



Rule Validation (Credit card)

FR Department

Updated: May 5, 2022

บริการทุกระดับประทับใจ

Agenda



Business Understanding

Data Exploring & Descriptive

Rule Exclusion

Rule Evaluation Results

Summary & Conclusion

Appendix

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Business Understanding

Data Exploring & Descriptive

Rule Exclusion

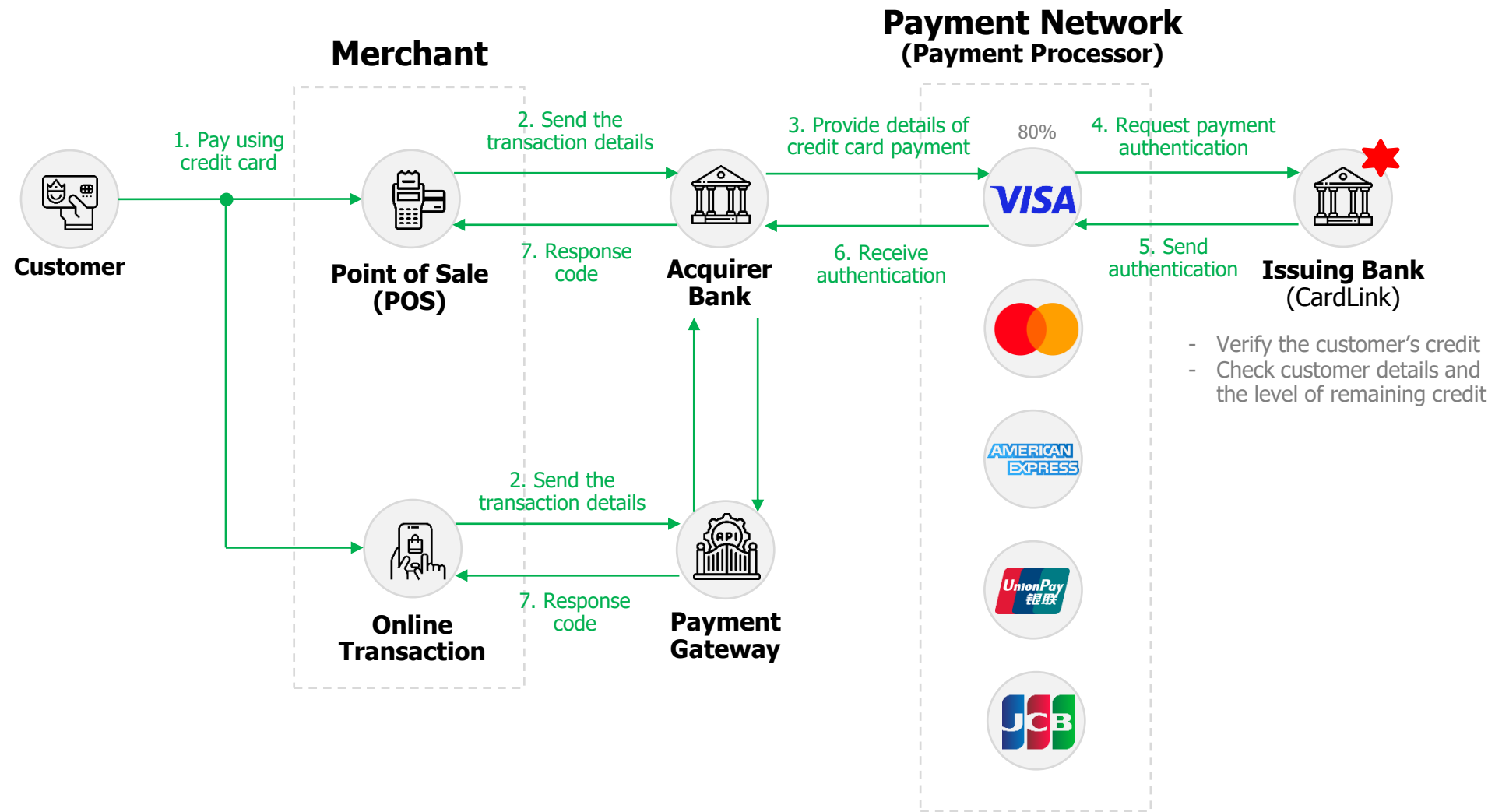
Rule Evaluation Results

Summary & Conclusion

Appendix

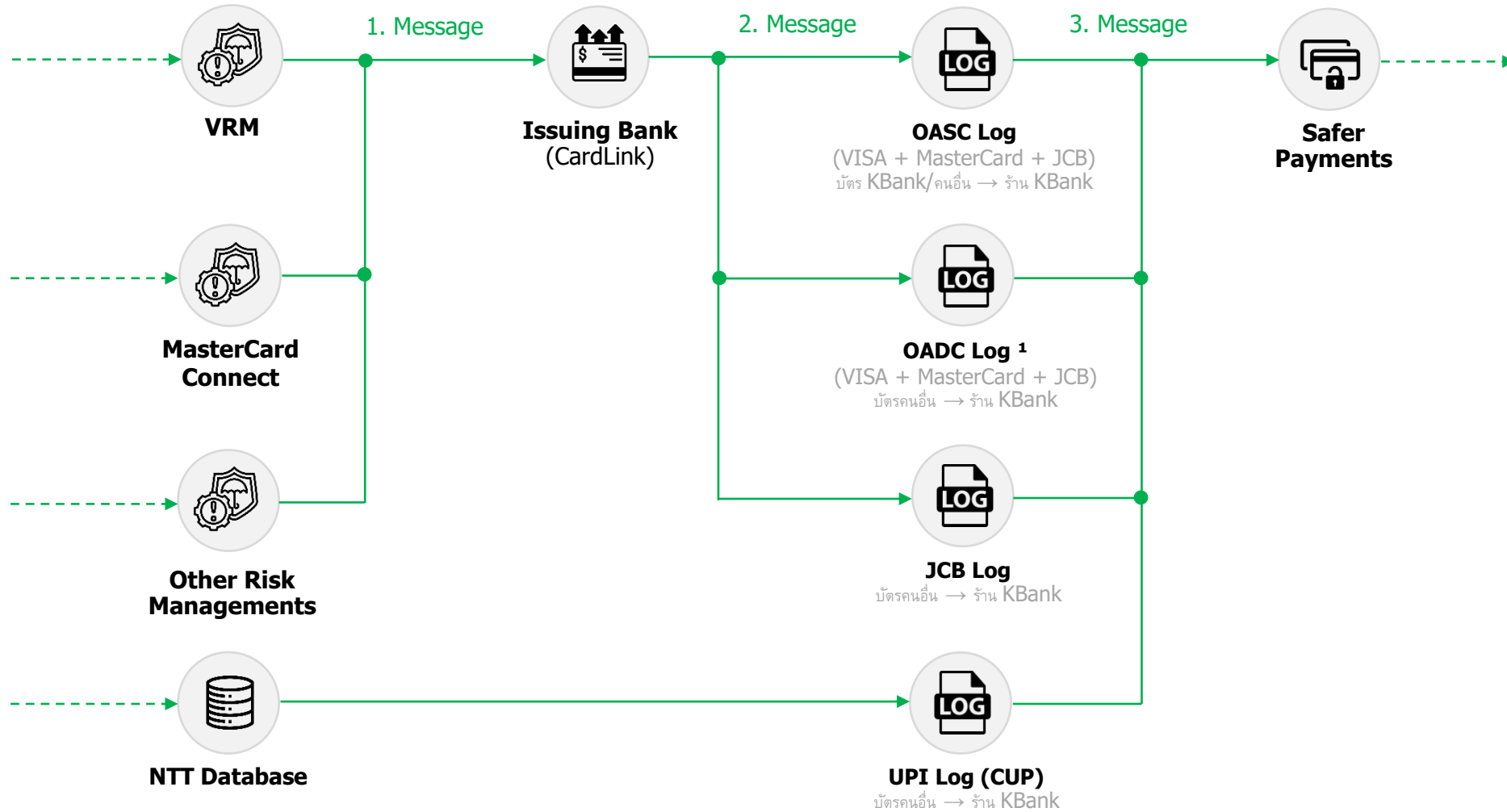
Credit Card Payment Processing

Credit Approval (t+0)



