

2016



工业互联网产业联盟
Alliance of Industrial Internet

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Ecode

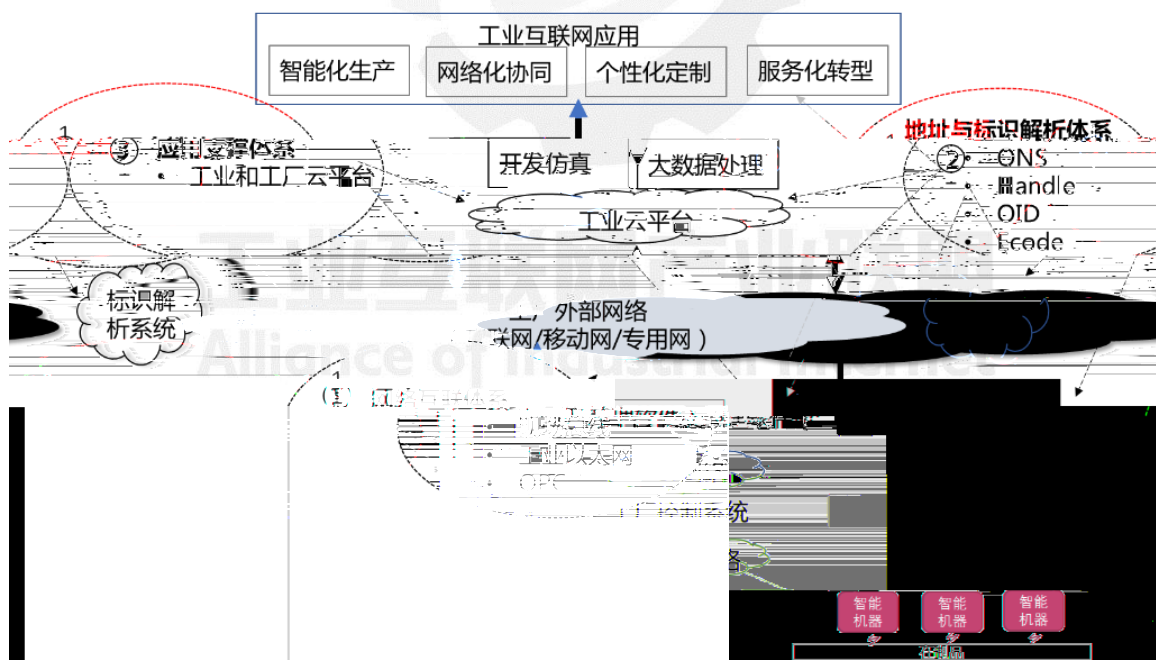
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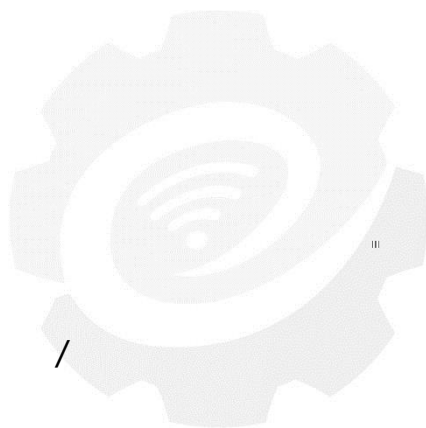
1

工业互联网整体网络体系目标框架



IT

OT



TI

OT

/

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PatentStrategies

2016

1

PROFINET Ethernet/IP

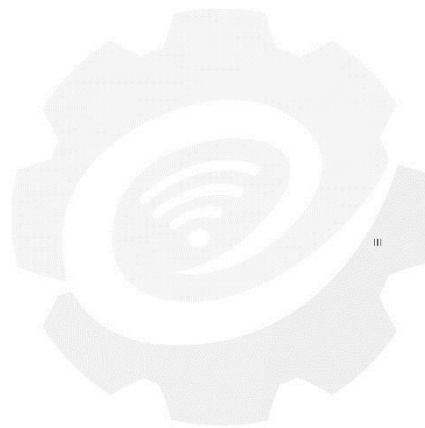
OPC/OPCUA

Handle

ONS

ONS Handle

OID Ecode



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1.

