SECURE

INFRASTRUCTURE MONITORING AND CYBERSECURITY



M/BAI+

THE BEST OF AI, PRE-OPTIMIZED AND INTEGRATED FOR YOU





<u>Thousands</u> of pre-configured data sources (Machine & Manufacturing, GPS/IPS & multi-sensing, operations, Machine Data, Networking ...)





Centreon

NCCEDIVN

splunk>

centreon Mind in a Box[™] AI+ and BIoTOPE **NCCEDINN** A powerful & integrated ecosystem splunk> Your operations Centreon Your infrastructure Your equipments **NCCEDIVN** splunk> Multi-sensing Mind in a Box[™] and/or Mind in a Box[™] **BIoTOPE** Machine Data **BIoTOPE** Mind in a Box[™] Zen Mind in a Box[™] Multi-sensi Your operations **Big Data Ingestion** ng and/or Training Catalyst Your infrastructure Data curation Machine Data High performance Real time analytics Your equipments Data AI/ML Visual analytics Produces Produces Best of breed One M/B Zen = in real time AI Solutions, 200000+ <u>ready for use</u> events per second!!! **Actionable Intelligence from Predictive and Prescriptive** descriptive and predictive analytics **Analytics from Al**

EaaS approach, with Scalability...

 M/B proposes a patented approach to scalability which supports stacking up M/B appliances very effectively, making it an evolutive solution.

Bell Technical Solutions, for instance, architectures their Elastic and Splunk acceleration and support on 5 stacked M/B Zen, (i.e. 80 physical CPU cores and an ingestion capability over 1,000,000+ events per second).

 No data loss or interruptions necessary to scale up on Elastic and Splunk.



- Security
- Data Sovereignty
- Regulation
- Tracking Consumption
- Unexpected Costs
- Business Continuity

Performance

«Migrating the monitoring system from Virtual Machines to the Mind in a Box appliance increased our customer response time to up to 20 times faster.

Originally designed to be rolled out to 700, we extended it to 7,000 with a projection to scale it to more than 30,000 employees this year. » (BTS, 2021)



Bell Technical Solutions



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Mind in a Box Secure: Network Perf. Monitoring with /\CCEDI/\N



- Faster deployment & customization
- Accelerated performances, at the Edge
- Native integrations with other partner solutions
- All-in-one unified front-end
- Support & Managed Services included

Mind in a Box – BIoTOPE

3 000+ native data sources ingestion w/ Best of Breed Network Equipment











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End User Experience-Aware IT Infrastructure Monitoring

- CARL STREET

Turnkey and Integrated:

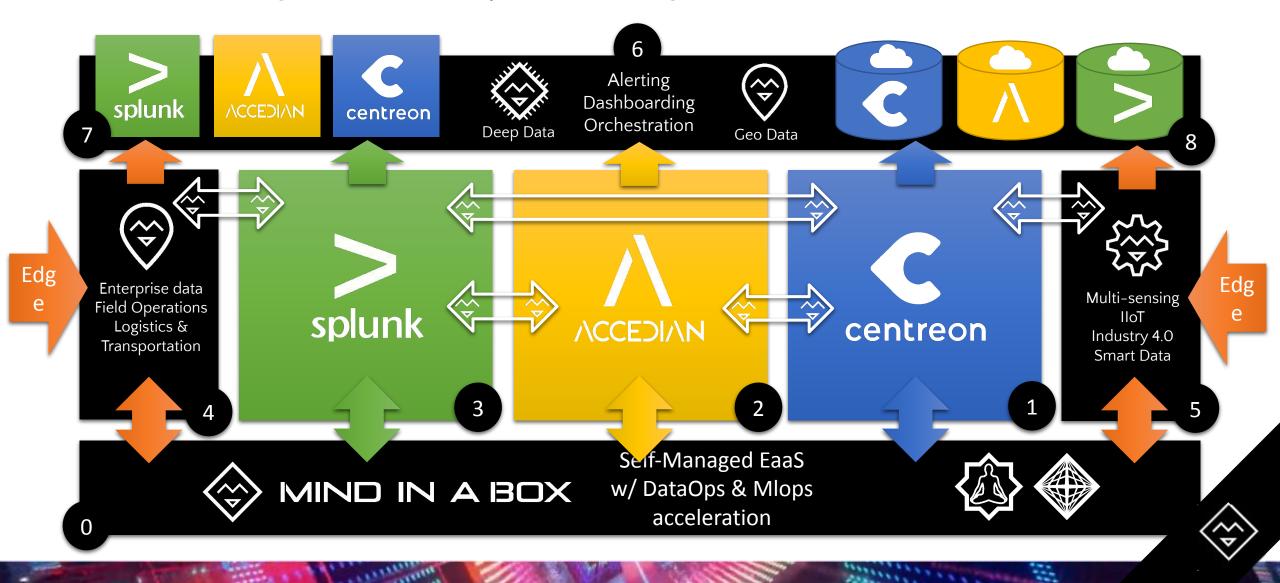
- Infrastructure Monitoring
- Application
 Performance
 Monitoring
- Network
 Performance
 Monitoring

