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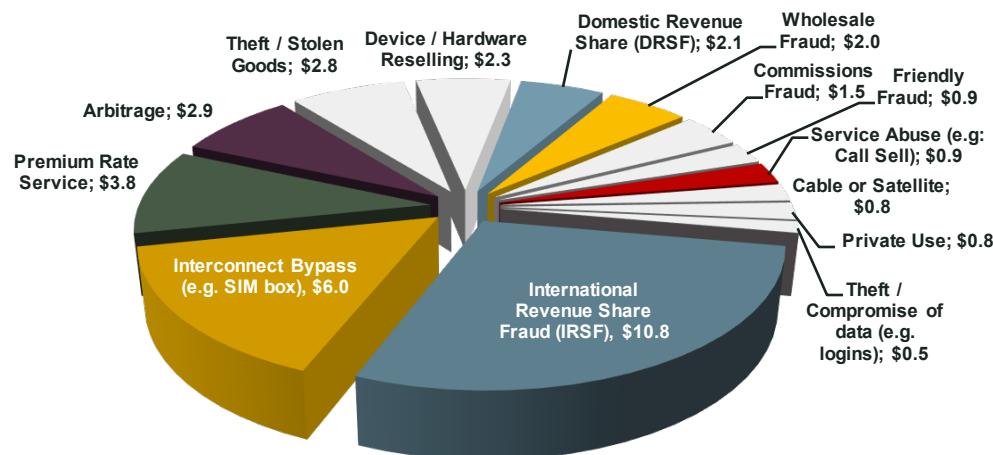
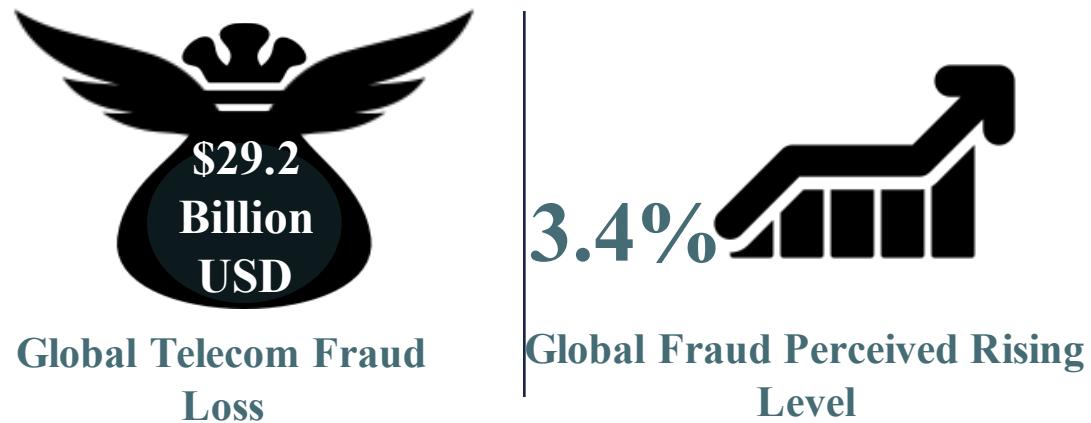
Virtual Fraud Manager





Telecom Fraud Is a Serious Threat

Estimating the scale of Telecom Fraud



Various Fraud Types

Most Widespread Type of Telecom Fraud

1	Revenue Share Fraud	\$ 12.8 B
2	Bypass Fraud	\$ 6.0 B
3	Arbitrage	\$ 2.9 B
4	Theft / Stolen Goods	\$ 3.02 B
5	PRS	\$2.39 B

Impact of Fraud

Operators

- Loss of Revenue
- Damage to Brand & reputation
- Increased spending on customer services
- Time and Manpower to repair damage