KBank Credit Card Processing

Transaction & Message Flow



Log Types:

1. Secure log or ASC log
2. None secure log or ECI7 (no OTP)

¹ Auto Approve : CardLink stand-in case

Overall Information Details

Safer Payment Introduction [1/2]

เข้าระบบผ่าน URL: <https://sp.kasikornbank.com:8080/>

IBM Counter Fraud Management for
Safer Payments

Login

Password

OK

first previous 1 2 3 next last 1 - 10 / 22

Name	Comment	Revisions	Champion
KBank		288	Yes
OADC		1	Yes
OASC		1	Yes
ATM		1	Yes
ELEC		1	Yes
VDO		1	Yes
m-POS		1	Yes
CARDLINK		1	Yes
IB		1	Yes
KBC		1	Yes

The table below lists all defined rules for this ruleset. To open details of a rule, click the respective row.

first previous 1 2 3 4 5 6 7 8 next last 1 - 20 / 153

Priority	Name	Comment	Enabled	Conditions	Conclusions	Actions
1000	ECOM001.1	[CC] ECI7 ต่างประเทศที่ร้านใหม่มากกว่า	Yes	(Channel = 4; 13;	(Intercept = 1); (Case Queue = 11); (Case Score +=	(Case Class = Credit_Purchases)
1000	ECOM001.2	[DB] ECI7 ต่างประเทศที่ร้านใหม่มากกว่า	Yes	(Channel = 2); (T	(Intercept = 1); (Case Queue = 21); (Case Score +=	(Case Class = Debit_Purchases)
1000	ECOM002.1	[CC] ECI7 ต่างประเทศที่ร้านใหม่มีบัตรเร	Yes	(Channel = 4; 13;	(Intercept = 1); (Case Score += 10); (Case Queue =	(Case Class = Credit_Purchases)
1000	ECOM002.2	[DB] ECI7 ต่างประเทศที่ร้านใหม่มีบัตรเร	Yes	(Channel = 2); (T	(Intercept = 1); (Case Score += 10); (Case Queue =	(Case Class = Debit_Purchases)
1000	ECOM005	บัตรเครดิต Invalid CVV มากกว่า 2 ครั้ง	Yes	(Channel = 4; 13;	(Intercept = 1); (Case Queue = 11); (ProductService	(Case Class = Credit_Purchases)
1000	ECOM007.1	[CC] Rule คม ECI7 ไม่ให้เกิน 35 รายการ	Yes	(Channel = 4; 13;	(Intercept = 1); (Case Queue = 11); (ProductService	(Case Class = Credit_Purchases)
1000	ECOM008	[CC] ECI7 มีการซื้อมากกว่า 3 รายการ	Yes	(Channel = 4; 13;	(Intercept = 1); (Case Queue = 11); (ProductService	(Case Class = Credit_Purchases)
1000	ECOM009	[CC] ECI7 มีการซื้อมากกว่า 3 รายการ	Yes	(Channel = 4; 13;	(Intercept = 1); (ProductService = Credit Card); (Fra	(Case Class = Credit_Purchases)
1000	ECOM010.1	[CC] ECOM ร้านต่างประเทศ Test บัตร	Yes	(TranTypeCode =	(Intercept = 1); (Case Queue = 11); (Case Score +=	(Case Class = Credit_Purchases)
1000	ECOM010.2	[DB] ECOM ร้านต่างประเทศ Test บัตร	Yes	(Channel = 2); (T	(Intercept = 1); (Case Queue = 21); (Case Score +=	(Case Class = Debit_Purchases)
1000	ECOM010.R	[MCH] ECOM คมร้านต่างประเทศ Test	Yes	(Channel = 4; 2;	(Intercept = 1); (Case Queue = 80); (Case Score +=	(Case Class = CreditMaster)
1000	ECOM011.2	[DB] มีการโทรเข้า Call center ก่อน	Yes	(Channel = 2); (T	(Intercept = 1); (ProductService = Debit Card); (Frau	(Case Class = Debit_Purchases)
1000	ECOM013.1	[CC] จัดการบัตรที่โดน Credit master	Yes	(Channel = 4; 13;	(Intercept = 1); (FraudChannel = ECOM-ECI7); (Fra	(Case Class = Credit_Purchases)
1000	ECOM014.1	[CC] มีการ Ver ว่าที่ APPLE.COM.ITUI	Yes	(Channel = 4; 13;	(Intercept = 1); (FraudChannel = ECOM-ECI7); (Fra	(Case Class = Credit_Purchases)
1000	ECOM015.1	[CC] ใช้ร้านเกมส์เสี่ยงสูงก่อนนำ	Yes	(Channel = 4; 13;	(Intercept = 1); (Case Queue = 11); (ProductService	(Case Class = Credit_Purchases)
1000	ECOM015.2	[DB] ใช้ร้านเกมส์เสี่ยงสูงก่อนนำ	Yes	(Channel = 2); (R	(Intercept = 1); (Case Queue = 21); (ProductService	(Case Class = Debit_Purchases)
1000	ECOM016.1	[CC]CVV Brute Force ไล่ CVV ผิดหลา	Yes	(Channel = 4; 13;	(Intercept = 1); (FraudChannel = ECOM-ECI7); (Fra	(Case Class = Credit_Purchases)
1000	ECOM018.1	[CC] ONLN3D ใช้ต่อเนื่องผิดปกติบน	Yes	(Channel = 4; 13;	(Intercept = 1); (FraudChannel = ECOM-ECI7); (Fra	(Case Class = Credit_Purchases)
1000	ECOM018.2	[DB] ONLN3D ใช้ต่อเนื่องผิดปกติบน	Yes	(Channel = 2); (T	(Intercept = 1); (FraudChannel = ECOM-ECI7); (Fra	(Case Class = Debit_Purchases)
1000	ECOM019.1	[CC] บัตรเคยใช้ที่ AIRASIA มีใช้ต่อเนื่อง	Yes	(Channel = 4; 13;	(Intercept = 1); (FraudChannel = ECOM-ECI7); (Fra	(Case Class = Credit_Purchases)

Data Mapping

Safer Payment Introduction [2/2]



1 Log Channel

2 Card Scheme Message Type

3 Log Field

7

4
Safer Payment's
Attributes

Mappings

show only inputs

4 of 103 selected

The table below lists mappings of all mandators. These mappings are all available in this model revision. Mappings lets you define for each data interface message type (aka "messages"), which interface attributes functions shall be applied. The table below lists all inputs.