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Connection attempt	Hits error	Traffic client 📃	
0.44 connections/s	0.003 hits/s	5.75Kb/s	
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② МІND IN А BOX 슈 **< centreon** 슈 <u>//CCEJI//N</u> 슈 **splunk**>

Ultimate 360° Observability on all your Infrastructure, Services & Applications from the Cloud to the Edge – as a Turnkey, Self-Managed & Low TCO solution.



MIND IN A BOX

Need our solution to be On-Prem or Air Gapped? We can support it

Mind in a Box[™] – Bring the Power of Skylight On-Prem INNOVATE WITH YOUR DATA

As regulations emerge and hybrid computing practices grow, many companies keep critical workloads both on premise and the cloud. Even when using public cloud providers, businesses increasingly need to capture workloads on premise or on the edge for observability, redundancy and business continuity.

Edge & On-prem deployments with Mind in a Box mean you are getting more for less:

- Better security, regulation compliant (Data Sovereignty/GDPR)
- Better performances with Skylight optimized hardware
- Lower Total Cost of Ownership (TCO) and no Unexpected Costs
- Managed services and support included

In summary, you get all the advantages of the cloud with none of its drawbacks.



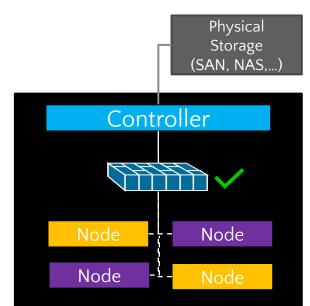
Let's Make a difference, Mind in a Box is an environmental-friendly solution!

Wind in a Box[™] Keeping the solution updated in an air-gap environment

Local Mirror Server

All patches and 0-day fixes can be stored locally directly on the Mind in a Box [™]. They are managed by its unique controller, which is the only mirror recognized by the cluster. The files received are first kept in an isolated environment where an analysis in accordance with your security requirements is carried out before being pushed to the nodes, which will never be exposed directly.

 Local Registry for containers images: Mind in a Box [™] also can act as a local registry for images and containers. Again, new files are first directed into an isolated environment provided by the controller to ensure compliance before being released to the cluster.



Mind in a Box[™] air-gap support options

Remote Support:

Mind in a Box and its worldwide partners can deliver remote support in about any part of the globe. Remote support (phone, email, etc.), including 24/7 support if required, can be provided, allowing our teams to troubleshoot the client in a simple and effective manner:

Client calls -> Mind in a Box support -> Sending image to resolve issues

• Physical Support:

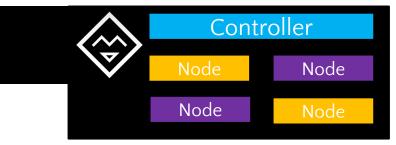
Depending on the SLA, Mind in a Box and its worldwide partners can travel in order to provide direct support within the facilities of the client. Our experts are all bilingual and dedicated to provide world-class support.