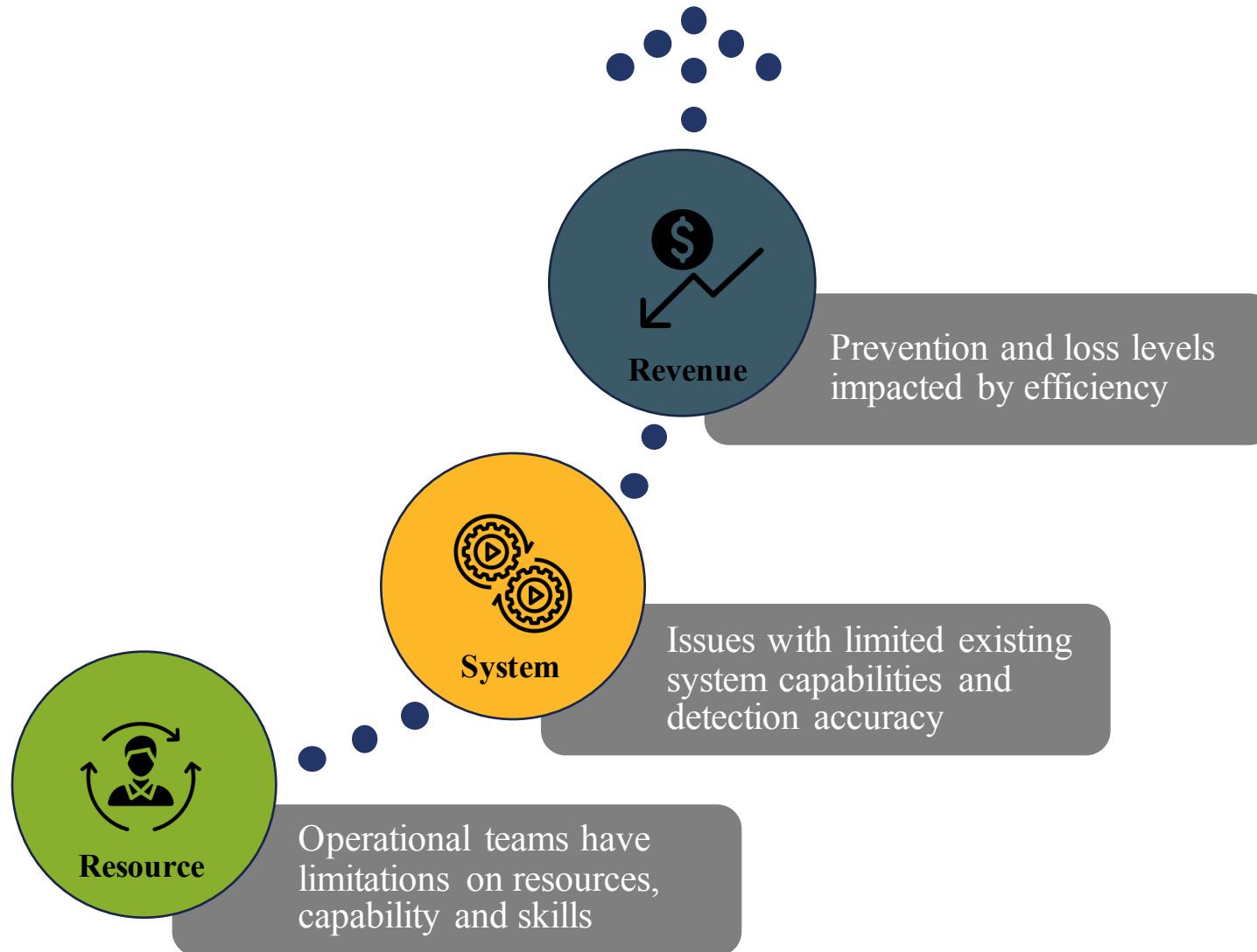
Subscribers

- Loss of Money
- Loss of personal information
- Time spent to recover damage
- Frustration/Stress/Loss of trust

*CFCA 2017



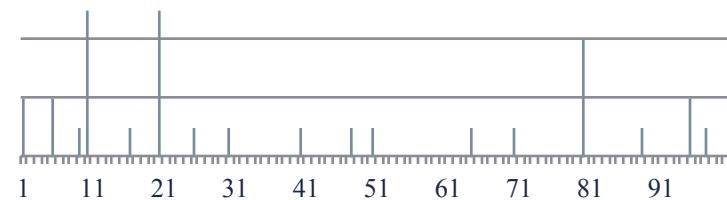
Operational Issues further Worsen the Problem



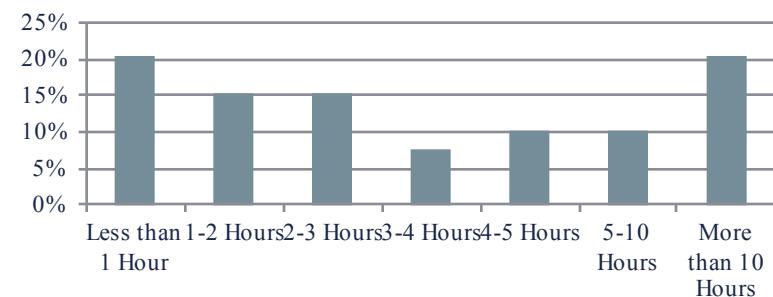
Personnel involved in Fraud & RA operations

# Subscribers	Average Total Department Size
<10,000	6
10,001 to 1,000,000	9
1,000,001 to 10,000,000	10
10,000,001 to 50,000,000	21
50,000,001+	81
Wholesale Only (no end user subs)	7

False Positive levels

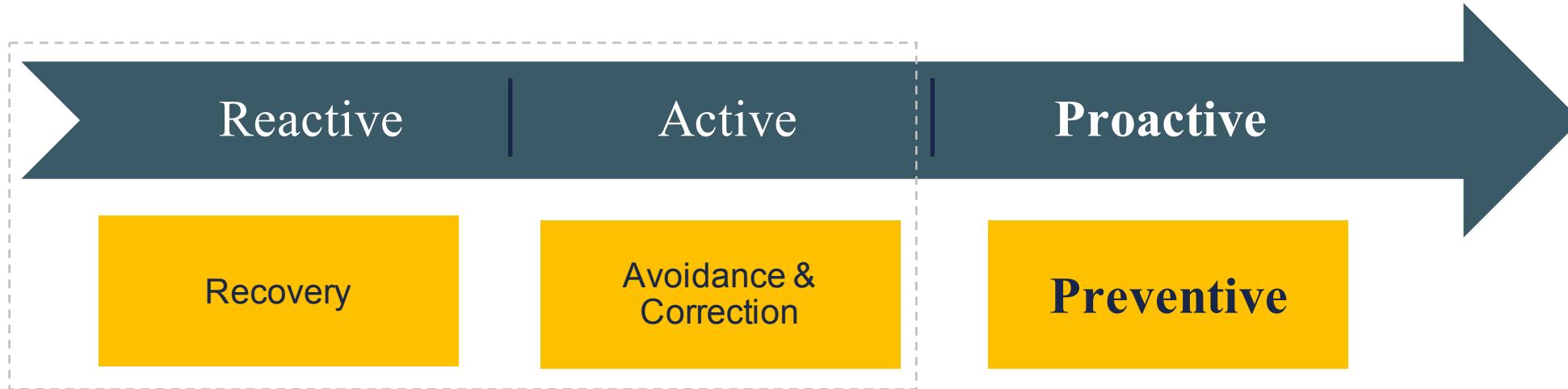


Average working time in resolving issues





What Industry needs Today?