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Attributes	Inherited from	OASC (VISA) [41]	OASC (MasterCard) [42]	OASC (JCB) [43]	OASC (CUP) [44]
Account 1	Technical Head Mandator				
Account 2	Technical Head Mandator				
Account PIN 5DIGIT Flag	Technical Head Mandator				
Account PIN Status	Technical Head Mandator				
AlertQue	Technical Head Mandator				
Amount	Technical Head Mandator	TXN_AMT	TXN_AMT	TXN_AMT	TXN_AMT
Amount-2	Technical Head Mandator	BILL_AMT	BILL_AMT	BILL_AMT	BILL_AMT
Amount-3	Technical Head Mandator				
Amount-4	Technical Head Mandator				
Amount-5	Technical Head Mandator				
Authorization Code	Technical Head Mandator	AHR_CD	AHR_CD	AHR_CD	AHR_CD
Capture Age	Technical Head Mandator				
Capture Gender	Technical Head Mandator				
Capture Gender Confident	Technical Head Mandator				
Card BIN	Technical Head Mandator	CARD_NO [Substring(0, 6)]	CARD_NO [Substring(0, 6)]	CARD_NO [Substring(0, 6)]	CARD_NO [Substring(0, 6)]
Card BIN 8dig	Technical Head Mandator	CARD_NO [Substring(0, 8)]	CARD_NO [Substring(0, 8)]	CARD_NO [Substring(0, 8)]	CARD_NO [Substring(0, 8)]
Card Expiration Date	Technical Head Mandator	CARD_EXP_DT	CARD_EXP_DT	CARD_EXP_DT	CARD_EXP_DT
Card FIID	Technical Head Mandator				
Card Number	Technical Head Mandator	CARD_NO	CARD_NO	CARD_NO	CARD_NO
Card Number 20Digits	Technical Head Mandator	CARD_NO [Substring(12, 4)]	CARD_NO [Substring(12, 4)]	CARD_NO [Substring(12, 4)]	CARD_NO [Substring(12, 4)]
Card Number Last4Digit	Technical Head Mandator				
Card Number Masked	Technical Head Mandator				
Card PIN Flag	Technical Head Mandator				
Card Status	Technical Head Mandator				
Card Type	Technical Head Mandator				
Cardholder Currency Code	Technical Head Mandator	BILL_CCY_CD	BILL_CCY_CD	BILL_CCY_CD	BILL_CCY_CD
Channel	Technical Head Mandator	CHANNEL [TakeIfEmpty("4")]	CHANNEL [TakeIfEmpty("4")]	CHANNEL [TakeIfEmpty("4")]	CHANNEL [TakeIfEmpty("4")]
CHIP Flag	Technical Head Mandator	FULL_CHIP_TXN	FULL_CHIP_TXN	FULL_CHIP_TXN	FULL_CHIP_TXN
CIS Mobile No	Technical Head Mandator				
Country Code	Technical Head Mandator	CTY_CD	CTY_CD	CTY_CD	CTY_CD
Cryptogram Authentication Result	Technical Head Mandator	CARD_AHR_RSLT_CD	CARD_AHR_RSLT_CD	CARD_AHR_RSLT_CD	CARD_AHR_RSLT_CD
Currency Code	Technical Head Mandator	TXN_CCY_CD	TXN_CCY_CD	TXN_CCY_CD	TXN_CCY_CD
Customer ID	Technical Head Mandator	IP_ID	IP_ID	IP_ID	IP_ID
Customer ID 2	Technical Head Mandator	MRCH_IP_ID	MRCH_IP_ID	MRCH_IP_ID	MRCH_IP_ID
CVV Result	Technical Head Mandator	CARD_VERF_RSLT	CARD_VERF_RSLT	CARD_VERF_RSLT	CARD_VERF_RSLT
CVV2 Indicator	Technical Head Mandator	CARD_VERF2_PRSC_IND	CARD_VERF2_RSLT		
CVV2 Result	Technical Head Mandator	CARD_VERF2_RSLT			
Decline Reason Code	Technical Head Mandator	DCLN_RSN	DCLN_RSN	DCLN_RSN	DCLN_RSN

Credit Card Data Validation

Data Definition [1/2]

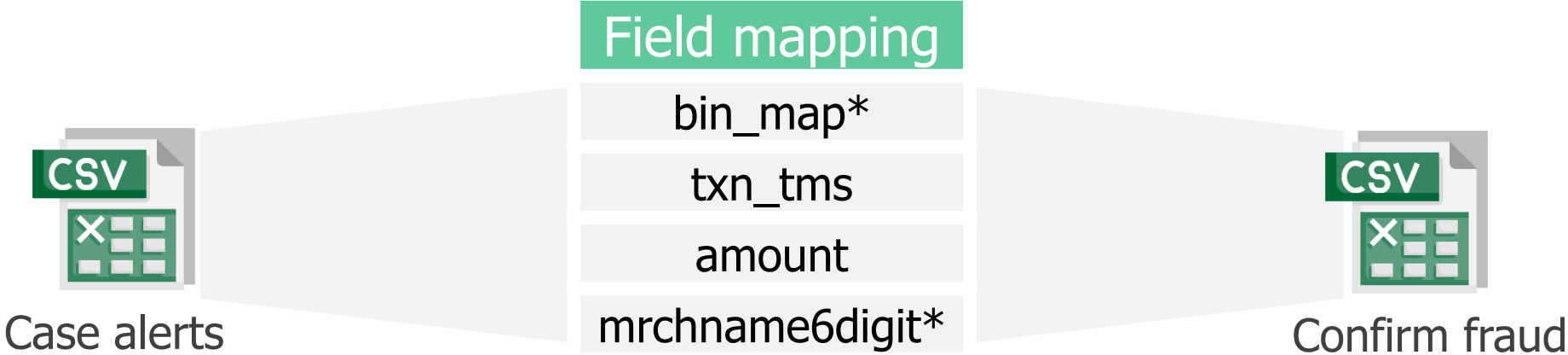
ธนาคารกสิกรไทย
开泰银行 KASIKORNBANK



Data files	Definition	Data sent	Data periods
 Case alerts	Description: Total case alerts from Safer payment system Provider: Fraud Management System Development Unit	Weekly: Every Wednesday	From 2017/06 to present
 Confirm fraud	Description: Fraud transaction from VISA/Master card * Provider: Fraud monitoring and detection unit	Monthly: Not over Date 5 of months	From 2016/04 to present

Credit Card Data Validation

Safer Payment Introduction [2/2]



Field mapping	Definition
binmap	df['CardNumber'].str[:6] + "xxxxxx" + df['CardNumber'].str[12:16]
txn_tms	Transaction date & time
amount	Transaction amount
mrchname6digit	The first 6 digits of merchant name

* Derived variables

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Data Exploration

Data scope & limitation



Data set for analysis

Data period: January 2020 to April 2022

Data criterion	# Alert	# Remain Fraud
Total (master table)	992,550	234,052
Exc: Not alert transaction	910,402	151,904
Exc: rules not found	910,351	151,903

Total rules from Safer Payment

Data: AS of 16 June 2022

Details of selection criterion	# Remain Rules
Total rules from Safer Payment	611
Exc: Debit card rules	484
Within data set for analysis	155

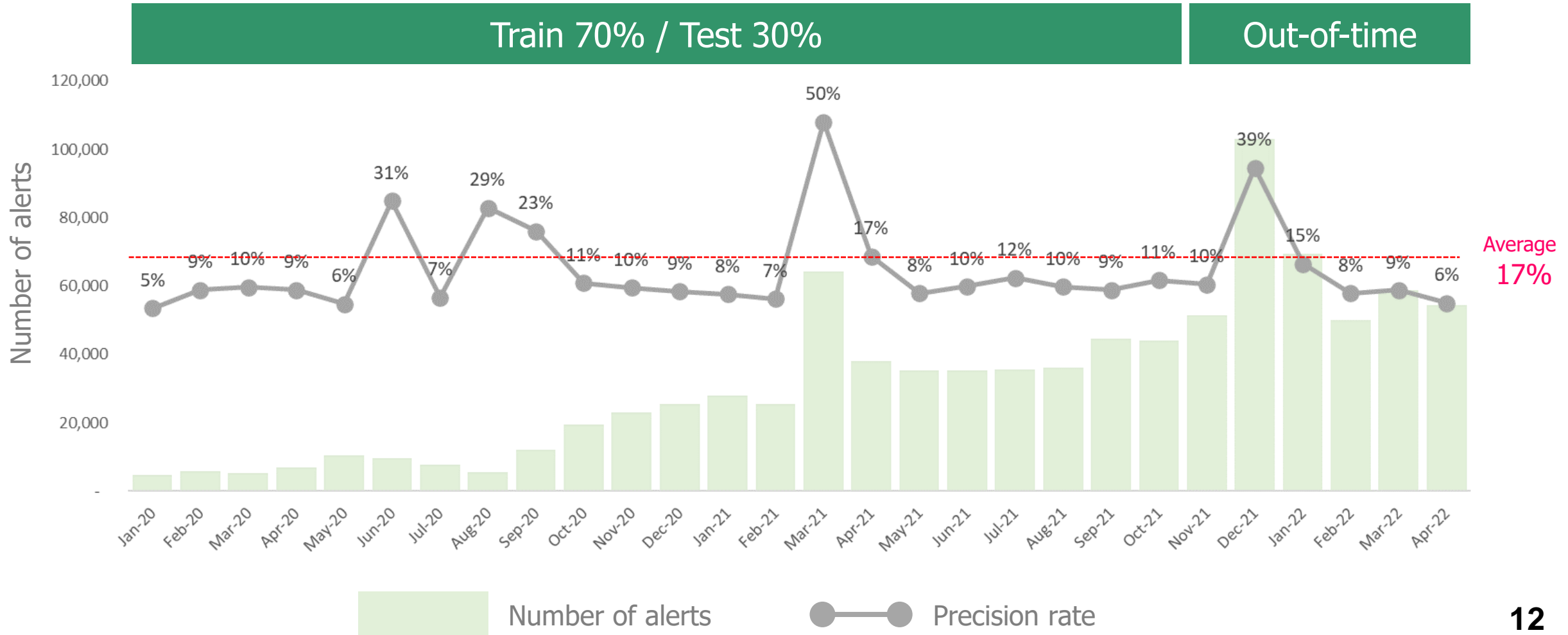
Data Exploration

Precision Rate by month

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แบ่งช่วงของข้อมูลสำหรับสร้างและทดสอบแบบจำลองทั้งช่วงเวลาเดียวกันและช่วงเวลาต่างกัน