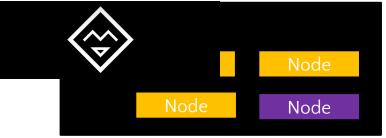




Mind in a Box[™] as an original, secure alternative to fully air-gap support options

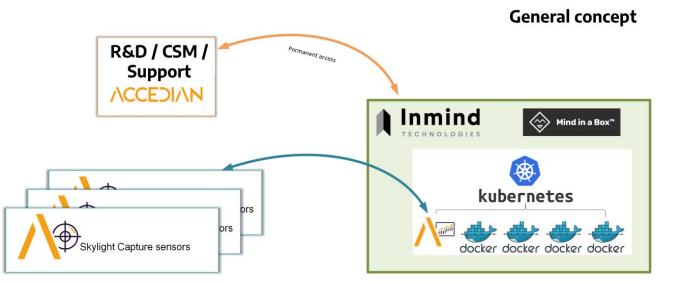
- Mind in a Box[™] 's patented databus architecture enables our customers to secure data and computations in new and innovative ways.
 - Positioned in cybersecurity and post-Quantum encryption, the integrated solutions we propose have strong security by design features which, in some case, remove the need for air-gap requirements, which have a significant impact in terms of loss of agility and cost of ownership
 - A strong network separation leveraging both SDN and hardware implementation and acceleration enables our customers to strictly separate :
 - Administration and data / processing / ingestion : The controller node is segregated from the 4 processing nodes inside the Mind in a Box Zen appliance, as well as added Mind in a Box Zen appliances for scalability purposes.
 - Between loads and use cases : The processing nodes can be strictly separated into subgroups which are separated at the OSI level 2 level, ensuring hardware enforced segregation.





Node group 1

Solution Deployment and Management Scheme





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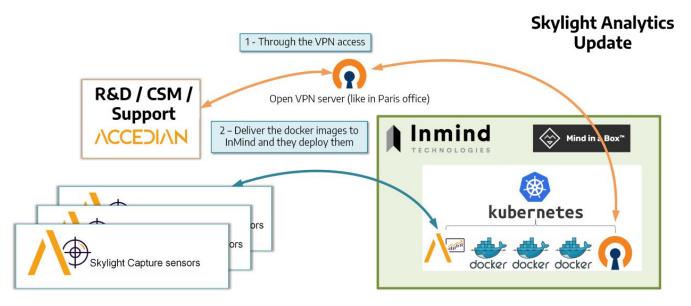
• From Accedian's point of view :

The M/B general concept is to make everything as similar and easy to deploy and maintain as if you were on the Cloud, with a similar pricing model, while being in most cases less expensive, The integrated solution relies on, but is not limited to, Kubernetes and Docker.

• From the Customer's point of view :

The solution is not on the Cloud but on premises to meet their regulatory or applicative requirements. However, Mind in a Box aims to provide the same user experience as the Cloud.

For the Skylight Solution Updates

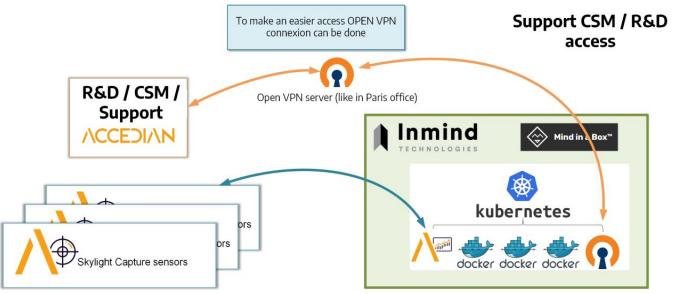


M/B deployment can be done remotely or physically on-premises depending on the situation.

ALL LUCK

- With AWS or HPE infrastructure solutions, Accedian would be left on its own to validate and test specifically for on-premises deployment AND for the hosting infrastructure context at each customer.
- With M/B, we support you all the way:
 - You make your image / Docker
 - We take care of the rest: testing (According to your needs), optimizing, deploying (Internet, local network, physical)
 - If you want access, you get it: direct console access is possible, even at the nodes level using Intel Active Management Technology.