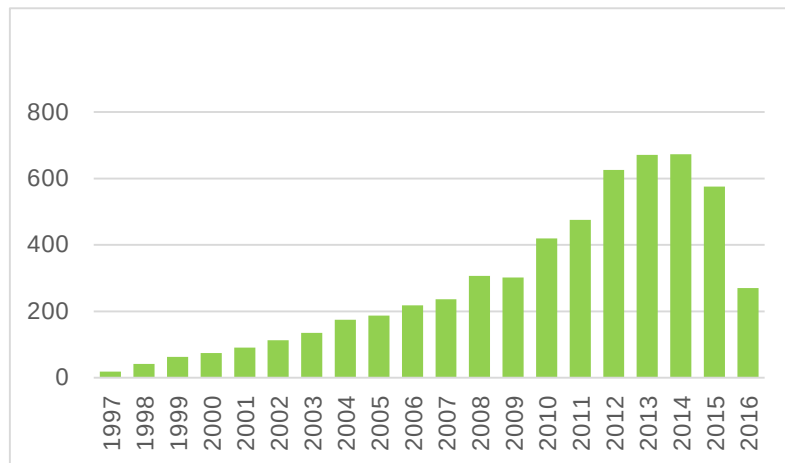
1.1

5671

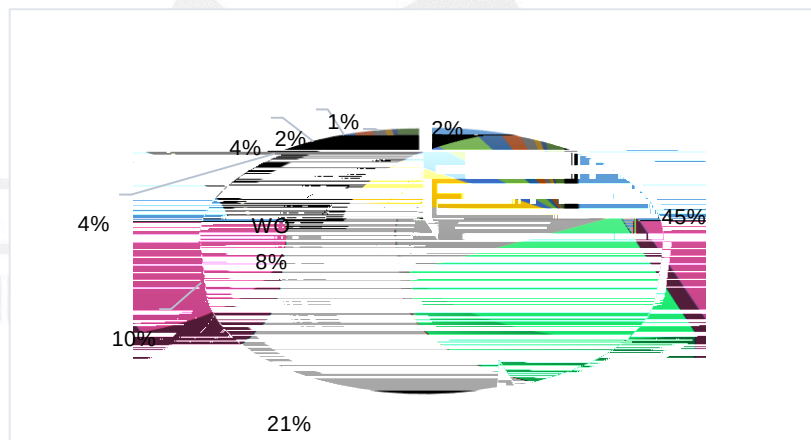
1997

2010

600



1.2



45%

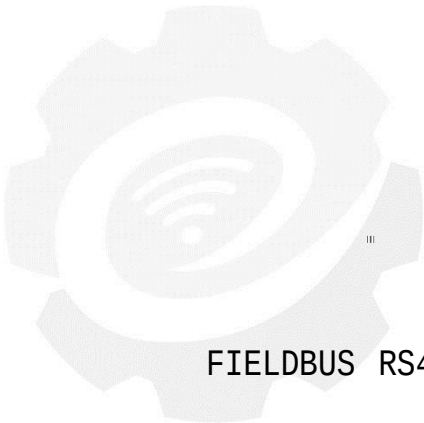
21%

1.3 Siemens ABB ROCKWELL GE

Siemens PROFIBUS
PROFINET ROCKWELL Devicenet Ethernet/Ip Siemens
ROCKWELL

ROCKWELL GE BOSCH ABB

1.4



FIELDBUS RS485 RS232 Can

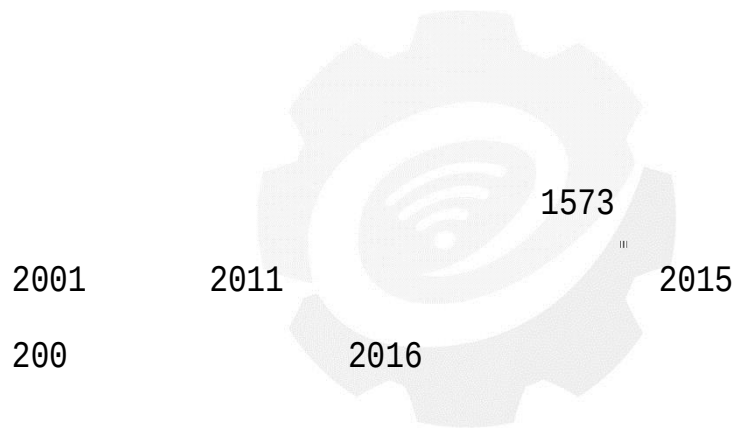
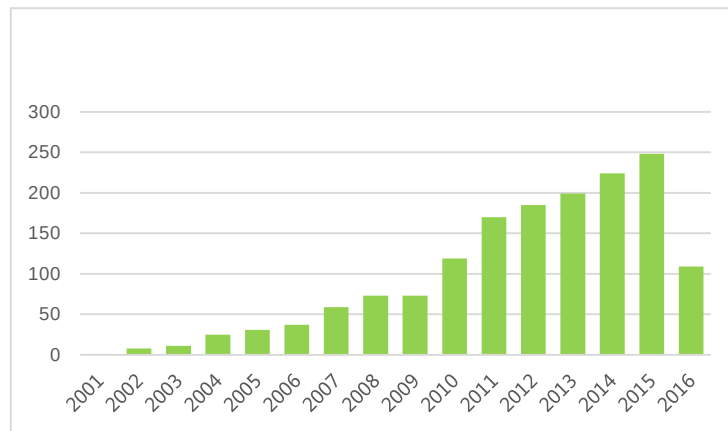
RS422

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2.

2.1

PROFINET

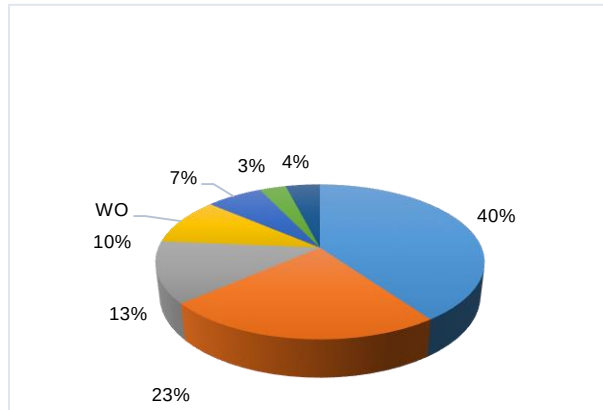


2.2

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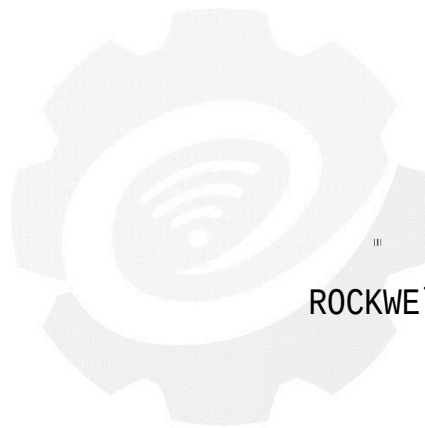
40%

23%



2.3

Siemens



ROCKWELL ABB BOSCH PHOENIX

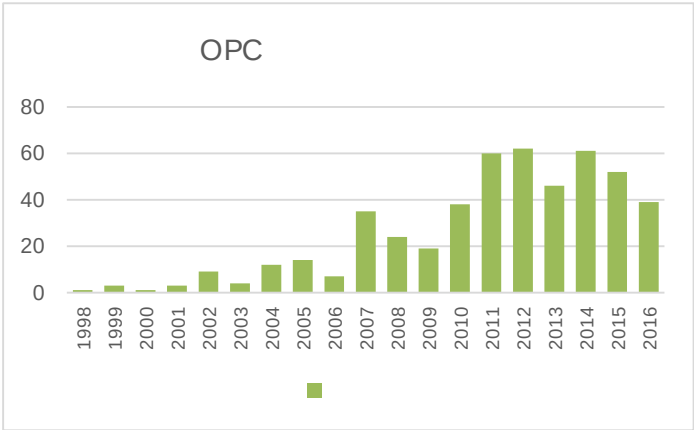
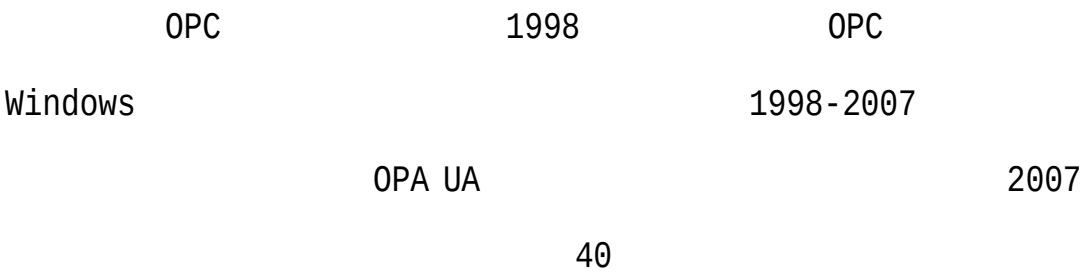
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2.4