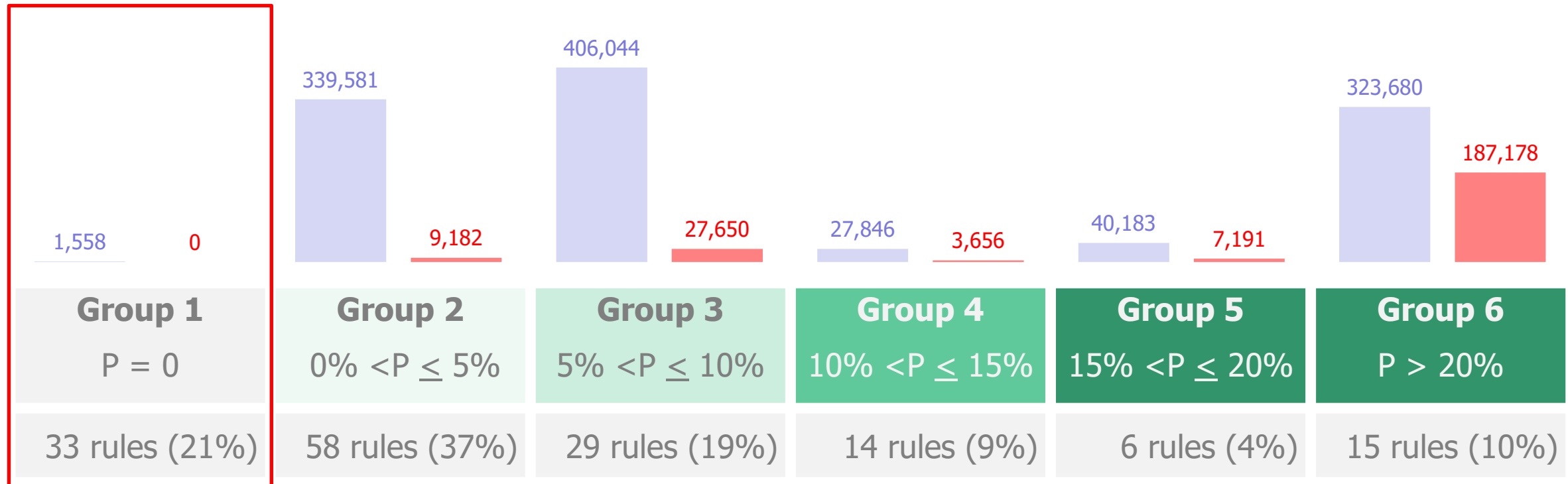


Descriptive analysis

Rules performance summary



มีจำนวนถึง 33 rules ที่ alert น้อยครั้งและไม่เป็นรายการ fraud ในช่วงเวลา 2 ปีที่ผ่านมา



"P" refers to precision rate



Number of alerts



Number of fraud transaction

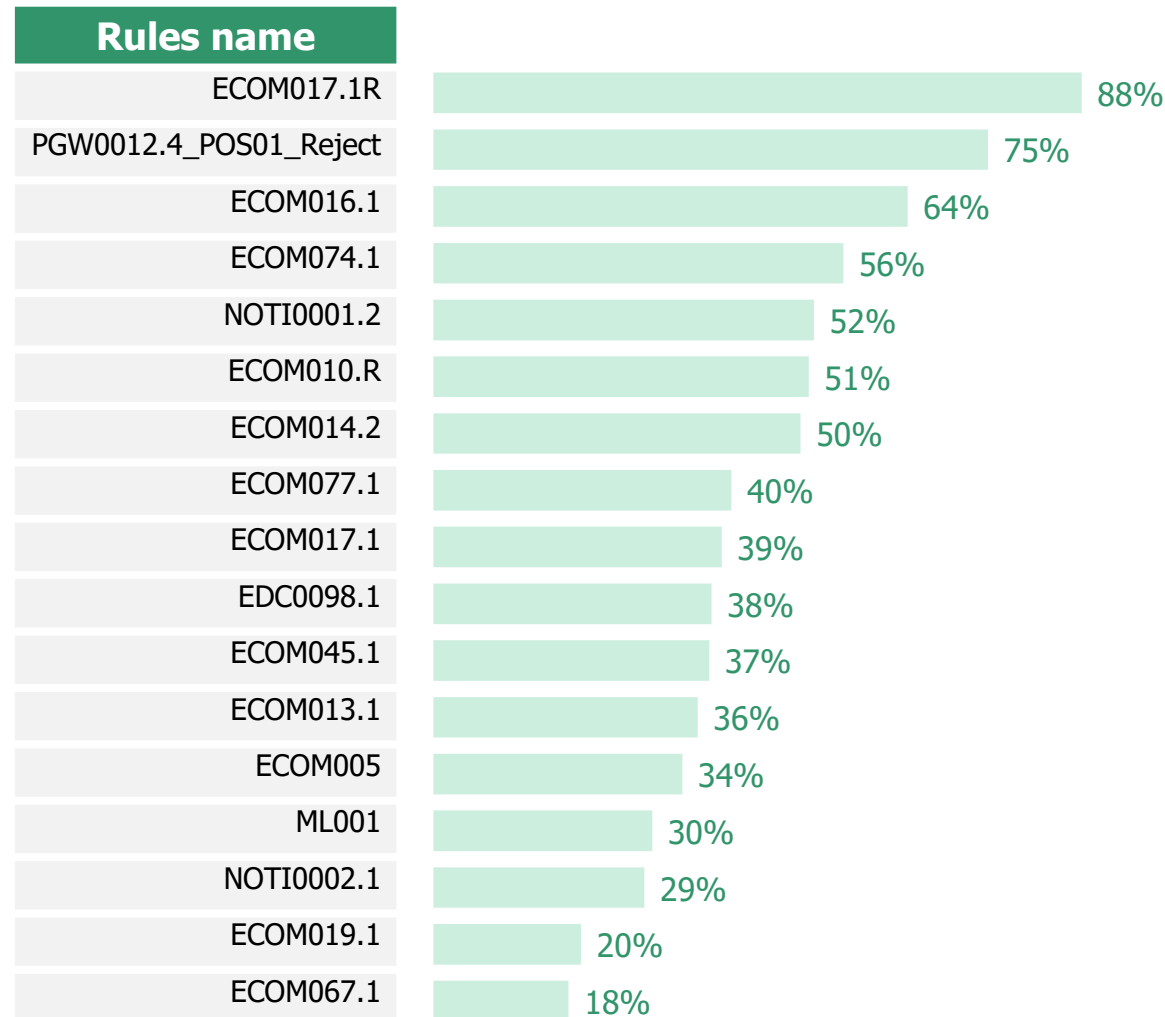
Total credit card rules: 155 rules, Total alerts: 910,402 alerts, Total fraud : 151,904 transaction

Descriptive analysis

Top rules performance (Precision)



จาก 17 rules ที่มี precision rate สูงสุด คิดเป็นจำนวน alerts 30% ให้ค่า recall rate ถึง 82%



Top 17 precision of credit card rules (Precision rate > 17%)