- Address problems** as they occur
- Advanced Analytics** with capability of handling **big data**
- Proactive revenue leakage avoidance, detection and prevention**
- Real-time Risk Intelligence**
- Cross leverage** and rationalize data storage and processing across revenue assurance and fraud management functions



Mitigates Current Challenges and Fulfil Unmet Needs

Challenges



Siloed Solution

Non- Integrated solutions with no knowledge sharing across Opco's



Integrated Solution

Big Data Based Integrated solution with global intelligence sharing across Opco's



Delayed Detection

Solutions take days to weeks in detecting potential leakage



Real-time Detection

Proactive leakage detection by leveraging Big data and AI capabilities



Limited operational support

No 24 X 7 operational support leading to more revenue leakage in non working hours



Automated Action

Complete Autonomous detection and action with reduced need for domain/technology talent



Rule based Solution

Rule based systems leading to higher false positives

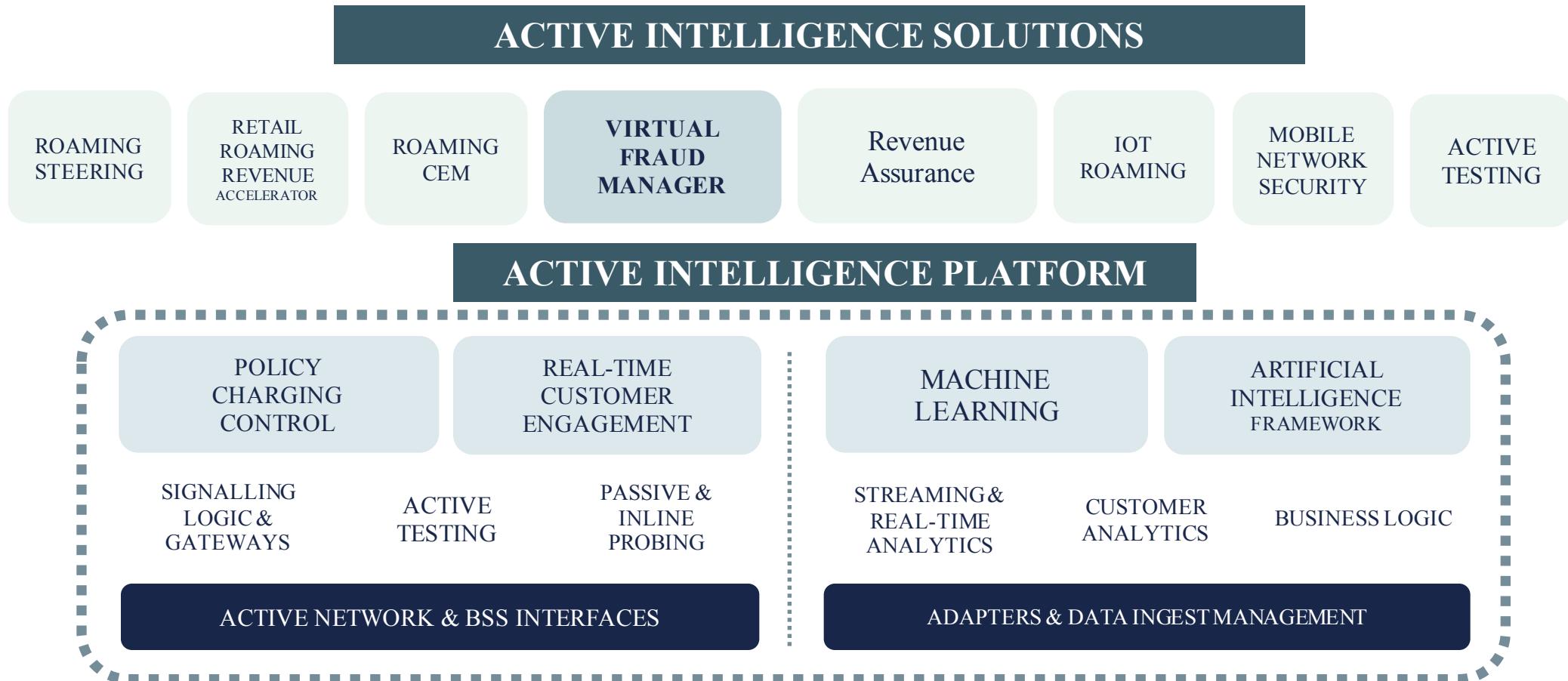


ML/AI based Solution

Self learning based system with predictive capabilities



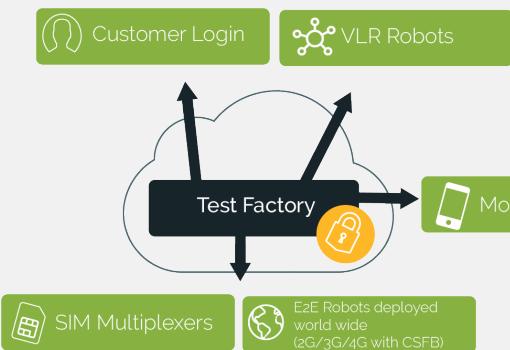
Mobileum Unique Technology Platform



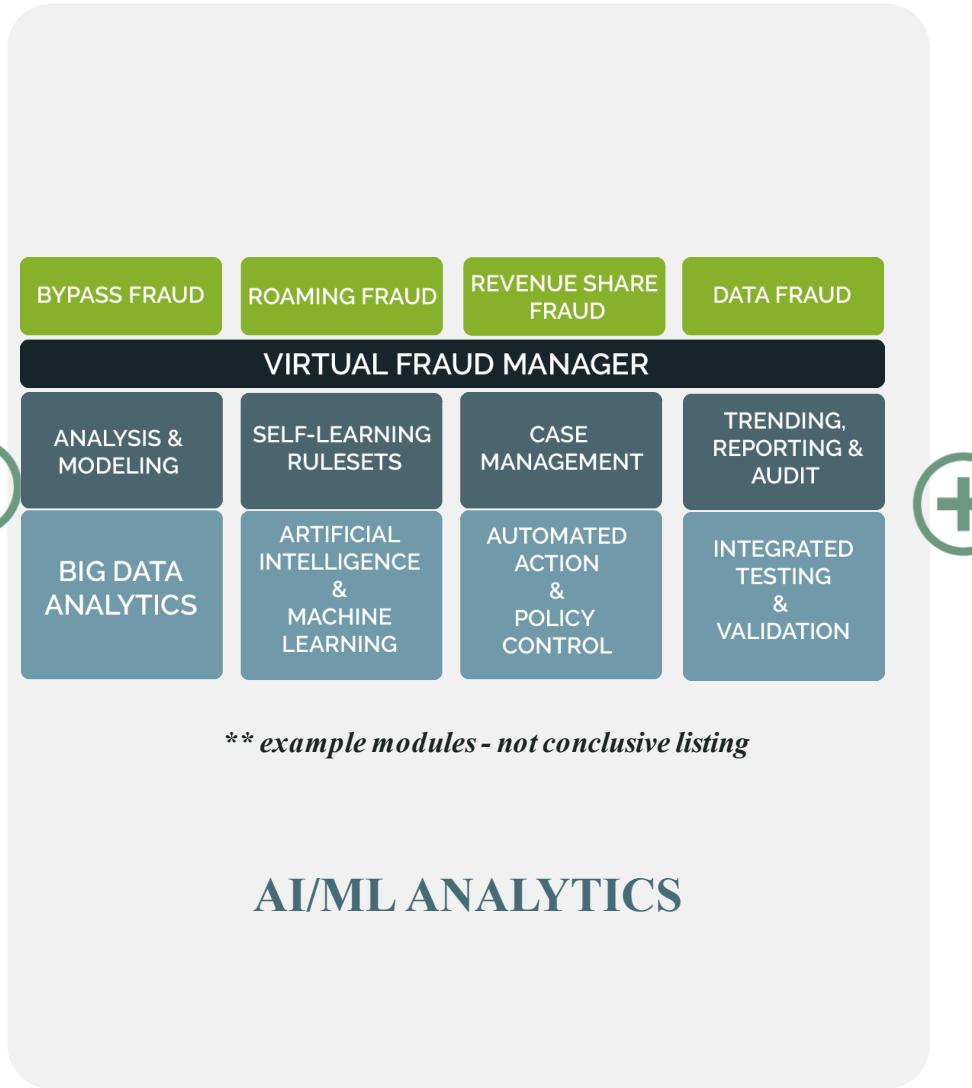
Our unique combination of service delivery platform and big data analytics capability enables CSPs to apply analytic driven action across their business