	FIELDNET	Modbus-RTPS	FF	HSE
Ethernet	powerlink	TCnet	sercos3	

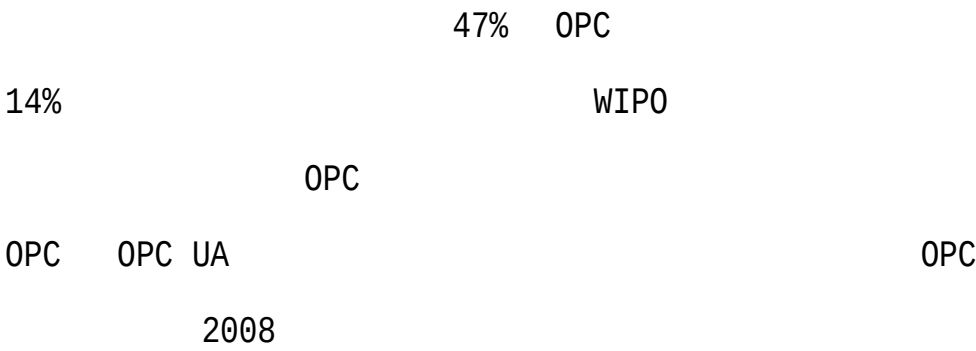
3.OPC/OPC UA

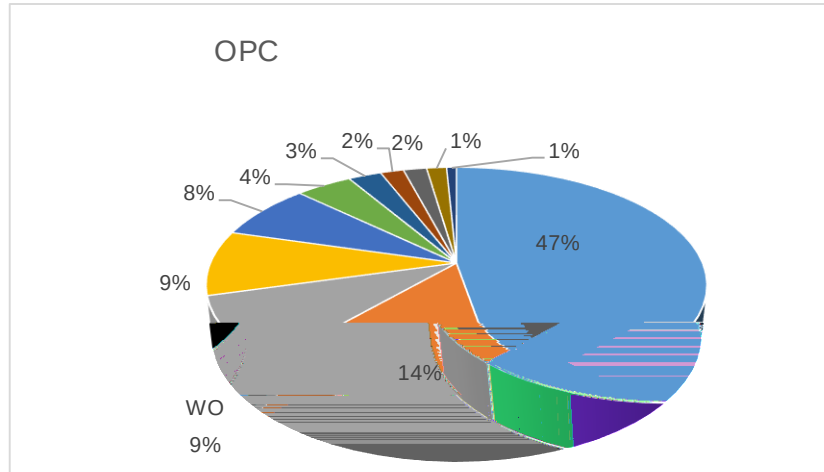
3.1 OPC/OPC UA 2012



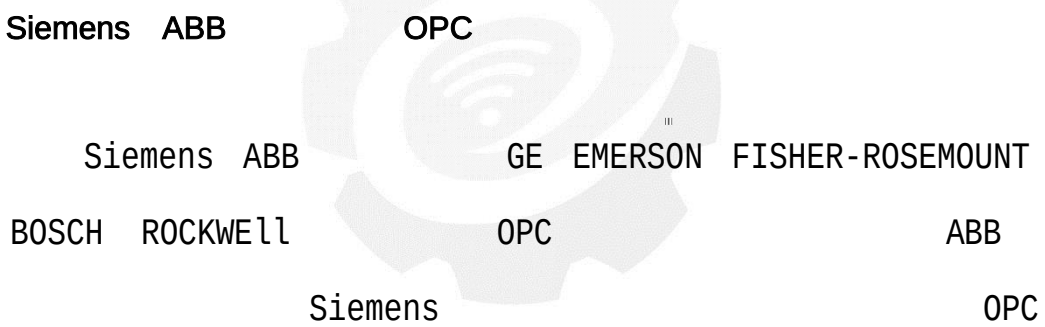
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3.2 OPC





3.3 Siemens ABB



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Siemens ABB

3.4 OPC UA

PLC

2008

OPC

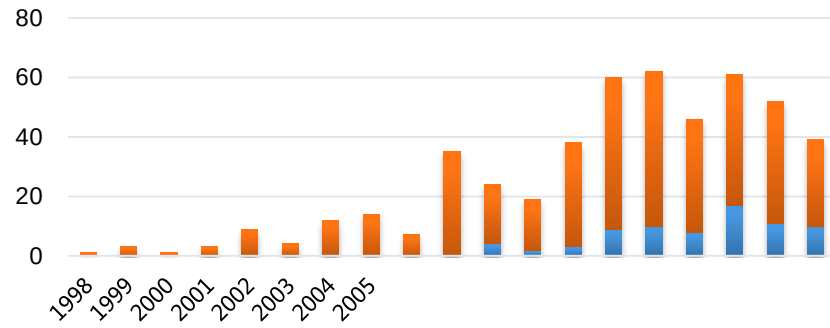
UA

OPC Classic

OPC

30%

OPC UA



OPC UA

2008

ABB

OPC UA

OPC

OPC UA

Siemens

ABB

工业互联网产业联盟
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3.5 OPC UA

OPC UA

OPC UA

OPC UA

OPC UA

1.0NS

1.1 ONS

ONS DNS ONS

532 257 2005
工业互联网产业联盟
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ONS

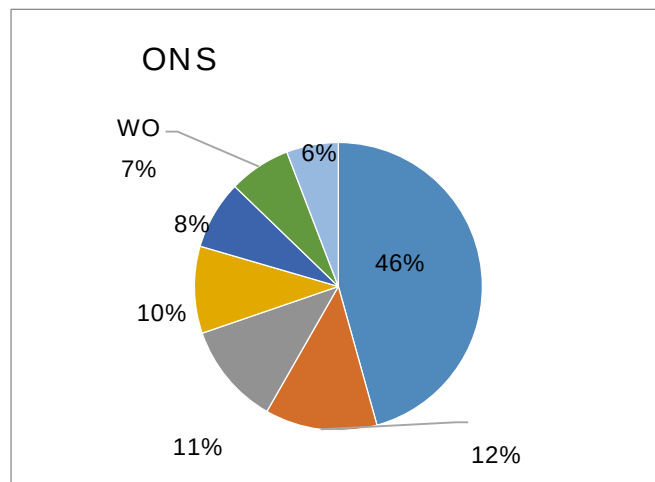
2012

2013

1.2

ONS

ONS



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GE
(IIC)

1.3 ONS

Cisco

ONS

80

IBM

ONS

70

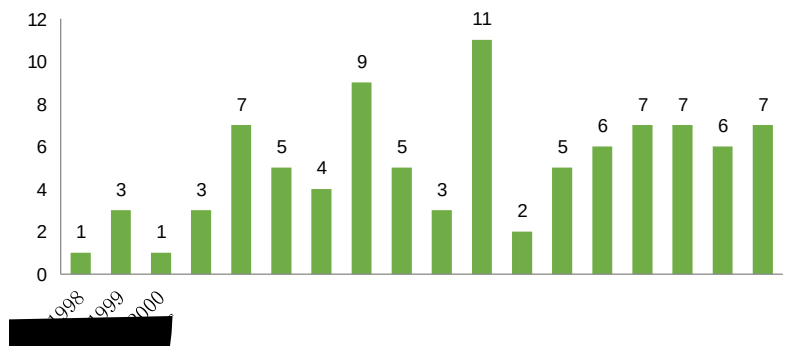
ONS

1.4 ONS

ONS

2.Handle

2.1 Handle



Handle

170

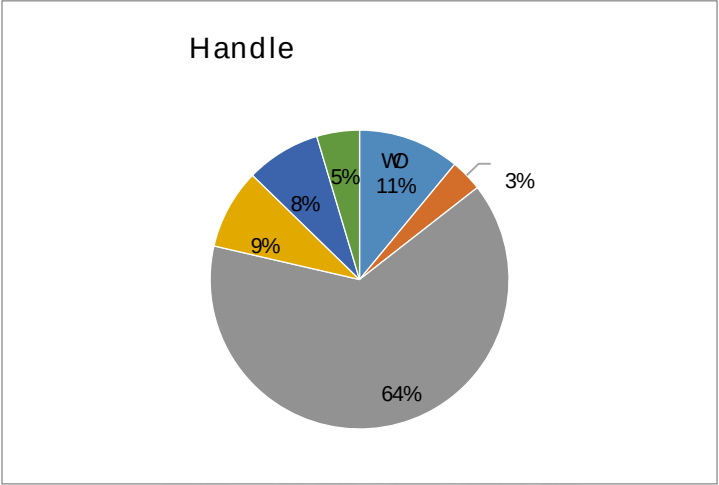
90

1998

2008

2.2 Handle

Handle
Handle



2.3 Handle

CNRI CORPORATION FOR NATIONAL
RESEARCH INITIATIVES Handle Robert Kahn
Handle 17 Handle