ECOM rules	12
OASC rules	2
Notification rules	2
Multi Channel rules	1

Average of Precision rate = 17%

Number of alerts

30%

(265,256 / 910,351)

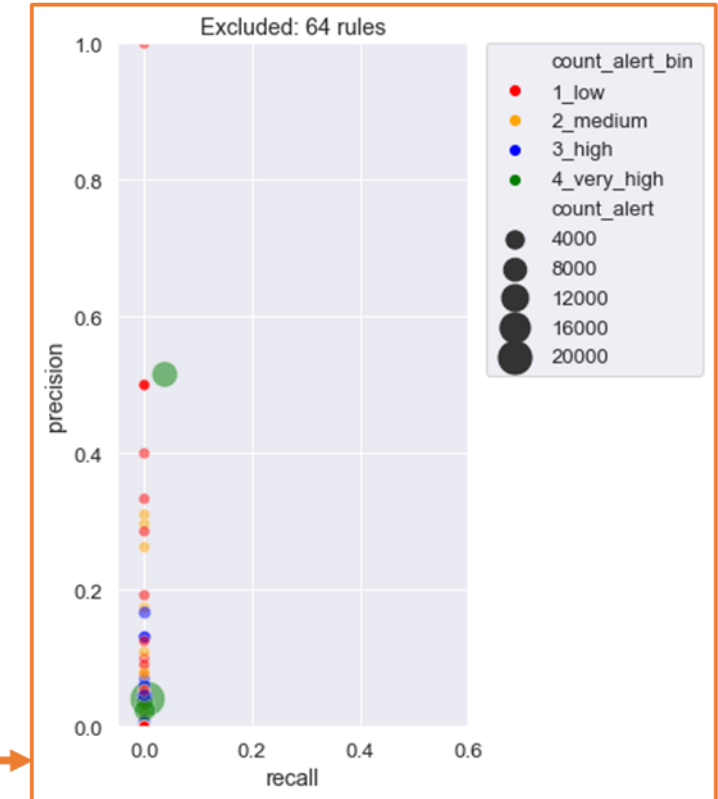
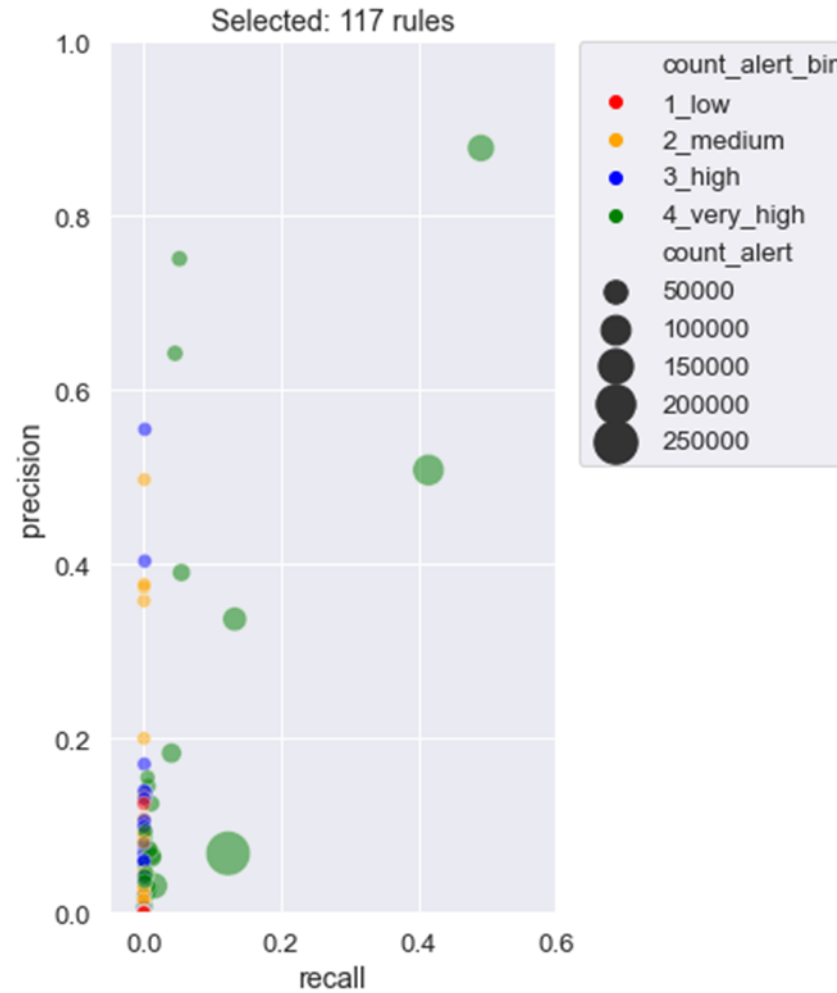
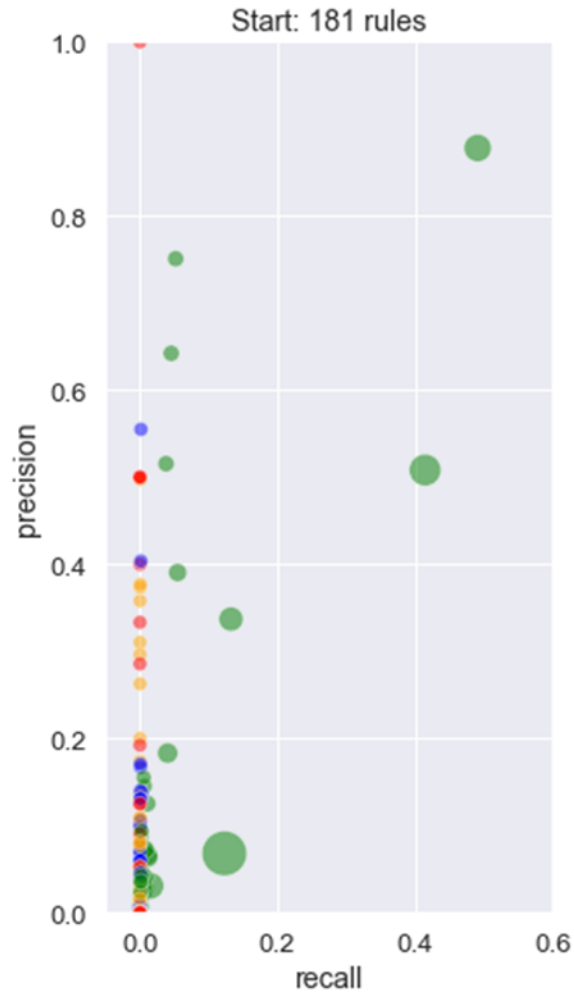
Number of frauds

82%

(124,177 / 151,903)

Descriptive analysis

Rules characteristics



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Rule Exclusion

Data scope & limitation [1/2]



Data set for analysis

Data period: January 2020 to April 2022

Data criterion	# Alert	# Remain Fraud
Total (master table)	992,550	234,052
Exc: Not alert transaction	910,402	151,904
Exc: rules not found	910,351	151,903
Exc: VRM rules	648,748	137,620
Exc: OAFM rules	640,079	137,317
Exc: NOTI rules	640,069	137,312

Total rules from Safer Payment

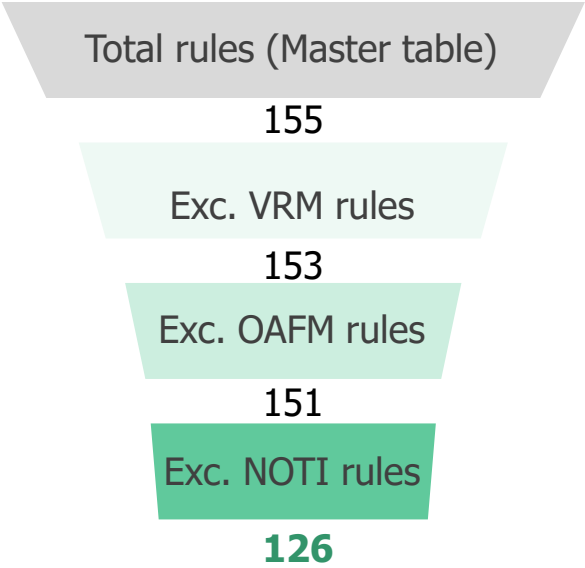
Data: AS of 16 June 2022

Details of selection criterion	# Remain Rules
Total rules from Safer Payment	611
Exc: Debit card rules	484
Within data set for analysis	155
Exc: VRM rules	153
Exc: OAFM rules	151
Exc: NOTI rules	126