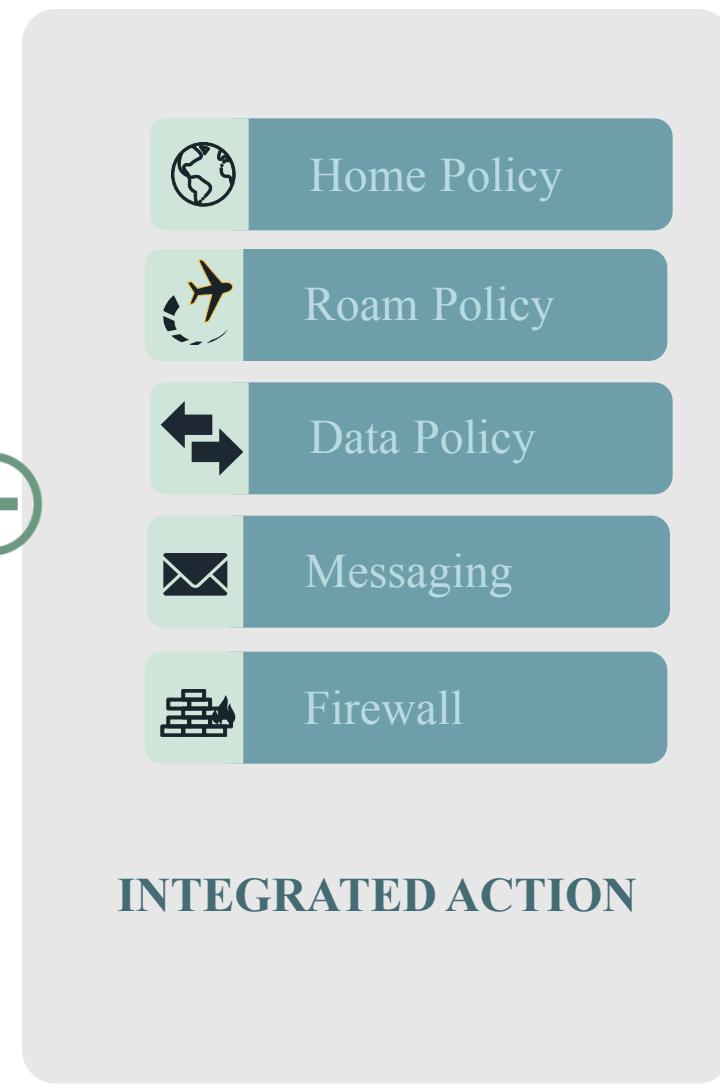
Virtual Fraud Manager Solution



ACTIVE TESTING



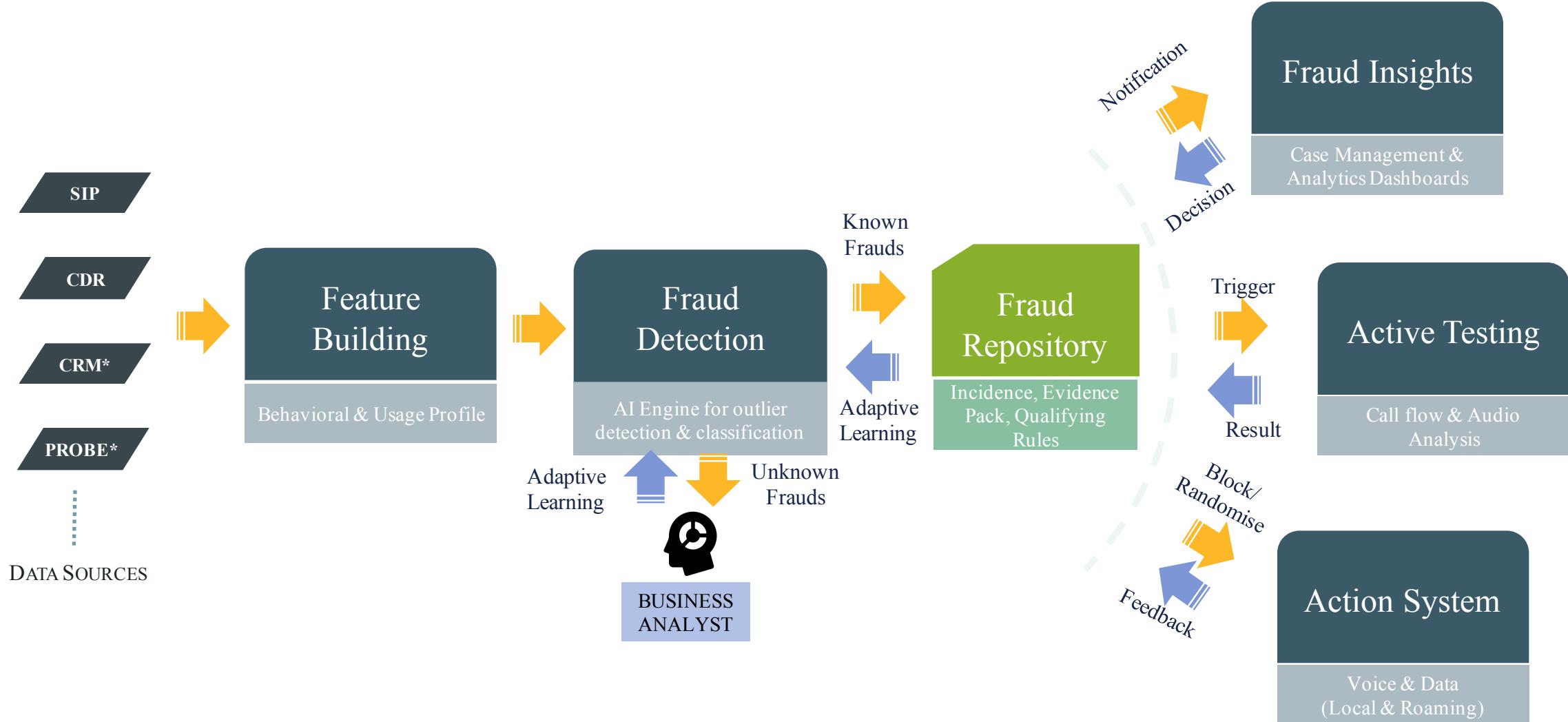
AI/ML ANALYTICS



INTEGRATED ACTION



Virtual Fraud Manager – Key Components





VFM – Key Offerings



ROAMING FRAUD

Focus on roaming related fraud issues

Roaming Abuse

IRSF

REVENUE SHARE FRAUD

Still the highest revenue driver for fraudsters worldwide

IRSF

DRSF

Wangiri

PABX

BYPASS

Highlighting Bypass and abuse of services

CLI-Refiling

SIM-Box (on-net/off-net)