Handle
IT IBM Microsoft AMERICAN EXPRESS
TRAVEL RELATE
IBM

CONTENT DIRECTIONS

AMERICAN EXPRESS TRAVEL RELATE

2.4 Handle

Handle

3.OID

3.1 OID

Object identifier, OID

ISO/IEC ITU

OID

2016 5 , OID

954393

OID

RFID 3GPP

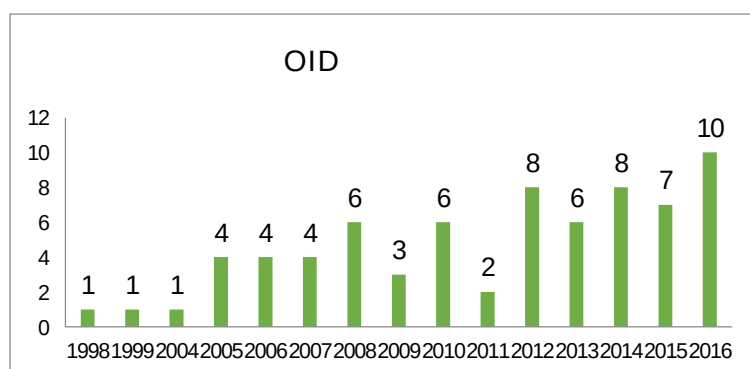
OID

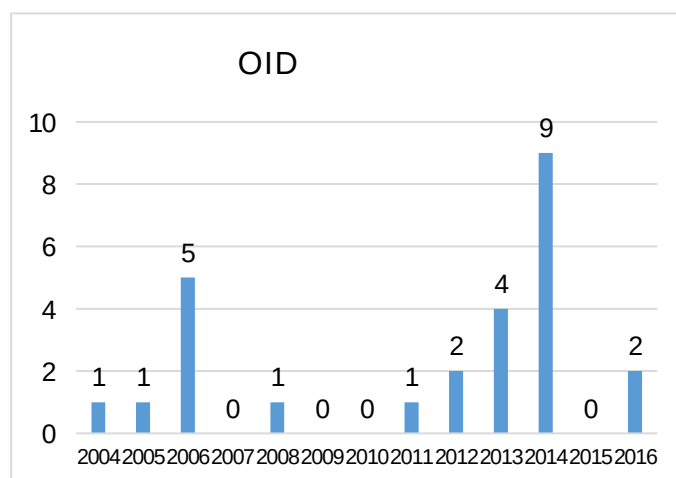
130

56

OID

1998





2015

ITU-T

“OID”

”

OID

26

24

OID

2004

OID

OID

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3.2 OID

OID

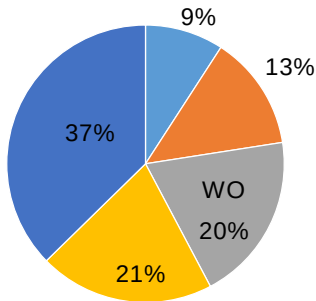
ISO ISO-ITU

(JOINT-ISO-ITU-T) ITU-T

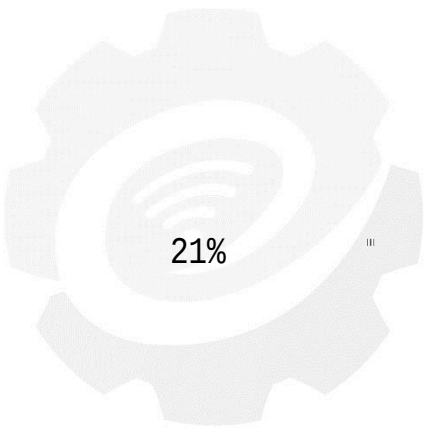
ISO ISO-ITU

OID

OID



OID



37%

3.3 OID

OID 工业互联网产业联盟 Alliance of Industrial Internet

ETRI

14

ULTRATA

12

IBM

10

OID



3.4 OID

RFID

OID

RFID

OID

4.Ecode

4.1 Ecode

2013

Ecode

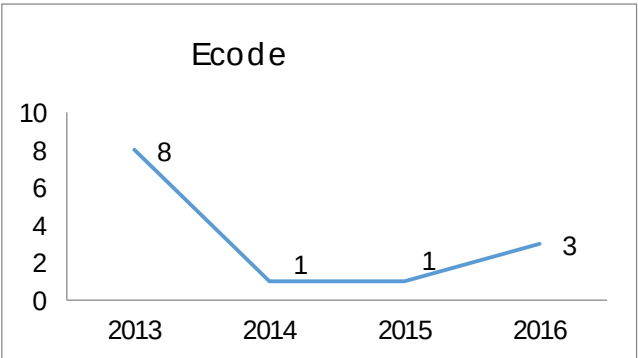
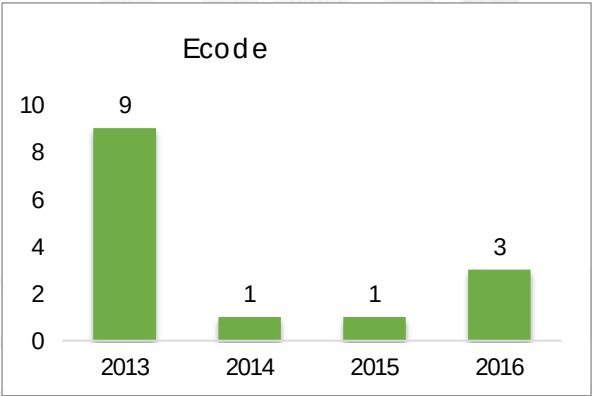
Ecode

22

14

Ecode

2013



Ecode

20

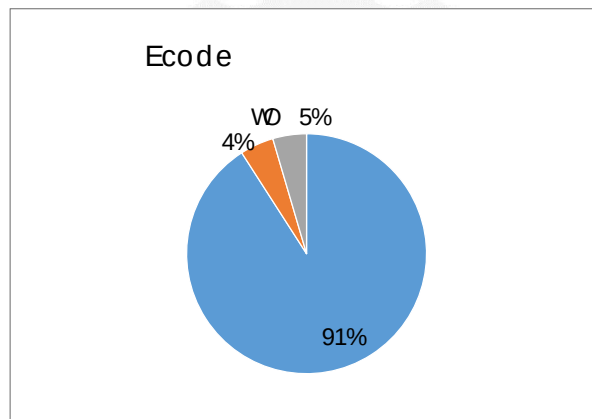
13

Ecode

4.2. Ecode

Ecode

Ecode



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4.3. Ecode

Ecode

10

Ecode

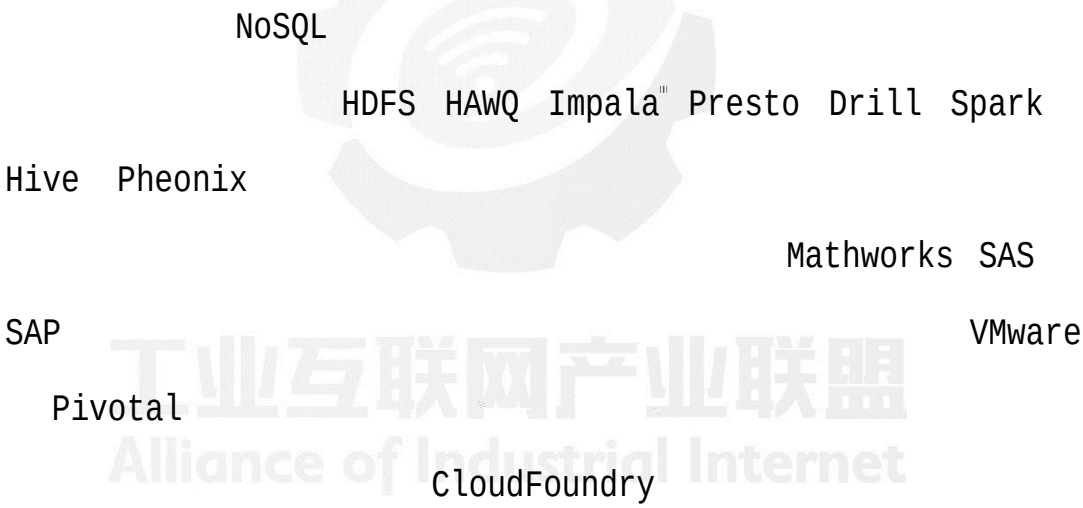
7 Ecode

Ecode

2 Ecode

4.4 Ecode

Ecode

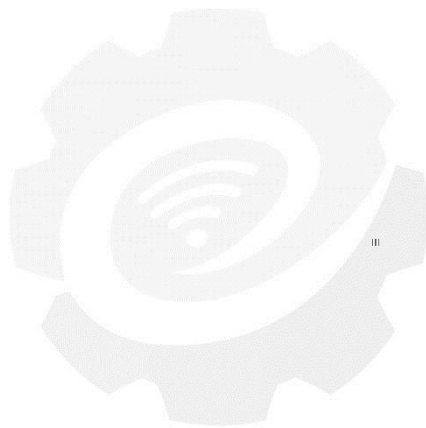


1.