Rule Exclusion : Remaining 126 Rules

Data scope & limitation [2/2]

Steps of rules exclusion



Rules sets summary

ECOM rules	70
OASC rules	27
Multi Channel rules	12
Monitor list rules	9
Others	8

Rules data summary

Rules set	# Rules	# Alert	# Fraud	Precision
ECOM rules	70	586,465	135,706	23%
OASC rules	27	37,547	1,527	4%
Multi Channel rules	12	32,782	8,613	26%
Monitor list rules	9	387	9	2%
Others	8	227	7	3%

Rules data summary (Excluding Credit Master Rules)

Rules set	# Rules	# Alert	# Fraud	Precision
ECOM rules	68	440,856	48,693	11%
OASC rules	26	37,334	1,485	4%
Multi Channel rules	10	21,493	620	3%
Monitor list rules	9	387	9	2%
Others	8	227	7	3%

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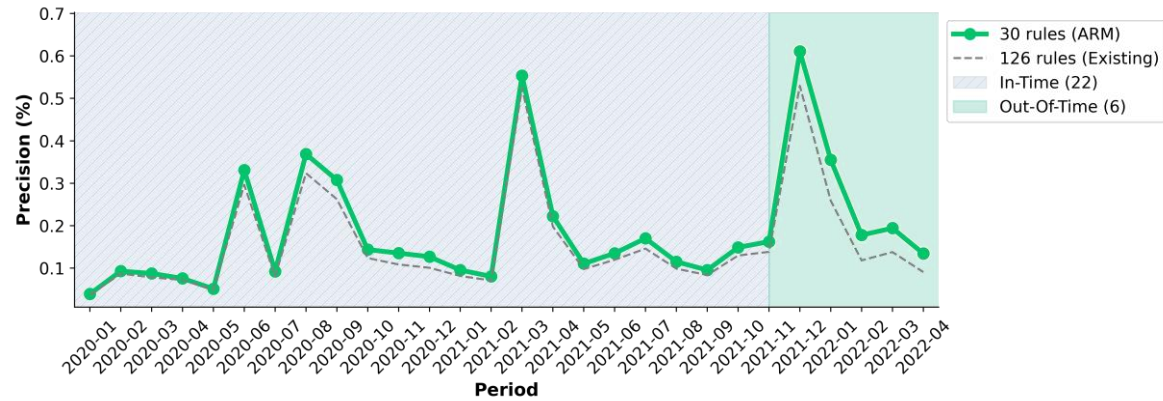
Rules Evaluation Results

Association Rules Analysis [1/2]

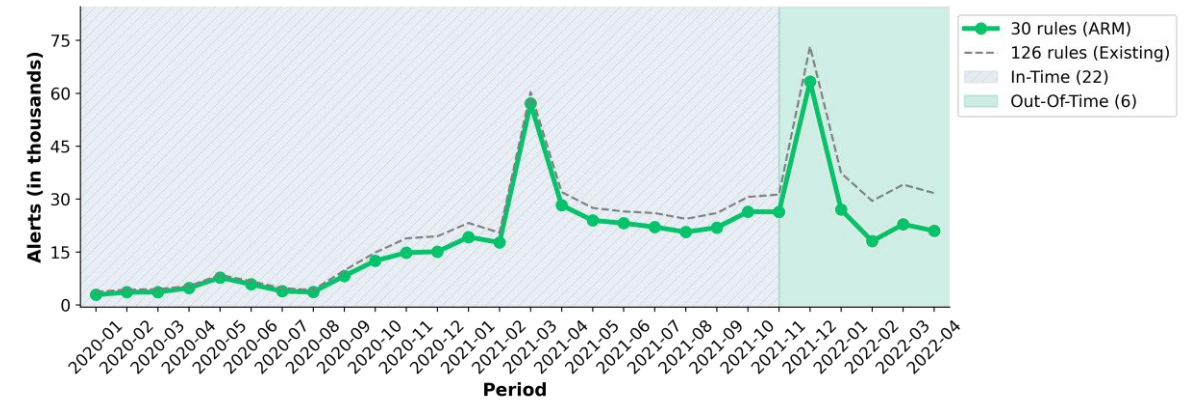


แบบจำลองที่สร้างด้วยจำนวน 30 rules ให้ผลอยู่ในเกณฑ์ดีในทุกตัวชี้วัด ยกเว้น recall

Precision rate (%)



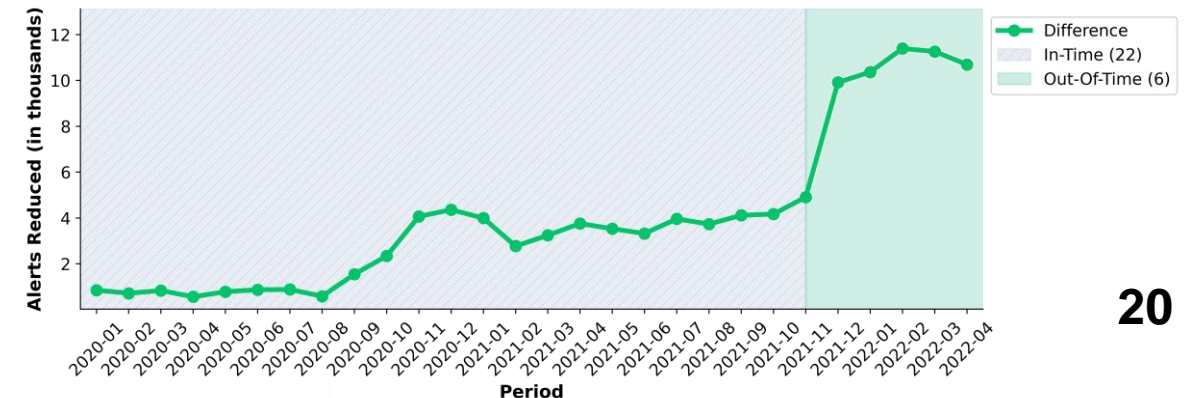
Number of alerts



Recall rate (%)



Number of reduced alerts



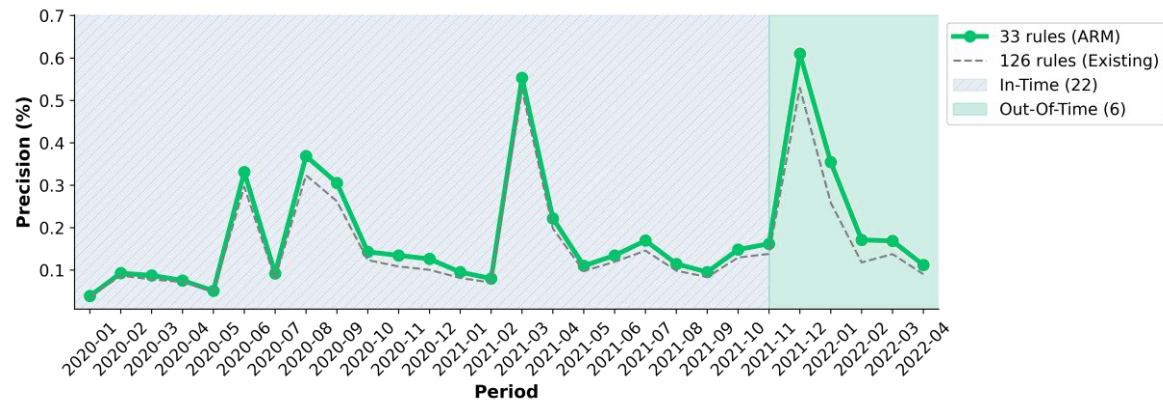
Rules Evaluation Results

Association Rules Analysis [2/2]