For the Skylight Solution Support



- As a POSIX-compliant (Linux) integrated solution, M/B can integrate a great number of protocols to support remote access. But specifically, SSH terminal-based connection and VPN access are secure, popular ways to remotely connect to our appliance.
- We could use an Open VPN connection. If your infrastructure does not have VPN connection capabilities already deployed, the M/B integrated solution can host its own VPN server, thus facilitating a secure access on-premises.



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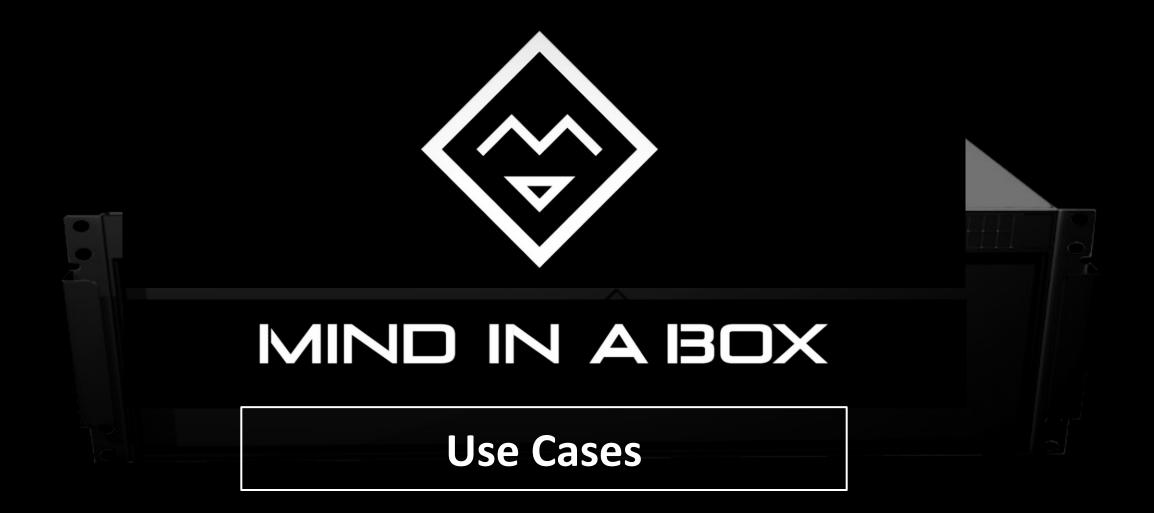
Specifications:

Case: 1U format CPU: 64-Core (Intel Xeon) RAM: 640GB DDR4 Storage: OS: 2 x 1TB U.3 NVMe SSD (1TB usable) DATA: 64TB U.3 NVMe SSD (32TB usable)

Operating Properties:

- Operating temperature: 10°C to 35°C
- Operating humidity: 8-80% (non-condensing)
- Non-operating temperature: -40°C to 60°C
- Non-operating humidity: 20%-95% (non-condensing)





Mind in a Box[™] - Bell Technical Solutions

Track & Trace, Mobility and Multi-Sensing





Bell Technical Solutions

«Migrating the monitoring system from Virtual Machines to the Mind-in-a-Box appliance increased our customer response time to up to 20 times faster. Originally designed to be rolled out to 700, we extended it to 7000 with a projection to scale it to more than 30 000 employees this year. » *BST-2021*

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VIEW OF YOUR OPERATIONAL AND CYBERSECURITY DATA



Mind in a Box[™] - Bell Technical Solutions

Track & Trace, Mobility and Multi-Sensing

Bell Bell Solutions techniques

Bell Technical Solutions or **BST** is a subsidiary of Bell Canada, with 8.7 million subscribers in 2016.

BST specializes in Bell Canada's repair services, including telephony, Internet and television IPTV services.