DATA FRAUD

Future proofing capability for data plans

Data Tunnelling

Content & Service Abuse

OTT Bypass



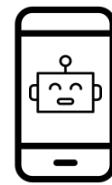
SIGNALING FRAUD

SIP and VoIP fraud is a serious business

DoS/TDoS Attack

PRN, IRSF, DRSF, Wangiri, IP-PBX

Call Alteration, SIP Messaging



ROBOCALLING FRAUD

Robocalling at record high in developed market

Robocalling Fraud

CLI Manipulation



ACTIVE TESTING-BYPASS FRAUD

Traditional low cost fraud detection

CLI Refiling

SIM-Box (On Net)

Analysis & Modelling

Self-Learning Rulesets

Case Management

Trending, Reporting, Audit & Invoicing

Big Data Analytics

Artificial Intelligence & Machine Learning

Automated Action & Policy Control

Integrated Testing & Validation

Existing Offerings

New Offerings



Robocalling and SIP/VoIP Fraud

World's biggest DDoS attack record broken after just five days

Memcached attacks are going to be this year's thing

By Iain Thomson in San Francisco 5 Mar 2018 at 23:59

19 SHARE ▾



It's not your imagination — robocalls are on the rise

August 14, 2018 | 9:37pm

Robocalls — those annoying, automated spam and scam messages — are on the rise. So far in 2018, more than 16.3 billion spam phone calls have pestered people across the...

Got a missed call from overseas? Don't call back! 'Wangiri' scam on the rise leaving victims with hefty phone bills



FCC fines man \$120M over massive robocalling campaign

May 10, 2018 | 6:19pm

The Federal Communications Commission on Thursday voted to issue a \$120 million fine to a Florida man alleged to have made almost 100 million robocalls to trick consumers with "exclusive"...

Action Fraud is continuing to receive reports of businesses falling victim to "PBX Dial through fraud". Find out what it is and how to protect against it.

Choosing the Wrong IP-PBX Can Cost You\$\$\$\$\$ in Toll Fraud

Apr 30, 2015 | VoIP Application Notes, VoIP PBX News and Blog

Americans received over 16 billion robocalls so far this year—here's how to stop them

Megan Leonhardt | @Megan_Leonhardt | 10:32 AM ET Wed, 6 June 2018

Unwanted calls far outnumber other FCC complaints

FCC complaint volume from October 2014 to July 2017:



Notes: "Unwanted calls" category includes historical robocalls and telemarketing categories from before October 2016. "requests for dispute assistance," "accessibility" and "emergency complaints."

2 Dedicated Offerings

ROBOCALLING FRAUD

Robocalling at record high in developed market

Robocalling Fraud

SIGNALING FRAUD

SIP and VoIP fraud is a serious business

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VFM Signaling Fraud (SIP/VoIP)

Key Attack Vectors



What is it?

Key Trends

Signaling Fraud \$10.3 B



- VoIPX Traffic is expected to grow by 22% in 2019
- Traffic is shifting from landline to VoIP network due to lower costs
- Multiple CSPs selling IP PBXs, SIM Boxes and VoIP Based numbers

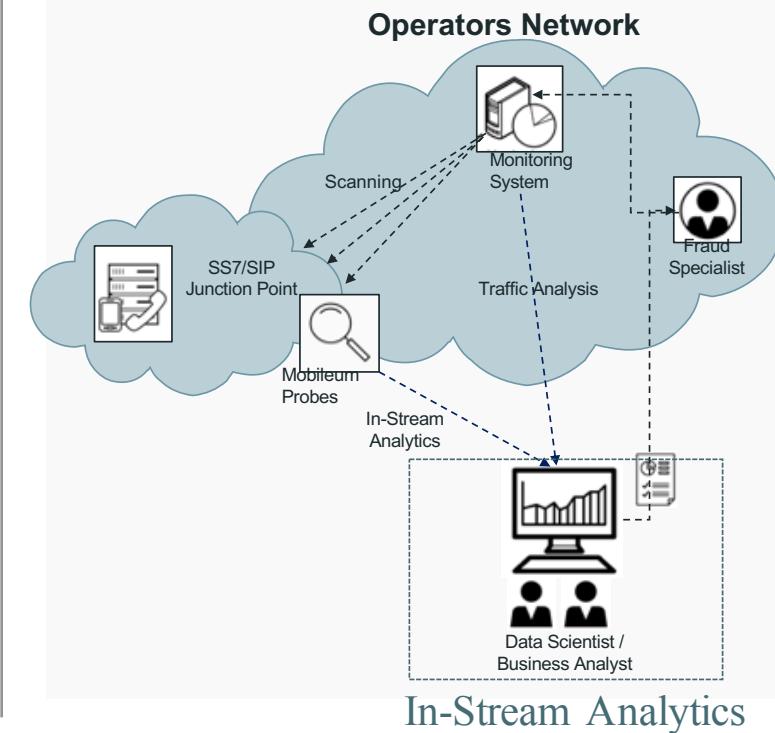
Global Fraud \$29.2 B



How it happens?

- Fraudster try to hack exposed services over SIP protocols (e.g. IP PBX)
- If hacked several attacks can be triggered (Wangiri, IRSF, DoS, DDoS, Spoofing etc.)
- Fraudsters leverage on the difference of Security and Fraud Team in telecom organization

How we fix it?