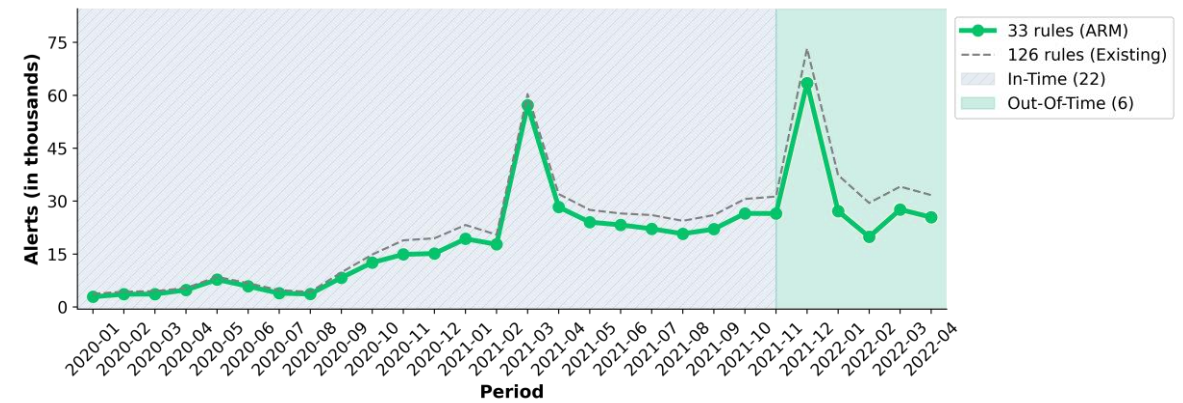


เมื่อเพิ่มจำนวน 3 rules ที่สร้างขึ้นใหม่ใน Out-Of-Time ส่งผลให้ recall rate ในช่วงเวลาดังกล่าวดีขึ้น

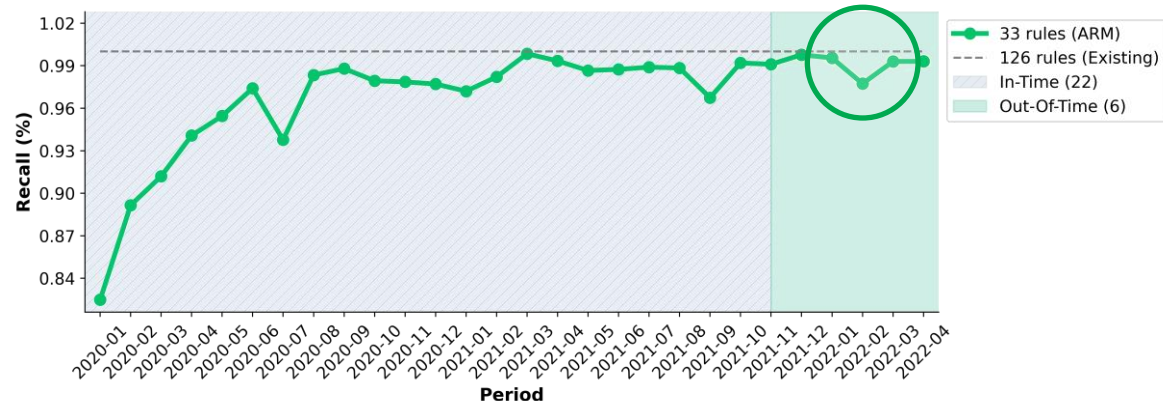
Precision rate (%)



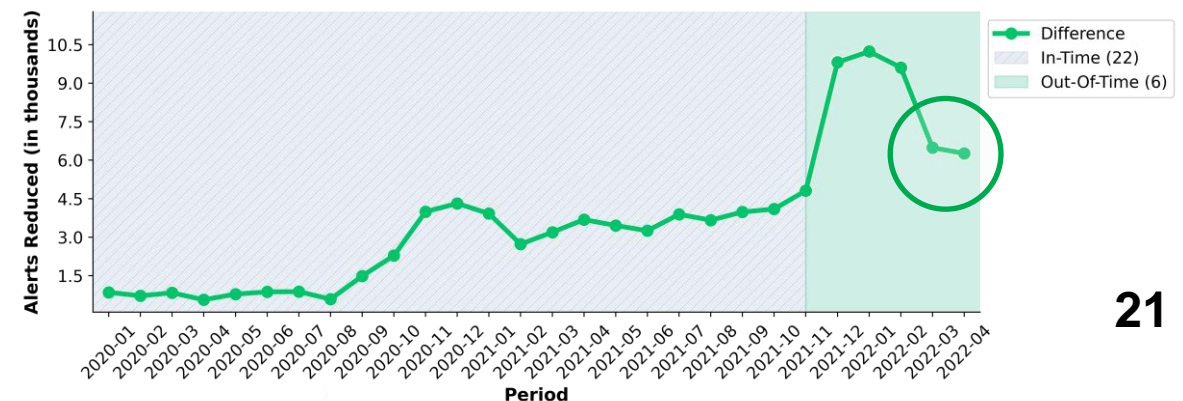
Number of alerts



Recall rate (%)



Number of reduced alerts



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Summary & Conclusion

Project summary & Next step

28 rules (จาก 33 rules) จะเป็น priority แรกในการพัฒนาการเตือน (alert) ให้มีประสิทธิภาพมากขึ้น

Data preparation

Performance Analysis

Association rules

Rules Improvement
(Next steps)

28

Priority rules
to be improved

No	Rules	Num. Alerts	Num. Fraud	Precision
1	ECOM017.1R	84,933	74,579	87.8%
2	ECOM010.R	123,886	62,968	50.8%
3	ECOM005	59,640	20,101	33.7%
4	ECOM017.1	21,305	8,320	39.1%
5	PGW0012.4_POS*	10,504	7,888	75.1%
6	ECOM016.1	10,738	6,897	64.2%
7	ECOM067.1	33,389	6,114	18.3%
8	ECOM055.1	76,664	2,353	3.1%
9	ECOM053.1	28,578	1,814	6.3%
10	ECOM050.1	26,627	1,755	6.6%
11	ECOM010.1	13,384	1,675	12.5%
12	ECOM054.1	17,397	1,259	7.2%
13	ECOM001.1	7,080	1,029	14.5%
14	ECOM007.1	31,217	905	2.9%
15	ECOM012.1	11,683	866	7.4%
16	ECOM071.1	5,309	824	15.5%
17	ECOM070.1	21,777	670	3.1%

No	Rules	Num. Alerts	Num. Fraud	Precision
18	ECOM049.1	23,084	509	2.2%
19	ML002	12,352	483	3.9%
20	ECOM020.1	2,856	393	13.8%
21	PGW0034.1	3,598	337	9.4%
22	ECOM048.1_2	3,702	331	8.9%
23	ECOM018.1	3,025	283	9.4%
24	ECOM023.1	4,892	259	5.3%
25	ECOM074.1	400	222	55.5%
26	ECOM027.1	2,967	221	7.4%
27	PGW0007.2	7,108	170	2.4%
28	ECOM017.2R	767	128	16.7%
29	ECOM026.1	2,376	99	4.2%
30	EDC0092	644	90	14.0%
31	ECOM014.2	179	89	49.7%
32	EDC0098.1	207	78	37.7%
33	ECOM068.1	732	58	7.9%

* PGW0012.4_POS01_Reject

Rule name Credit master rule

Rule name Machine learning rule



Appendix

Rule Evaluation (Credit card)