1.1 NoSQL

NoSQL

NoSQL



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1.3

IT

IBM Microsoft NoSQL

NoSQL

7

NoSQL

IT

1.4

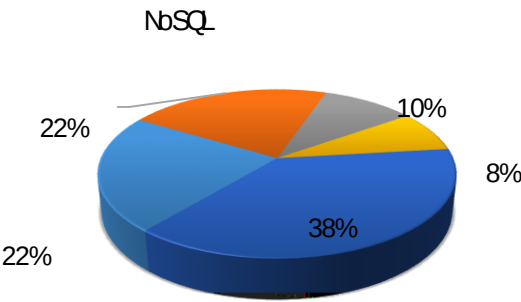


a.

NoSQL SQL JSON

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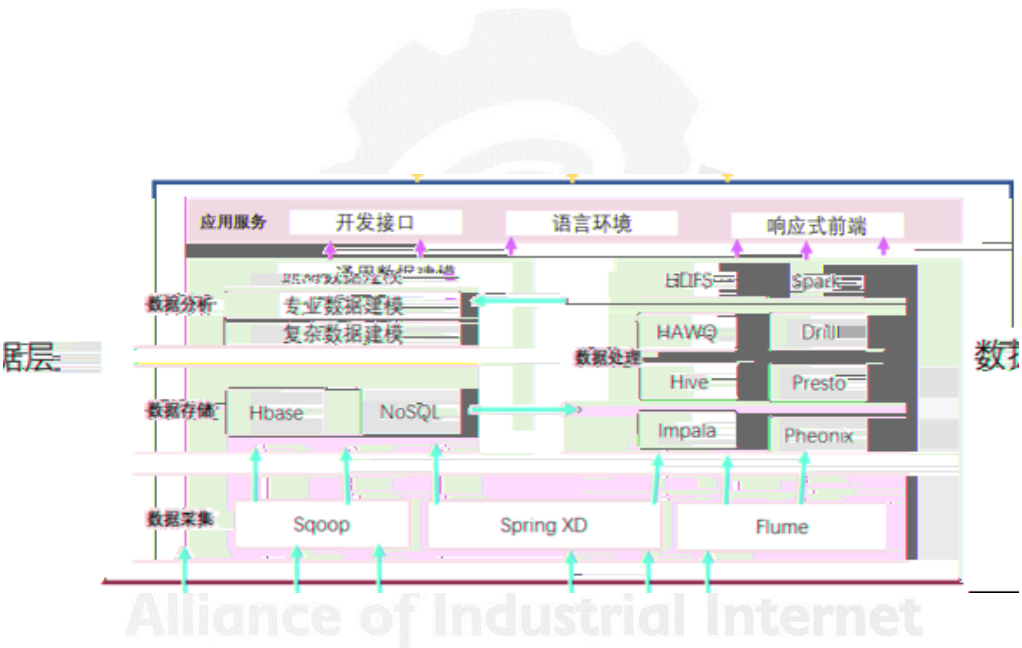
b.



Apache2.0/GPLV3

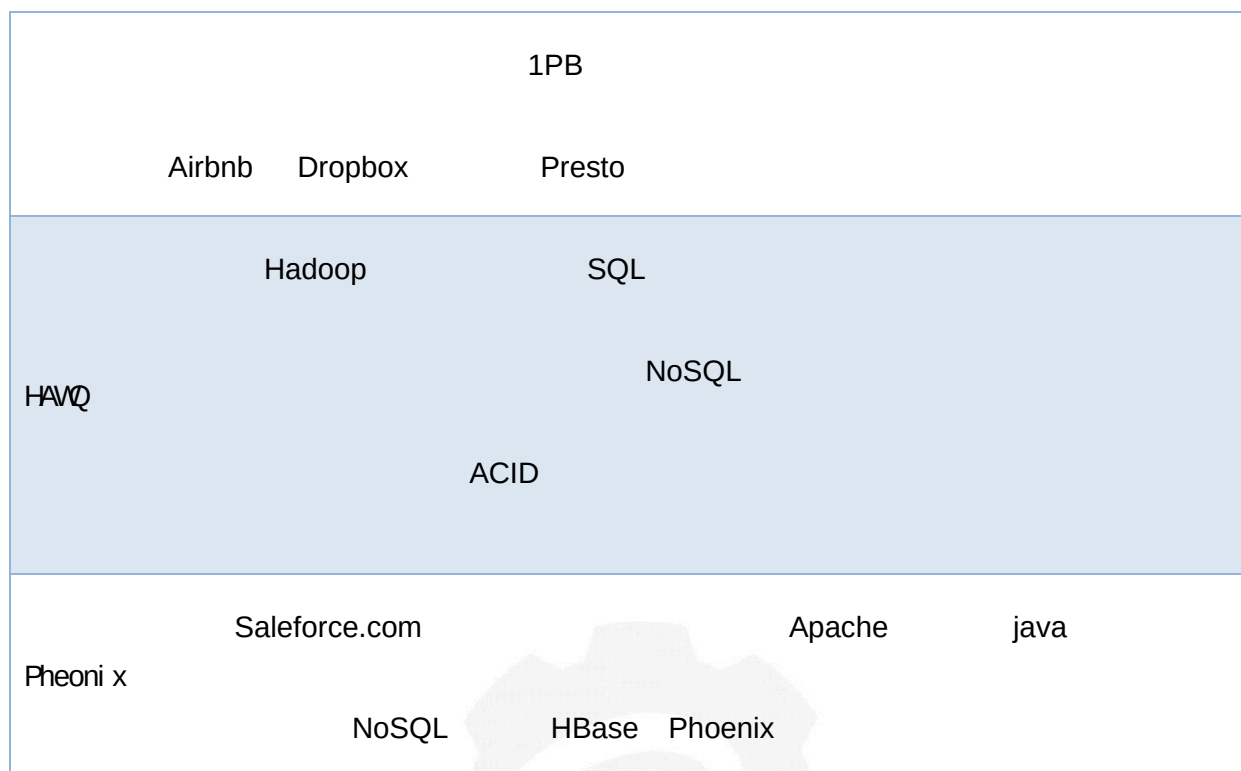
2.