Key Insights

SIMs Involved in Fraud

Fraudulent PRN / High-cost destination number

notifications about new vulnerabilities and attacks

MoU / Revenue details

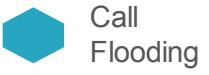
Real-Time Actions

- ✓ Actions over SIP Interface
- ✓ Call blocking
- ✓ Call Release
- ✓ Usage Based Restrictions



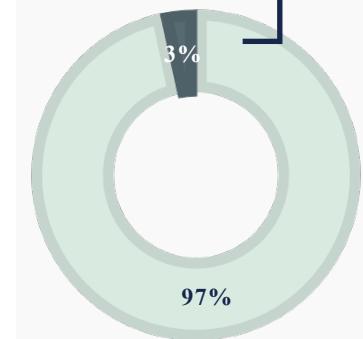
VFM Robocalling Fraud

Key Attack Vectors



What is it?

Key Trends



Robocalling Fraud \$1 B

- Robocalling Fraud constitutes **roughly 3%** of global Fraud
- As per FTC and FCC, they have witnessed **4.1 B robocalls in May 2018**, vs. 2.1B calls in Aug, 2017
- The FTC received over **7.1 million complaints** about robocalls in FY2017, up from **5.3 million complaints** in FY2016.



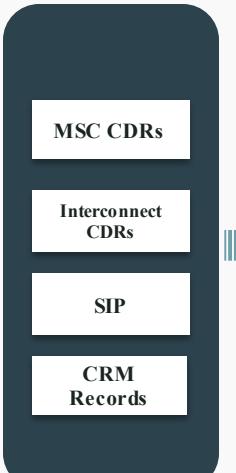
Global Fraud \$29.2 B



How it happens?

- Fraudster sets up Bot/Robocallers
- Robocalls play a pre-recorded message and then transfer to human
- Fraudsters can also spoof/refile caller ID to get personal information (Credit card, Email Ids, banking transactions, OTP etc.) from the subscribers

How we fix it?



Data Source

- **UNR Analysis**
- **Route Profiling**
- **Space-Time Analysis**
- **Subscriber Profiling**
- **Device Change Analysis**
- **Clustering**
- **Velocity Analysis**

Multi-Dimensional Advanced Analytics

Key Insights

SIMs used in fraud (IMSI / MSISDN)