Problematic and Needs

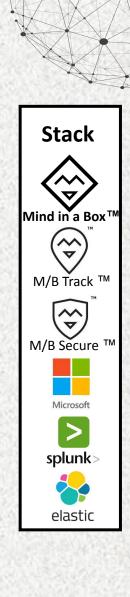
- **Connect Project** : Contact technicians, communicate with them (QC/ON/MB)
- Needs in Operational Monitoring
- Needs in Visual Analytics
- Needs in Reporting and Business Intelligence
- Cybersecurity and data governance
- Support of + 30,000 accounts, 10,000 active users and + 415 GB of shared data / day

The solution

- Historically at BST, IBM tool suite: Qradar, Tivoli. Inmind has improved this by replacing them with **Open Source** solutions.
- <u>Elastic</u>: For operational supervision (number of users, type of devices, use of devices, geolocation of access, data seasonality, predictive and prescriptive analysis).
- <u>Mind in a Box</u>: Edge and Fog Computing turnkey solution for 20x more performance than virtualization, more stability, and to accelerate Splunk and Elastic software solutions.
- <u>Splunk</u>: SIEM and SOC. Crossing security information with operational analytics (+ Machine Learning). Automatic sensor system detects capacity breakdowns / failures and prevents service discontinuities. Using Splunk and **Mind in a Box**.

<u>Results</u>

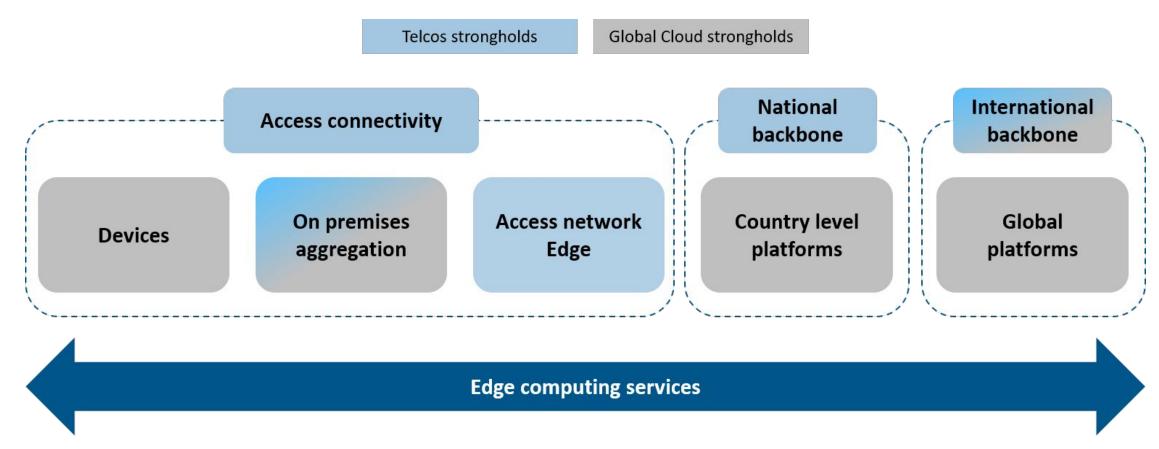
- The social network "Project Connect" is running, strong adhesion.
- Monitoring in 3 provinces and tens of thousands of devices.
- More security, and possibility of triangulation of VPN access.
- Ergonomic and personalized visual geoanalytics.
- Creation of business intelligence and prescriptive analysis.
- Better performance and reliability at a lower cost.



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Track & Trace, Mobility and Multi-Sensing