2.1



HDFS	Hadoop Distributed File System	Java	Hadoop
	Hadoop		

	Hadoop				SQL Structured Query Language		
Hive							MapReduce
			MapReduce				
	PB						Apache
Spark	Amazon	eBay	Yahoo	Spark			Scala
	Java	Python	API	Hadoop			
	Cloudera				SQL		
Impala	Hadoop	HDFS	HBase	PB			Hive
	SQL	Hive		MapReduce			
					Impala		
					ANSI SQL		
Drill	HDFS		HBase	MongoDB	Parquet		JSON
	CSV	TSV	PSV	Google	Dremel	Drill	
	PB						
Presto	Facebook	2012	SQL		2013		
			GB	PB	Presto		



2.2

2.2.1 HDFS Hive Spark

2009 工业互联网产业联盟
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4000

2629

HDFS Hive Spark

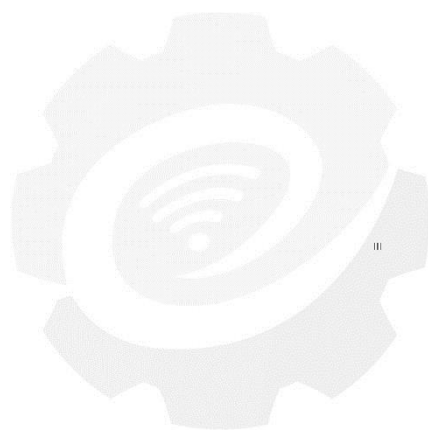
Imala

Drill

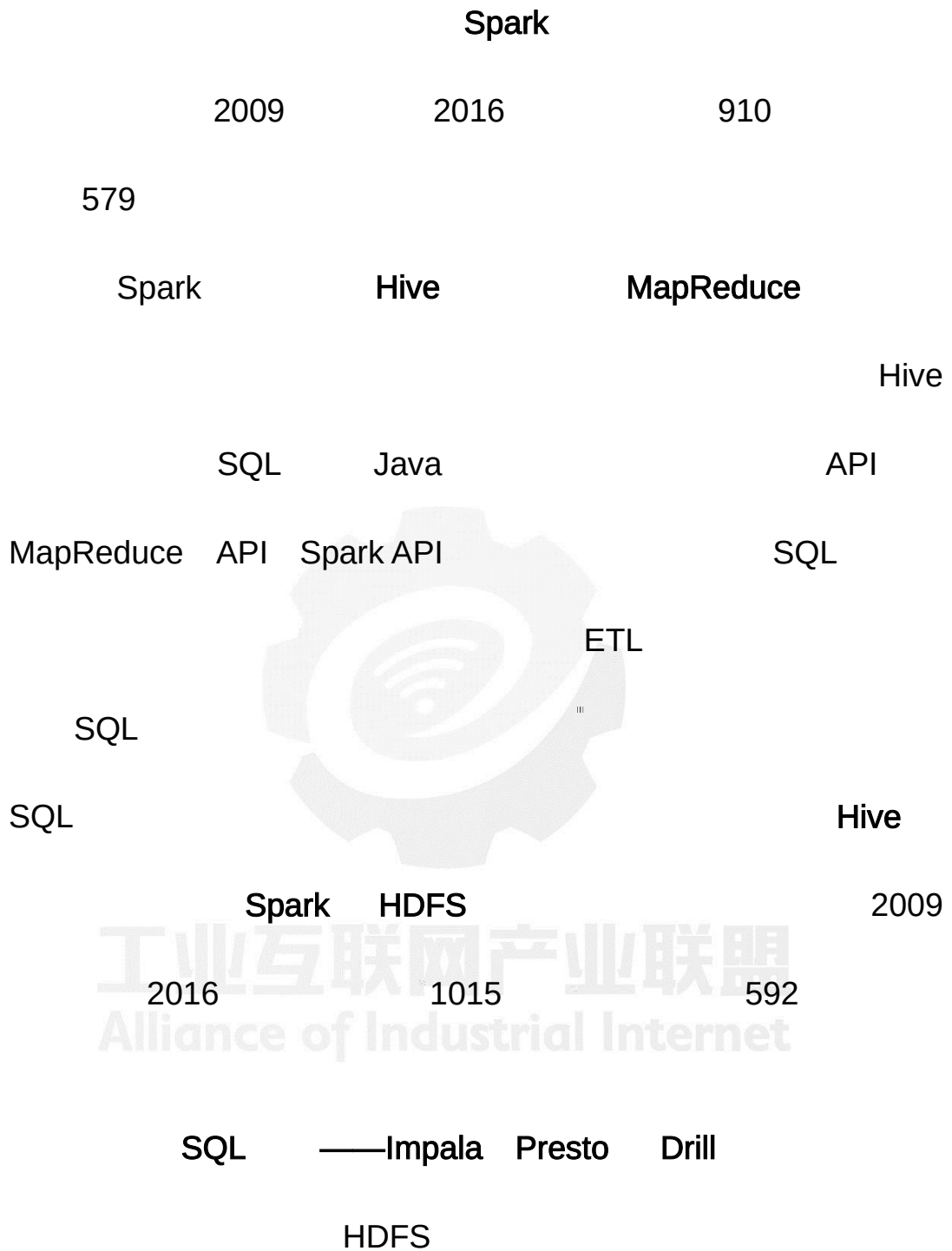
Presto HAWQ Pheonix

HDFS Hive Spark

Yp



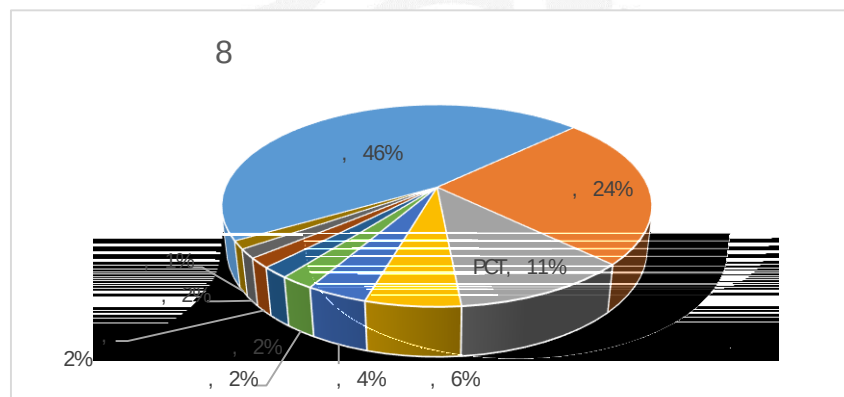
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HAWQ

2.2.2

24%



2.2.3 IBM FACEBOOK

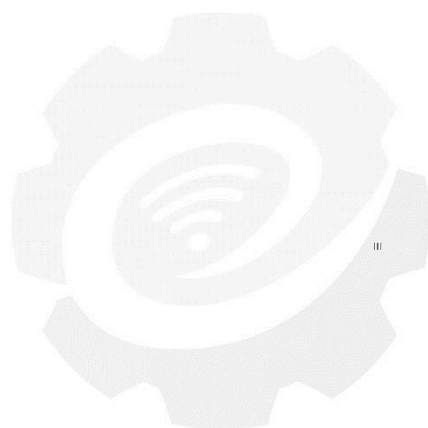
HDFS Hive Spark Imala Drill Presto HAWQ

Pheonix

20

IBM Facebook Cloudera Yahoo

AMAZON



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- **Hive**

Hive

Hadoop



- **Spark**

Spark

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Spark

- **Imala**

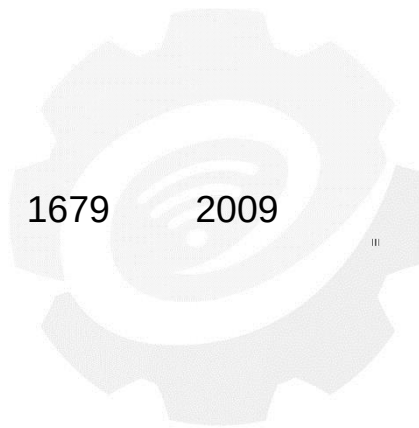
- Pheonix

Pheonix

3.