Cloned / Stolen SIM

Routes/Carriers

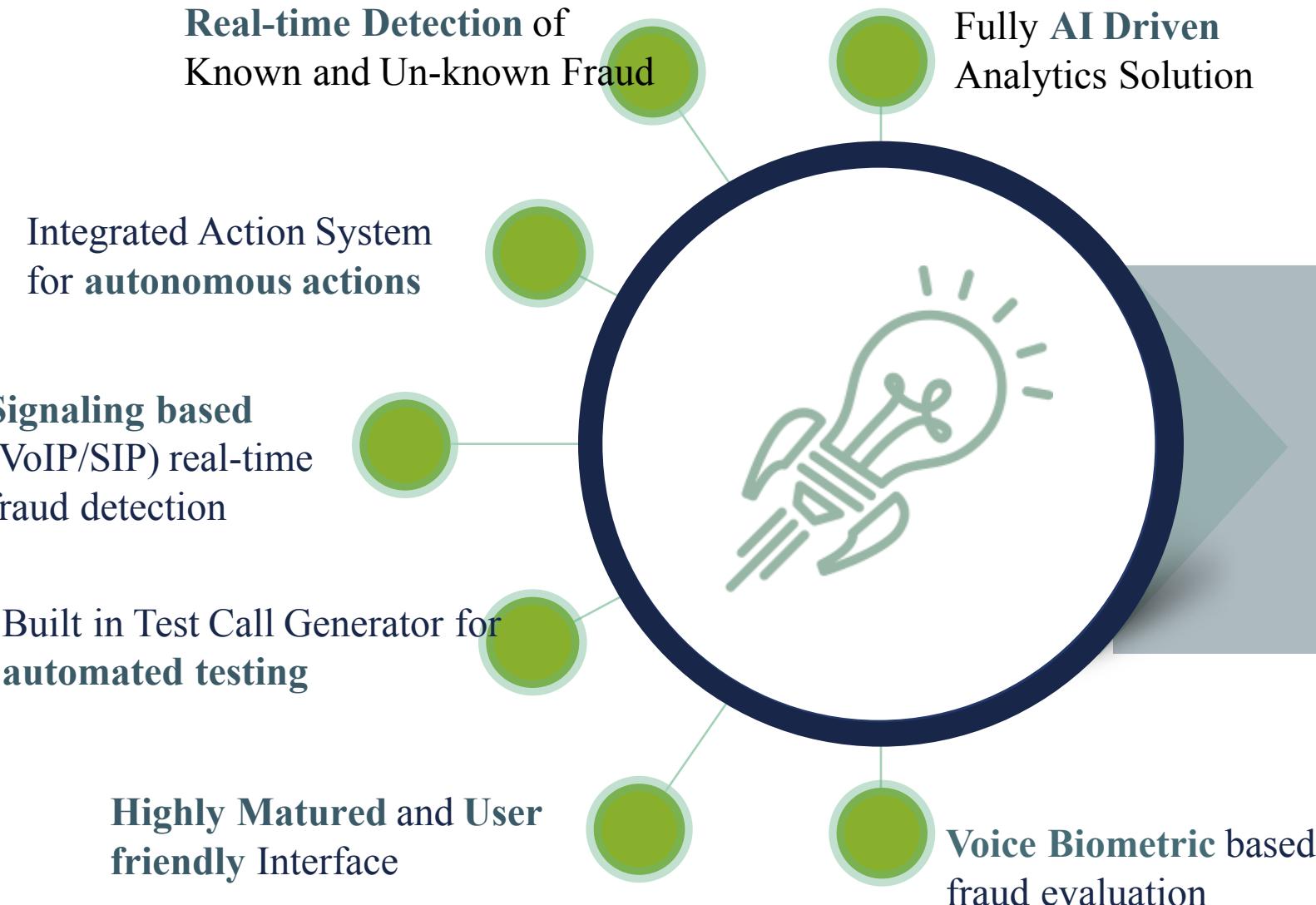
MoU / Revenue details

Real-Time Actions

- ✓ Integration with STIR and SHAKEN Solution
- ✓ Random Blocking
- ✓ Call Blocking
- ✓ Whispering



Key Differentiators – Virtual Fraud Manager



VFM is only automated fraud management solution with **AI** and **Integrated action capabilities**



Case Study – Virtual Fraud Manager

Tier-1 North American Operator with 75M subscribers

Challenges

- Witnessing revenue loss despite of existing Fraud Management Solutions (FMS) and extensive fraud operation personnel.
- Existing FMS worked on limited datasets, rule based resulting in higher false positives, alongside manual process fraud team taking action.