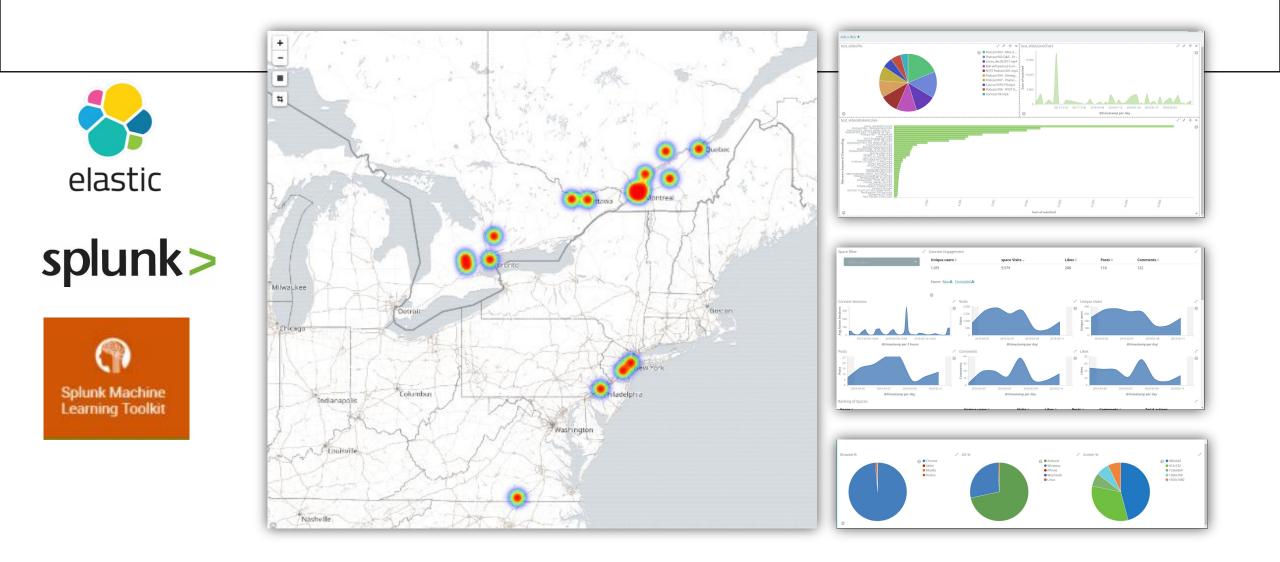
Edge in the Cloud and Telco infrastructures



Source – Delta Partners Group

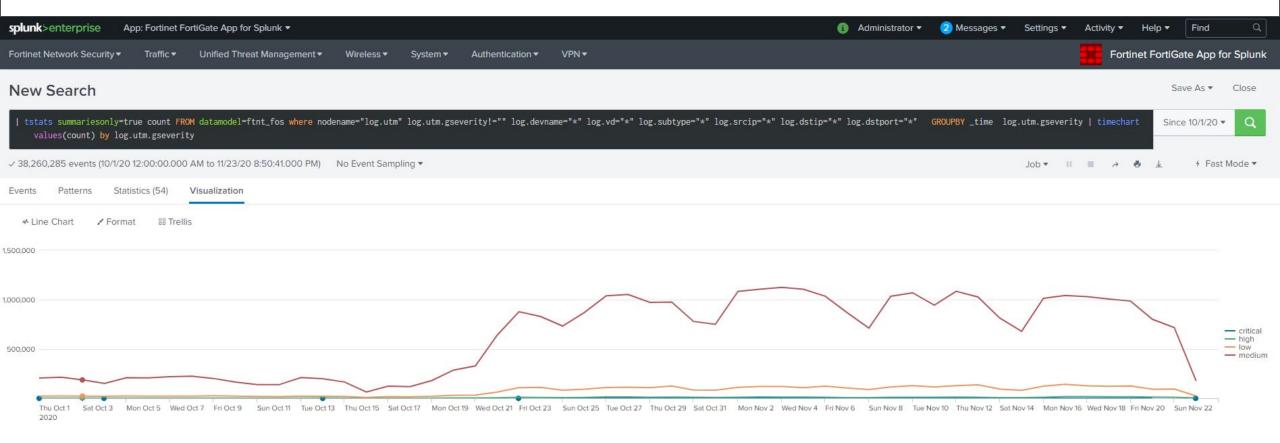
Mind in a BoxTM - Bell Technical Solutions Track & Trace, Mobility and Multi-Sensing