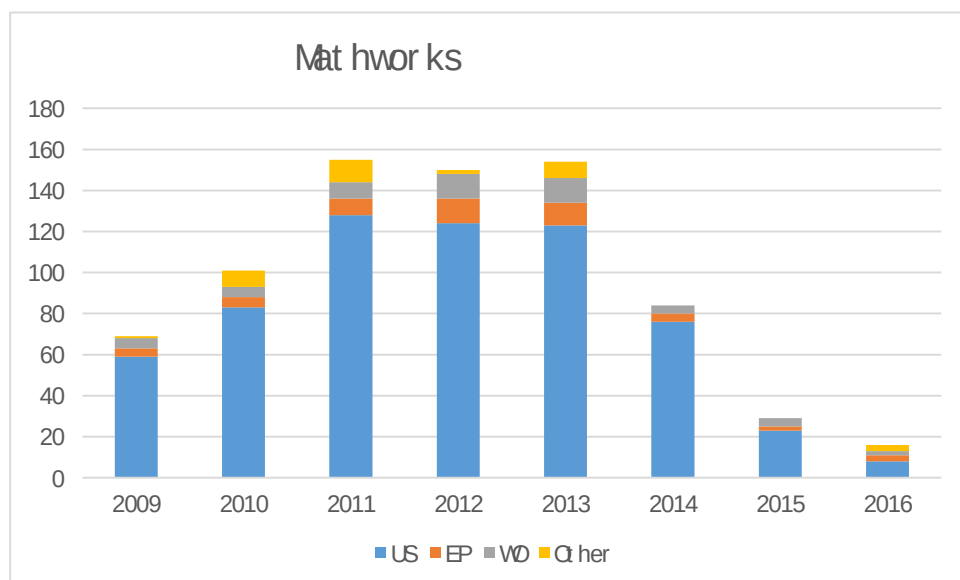
3.1 Mathworks

Mathworks



2011

2013



Mathworks

Mathworks

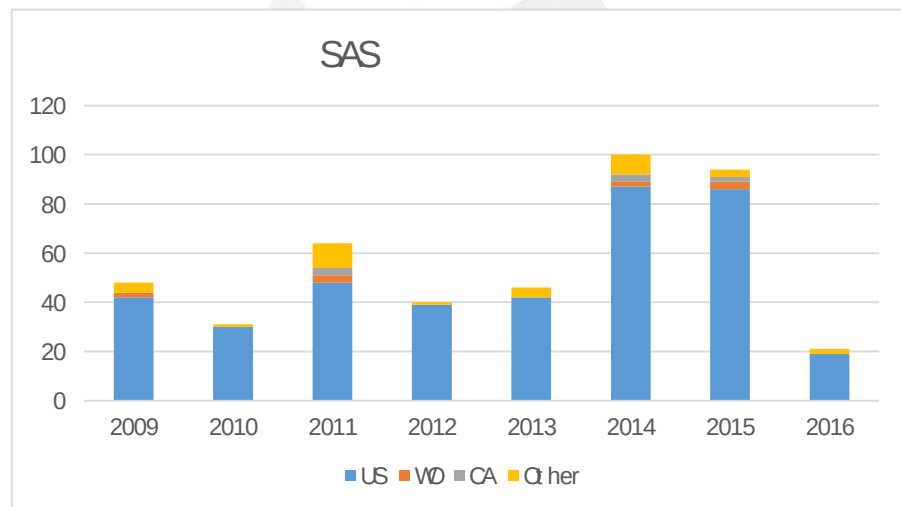
3.2 SAS

SAS

SAS INSTITUTE INC

1976 SAS

SAS



SAP

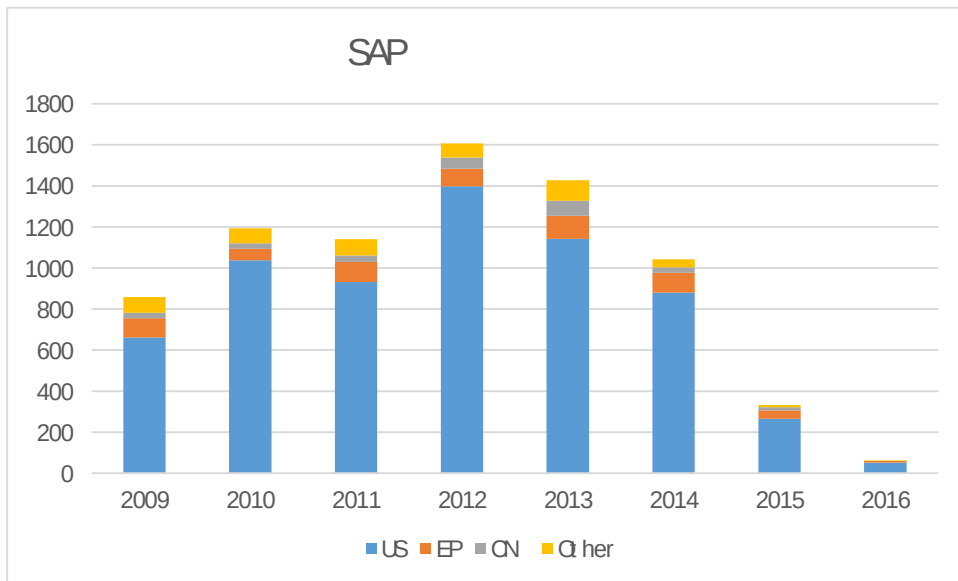
SAS INSTITUTE INC

694

2009



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SAP

SAP

工业互联网产业联盟
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4.

4.1 Pivotal software

Cloud Foundry

GreenPlum

Pivotal software

Pivotal

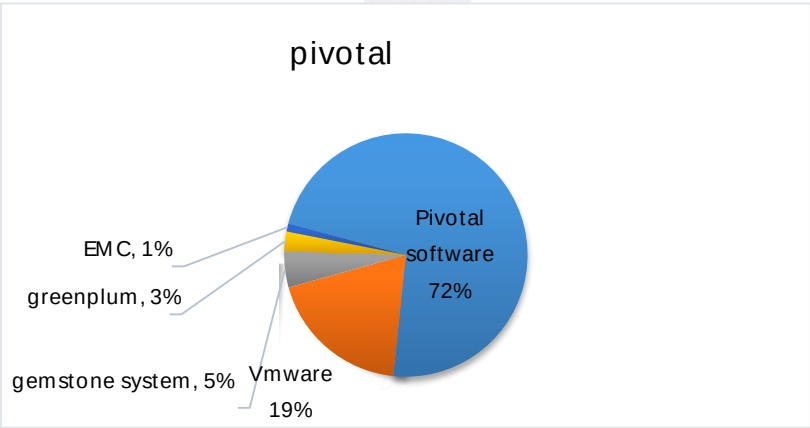
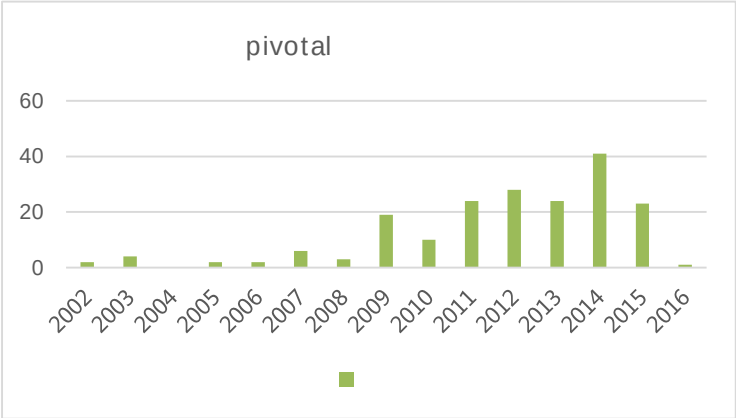
Pivotal One