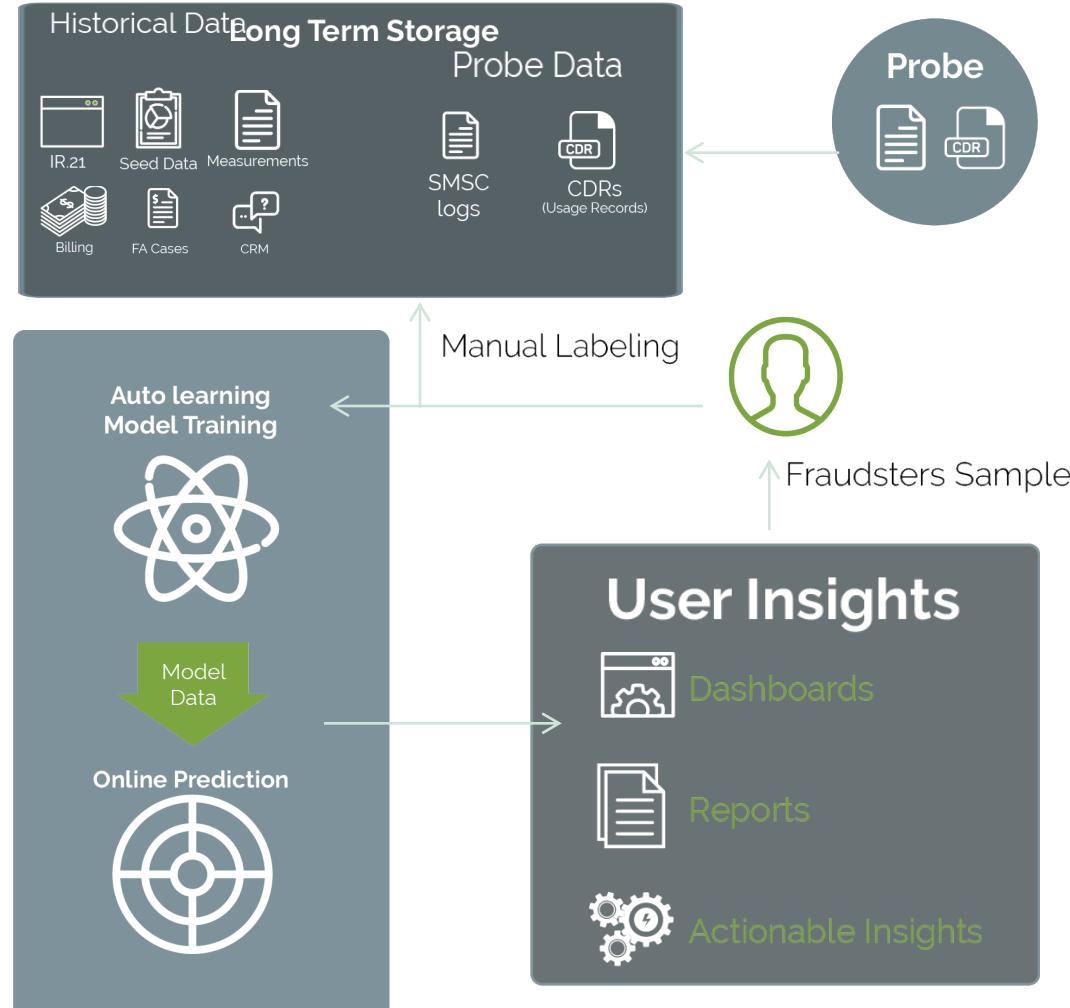
Mobileum's Solution

- AI Big data powered Virtual Fraud Manager solution providing predictive machine learning based fraudulent insights.
- VFM's integrated actions providing real time fraud prevention fully automated.

Results

- Detected and prevented **Revenue Share Fraud**
- **3 times** more fraud detected as compared to incumbent
- Fraud run time **reduced by 90%**
- More than **95%** fraud detection **accuracy** and less than **5% false positive rate**
- Estimated annual revenue **savings** of **USD 30M**

Mobileum AI Virtual Fraud Manager Solution





THANK YOU