บริการทุกระดับประทับใจ

Rules name	Rules set	Precision rate	Comment (# Alerts)
ECOM017.1R	ECOM Rules	88%	Credit master verify ไม่ผ่านหลายรายการ (84,933)
PGW0012.4_POS01_Reject	MultiChannel	75%	Credit master same merchant (10,504)
ECOM016.1	ECOM Rules	64%	CVV Brute Force (10,738)
ECOM074.1	ECOM Rules	56%	CC AirAsia Watchlist มาทำร้าน Facebook ใน 24 ชม. (400)
NOTI0001.2	Notification Rules	52%	Credit invalid CVV 4 ครั้งใน 24ชม. (11,175)
ECOM010.R	ECOM Rules	51%	[MCH] ECOM คุมร้านต่างประเทศปฏิเสธรายการ (123,886)
ECOM014.2	OASC Rules	50%	จัดการบัตรโดน credit master มาก่อนทำ ECOM,MOTO (179)
ECOM077.1	ECOM Rules	40%	CC AirAsia Watchlist มาทำร้าน Facebook ใน 90วัน (488)
ECOM017.1	ECOM Rules	39%	Credit master verify ผ่านหลายรายการ (21,305)
EDC0098.1	OASC Rules	38%	Invalid CVV แบบ CardPresent ประเทศเสี่ยง
ECOM045.1	ECOM Rules	37%	ร้าน STREAMGAMES ECI7 ผ่าน > 5 ครั้งใน 1 ชม. (83)
ECOM013.1	ECOM Rules	36%	จัดการบัตรโดน credit master มาก่อนทำ ECI7 (179)
ECOM005	ECOM Rules	34%	Invalid CVV > 2 ครั้งใน 10 นาทีรายการต่างประเทศ (59,640)
ML001	ECOM Rules	30%	CC เฉพาะ VISA ไม่รวม CRDVER และ ML Score >= 0.57 (16)
NOTI0002.1	Notification Rules	29%	Credit invalid expire date 3 ครั้งใน 24 ชม.
ECOM019.1	ECOM Rules	20%	บัตรเคยใช้ที่ AirAsia ต่อเนื่องผิดปกติบนร้านที่บัตรอื่นโดน (80)
ECOM067.1	ECOM Rules	18%	ทำรายการ ECOM ร้านต่างประเทศ ไม่เคยทำและมียอดซ้ำ (33,389)

Appendix 2

Association Rules Analysis results

Features in model (Round 1)		Add features in model (Round 2)	Total 33 features
ECOM005	PGW0012.4_POS01_Reject	ML002	<div>Non-Credit master rules (29 rules)</div> <div>ECOM rules23</div> <div>OASC rules5</div> <div>Multi Channel rules1</div> <div>Credit master rules (4 rules)</div> <div>ECOM rules2</div> <div>OASC rules1</div> <div>Multi Channel rules1</div>
ECOM010.R	ECOM020.1	ECOM074.1	
ECOM017.1R	ECOM027.1	ECOM048.1_2	
ECOM055.1	ECOM071.1		
ECOM017.1	ECOM017.2R		
ECOM067.1	PGW0007.2		
ECOM053.1	ECOM070.1		
ECOM050.1	PGW0034.1		
ECOM010.1	EDC0092		
ECOM007.1	EDC0098.1		
ECOM049.1	ECOM018.1		
ECOM054.1	ECOM026.1		
ECOM016.1	ECOM068.1		
ECOM001.1	ECOM023.1		
ECOM012.1	ECOM014.2		

Appendix 3

Model Selection Results

Model	Metrics	Max_feature	Precision-Train	Recall-Train	Precision-Test	Recall-Test	# Features
1	f1,f1,f1	10,10,10	21.4%	98.5%	21.2%	98.4%	27
2	Ent,Ent,Ent	10,10,10	23.4%	97.9%	23.3%	97.8%	30
3	Pre,f1,f1	10,10,10	22.5%	97.8%	22.3%	97.7%	22
4	Pre,Ent,Ent	10,10,10	24.0%	97.2%	23.9%	97.2%	22
5	rec,ent,ent	10,10,10	22.0%	98.5%	21.8%	98.4%	30
6	rec,f1,f1	10,10,10	20.9%	98.9%	20.8%	98.8%	30
7	rec,rec,ent	10,10,10	21.0%	98.8%	20.8%	98.7%	30
8	Rec,--,--	30,--,--	20.5%	99.0%	20.4%	98.9%	30
9	ent,--,--	30,--,--	35.4%	83.1%	35.0%	82.8%	14
10	f1,--,--	30,--,--	36.1%	81.2%	35.8%	81.1%	8
11	lift,--,--	30,--,--	43.1%	83.6%	42.9%	83.5%	11
12	lift,rec,rec	20,10,10	20.9%	98.9%	20.7%	98.8%	31
13	lift,lift,lift	20,10,10	28.1%	93.1%	28.0%	93.0%	31
14	lift,ent,rec	20,10,10	20.9%	98.9%	20.7%	98.8%	31

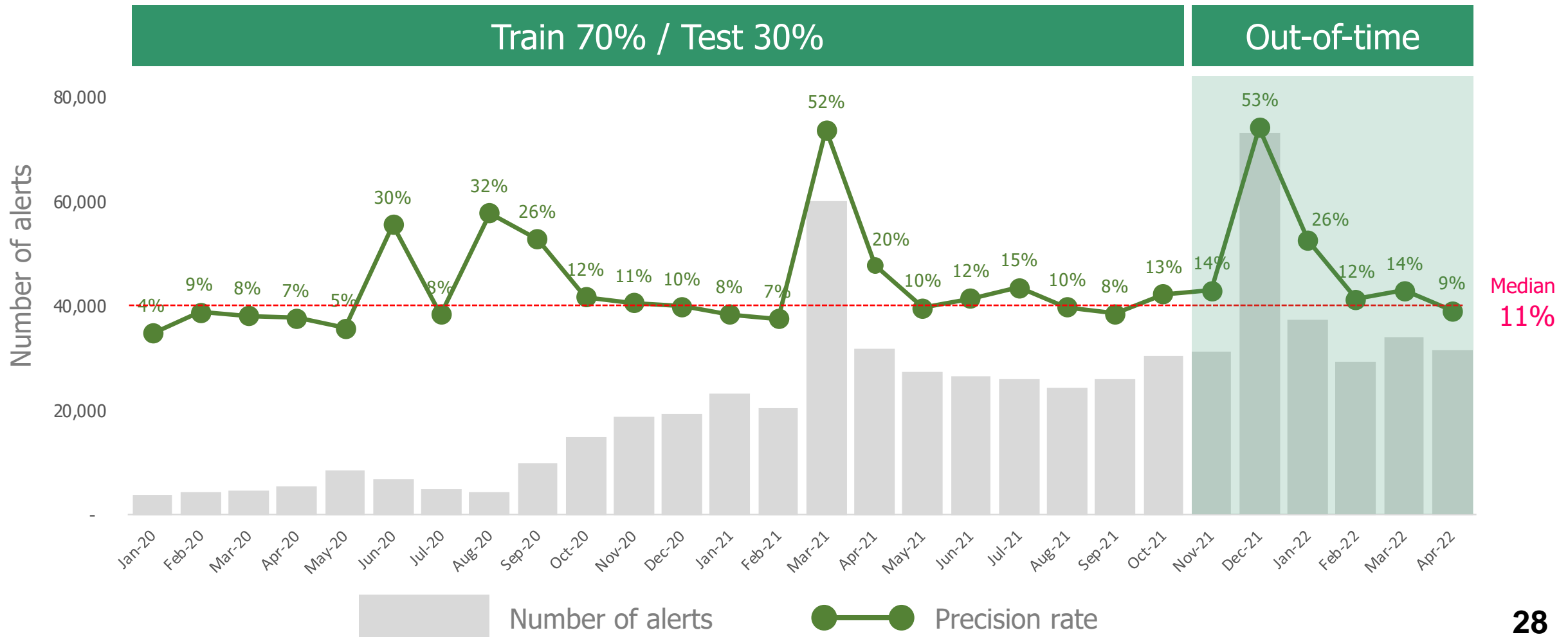
Note: (Metrics)
f1: F1-Score
Pre: Precision rate
Rec: Recall rate
Ent: Entropy

Appendix 4

Precision Rate by month (Excluding "VRM","OAFM","NOTI" rules)



แบ่งช่วงของข้อมูลสำหรับสร้างและทดสอบแบบจำลองทั้งช่วงเวลาเดียวกันและช่วงเวลาต่างกัน



Appendix 5

Precision Rate by month (Excluding "VRM","OAFM","NOTI" & Credit master rules)



แบ่งช่วงของข้อมูลสำหรับสร้างและทดสอบแบบจำลองทั้งช่วงเวลาเดียวกันและช่วงเวลาต่างกัน