Pivotal

Pivotal

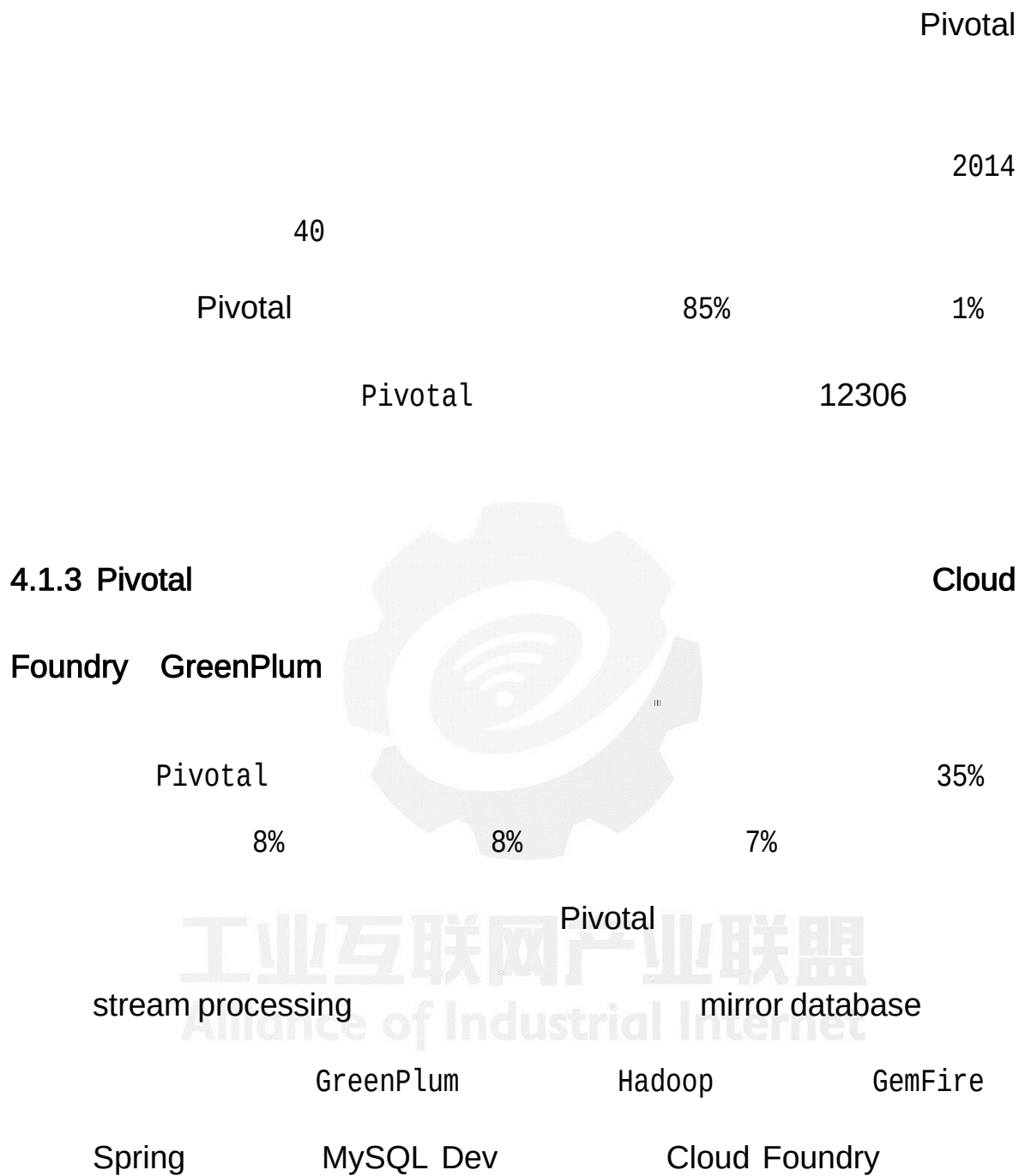
4.1.1 Pivotal

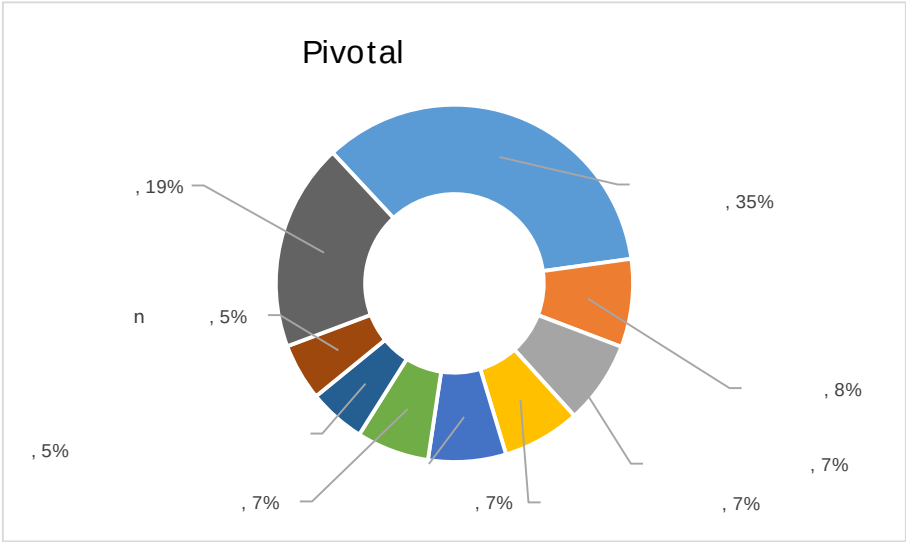
VMware EMC



Pivotal 189 2013

EMC VMware 2013 Pivotal





4.2 VMware

VMware

PaaS

Cloud Foundry1.0

4.2.1 VMware

VMware

1032

2001

VMware

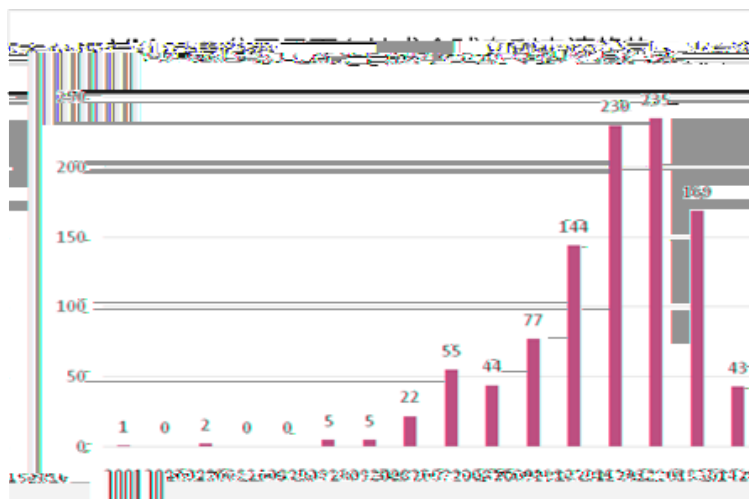
2008

VMware

2014

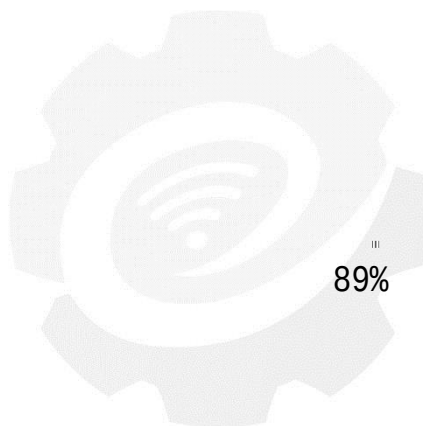
235

VMware



4.2.2 VMware

VMware



89%

VMware

VMware



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