Mind in a Box[™] - Bell Technical Solutions

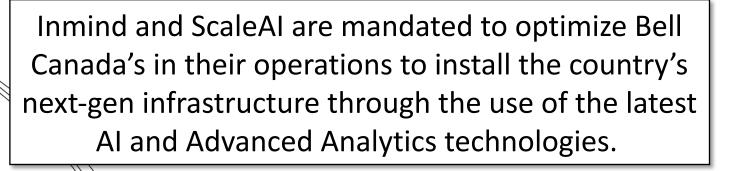
Track & Trace, Mobility and Multi-Sensing



Mind in a BoxTM - Bell Collaboration and AI Automation









Mind in a Box[™] - Bel

Collaboration and AI Automation

Extending an order's life cycle through AI

The Challenge

Bell Business Markets (BBM) offers a wide variety of communications technologies to Canadian businesses, including broadband connectivity through fibre. To meet market expectations, the project aims to reduce installation time for new fiber optic connections by accelerating several steps in the supply chain with artificial intelligence solutions.

Ariel Quintin, VP Transformation Sales and Services BBM: "Bell is one of the largest investors in research and development in Canada and we are proud to collaborate with Scale AI to facilitate access to the best connectivity technologies for Canadian businesses."

Jérémie Farret, VP Advanced Analytics and AI at Inmind Technologies: [∞]Inmind is pleased to put its expertise in AI and its hardware acceleration solution Mind in a Box[™] to the benefit of this innovative collaborative project, which will be of great benefit to the Canadian economy. »



Overview of the BI Program to Deploy AI DEPLOYED ON TRACK AT RISK WON'T DELIVER IN '20 \mathbf{x} Solutions NOT PRIORITIZED AI SOLUTION DESCRIPTION 2020 TIMELINE STATUS DEPLO FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC **CPM Accounts** Process evaluates 3.3M accounts against 77K Golden Keys (4 days JAN runtime!!!!) -0 Automated 90% of new accounts are approved automatically via AI. Deployment ***Model retraining is not deemed Approvals Standarization rule improvments of Customer Naming Tool should move us to 99% automation. necessarv** 2020 · A component of the intelligent routing program SEP OCT NOV DEC MAR APR MAY JUL AUG Intelligent Email · Using natural language processing on work request emails to Routing enable correct agent routing, limiting and eventually eliminating Planning & Development Testing Deployment the need for WLCs to intervene in routing. Design Active development was paused to resource COVID collections Next Best JAN ОСТ NOV DEC FEB MAY JUN JUL SEP AUG task force Collections Nonetheless, determining early signals for Insolvency will prove Emergency beneficial to help the AI prioritize resource intensive Actions Collections Deployment Action Soft Launch and adjust 'soaking' time between actions for at-risk orgs. Task Force $\overline{\triangleleft}$ Provisioning OCT NOV DEC JAN FEB MAR APR ΜΔΥ Consolidating communications channels and auto-replying to ALE 🔶 Testina Automated customers & internal stakeholders with standardized response Pivot towards templates. Development Additional Soft-launch Deployment Response Standalone requirements SC PoC Focusing on Complex Orders and minimizing error rates to 25% SEP OCT NOV DEC FEB MAR JUL APR MAY AUG Next Steps: Ľ **OLCM SDD** Technical: Improve algo with extra features (customer metadata, etc...) Ō Predictor Define predictions U/L boundaries, customer comm. Policy: Testing & Planning & Development Deployment ш Formalize customer comm. process for longer predictions Optimization Process: Design Ш Δ · Predicting if a provisioning order will fall into jeopardy. SEP OCT NOV DEC FEB MAR APR MAY JUN AUG Ō **OLCM** Jeopardy Next Steps: S S Predictor Technical: Adapt SDD Predictor foundation to predicting jeopardies Planning & Development Testing Deployment Process: Create jeopardy mgmt. function; ensure tasks are actioned Design Ż DEC NOV · Using machine learning to predict the time required to resolve an **Network Build** incident. **Type Predictor** This information will be used to determine the risk of a SLA miss. Development PoC Planning & Development Testing Deployment

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Mind in a BoxTM - PT. TELKOM End-User Experience Monitoring on a large-scale





Mind in a Box monitors PT. Telkom's End-User Experience through Network Performance Monitoring on an infrastructure supporting +120M users countrywide

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Mind in a Box signed a deal through its local partner PT Eradi Teknologi Digital with PT Telkom Indonesia, a first-tier telecommunication company, to implement leading Network and Application Performance Monitoring Solution (NAPM) : M/B Secure. The goal of this first phase is to ensure the continuity of operations and quality of service of PT. Telkoms's network in its Regional Division in Bandung, West Java. Following this first deployment, PT. Telkom is projecting a general rollout of Mind in a Box's technologies to cover the entirety of its network infrastructure in the country, as well as to leverage the processed data for Advanced Analytics and Artificial Intelligence applications.

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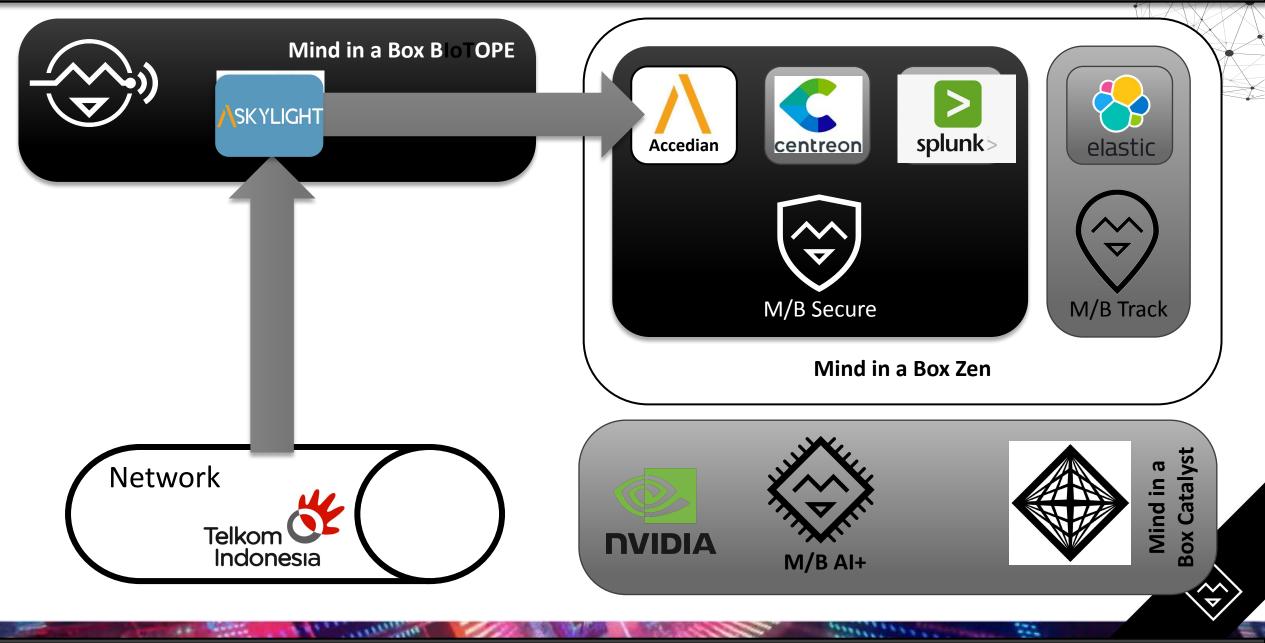




Mind in a Box[™] - PT. TELKOM

End-User Experience Monitoring on a large-scale







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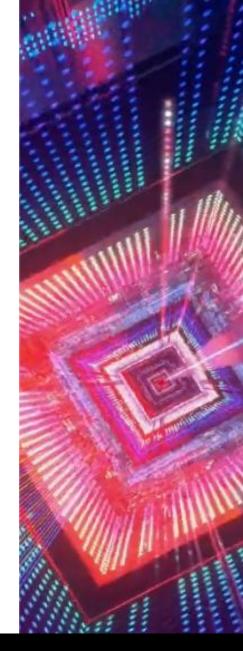


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Questions? jeremie@mindinabox.ai



Feel free to reach out to us by email for any question!