Dynamic Data Masking

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ID	PersonName	EmailAddress	CreditCardNumber	SocialSecurityNumber
1	Anoop Kumar	abcdefgh@hotmail.com	1234-5678-4321-8765	123-45-6789
1	Rahul Gupta	amitguptaabcdefg@hotmail.com	8765-1234-5678-4321	231-45-6787
1	Amit Goel	amitgoelabcdefgh@hotmail.com	4321-1234-5678-4321	321-45-6700

ID	PersonName	EmailAddress	CreditCardNumber	SocialSecurityNumber
9590	AXXXr	aXXX@XXXX.com	xxxx-xxxx-xxxx-8765	xxxx
7604	RXXXa	aXXX@XXXX.com	xxxx-xxxx-xxxx-4321	xxxx
8453	AXXXl	aXXX@XXXX.com	xxxx-xxxx-xxxx-4321	xxxx

Random Number function – generates random number based on selected boundaries and actual data type.
Can be applied only numbers, not string

Email function – Exposes the first letter and replace the domain with xxx.com

Custom String function – You can define the exposed prefix, the padding string and exposed suffix

Credit Card function - Only the last four digits of Credit card are shown

Default function – Full masking of data.
For numeric – 0
For String – XXXX characters

Dynamic Data Masking

- **Limit the exposure of sensitive data to non-privileged users**
  - You can decide the level of exposure of data
- **No change in physical layer**
  - Data in the database is not changed
  - Not the same as data encryption
- **No additional development effort needed at application level**
- **Security: Should not be used as a primary security layer**
  - Dynamic Data Masking should not be used as an isolated measure to fully secure sensitive data
  - ad-hoc query permissions can apply techniques to gain access to the actual data.
- **Other considerations**
  - Masked columns can be updated if user has permission
  - Export masked from source data results in masked data in target table

Dynamic Data Masking

- **How to Enable DDM?**
  - Portal
  - Powershell
    - Get-AzSqlDatabaseDataMaskingRule
    - New-AzSqlDatabaseDataMaskingRule
    - Remove-AzSqlDatabaseDataMaskingRule
    - Set-AzSqlDatabaseDataMaskingRule
  - Rest API


Encryption
Of data at rest, motion or use

1

Data at Rest

Inactive data that is not currently being transmitted across a network

2

Data in motion

Data that is currently travelling across a network

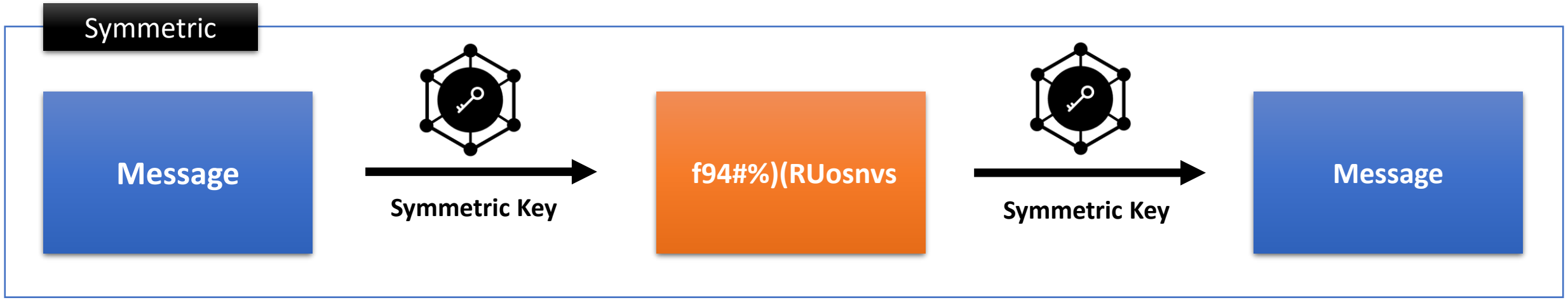
3

Data in Use

Data currently in the process of being generated, updated, appended or erased

Types of Encryption

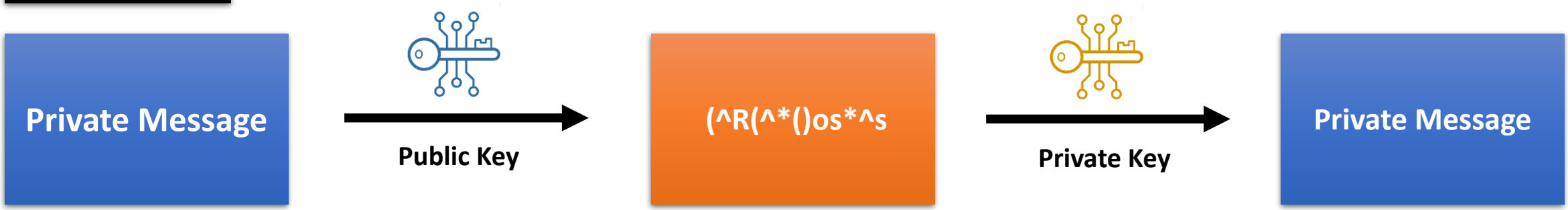
Symmetric



- Highly performant
- Secure key handling is difficult

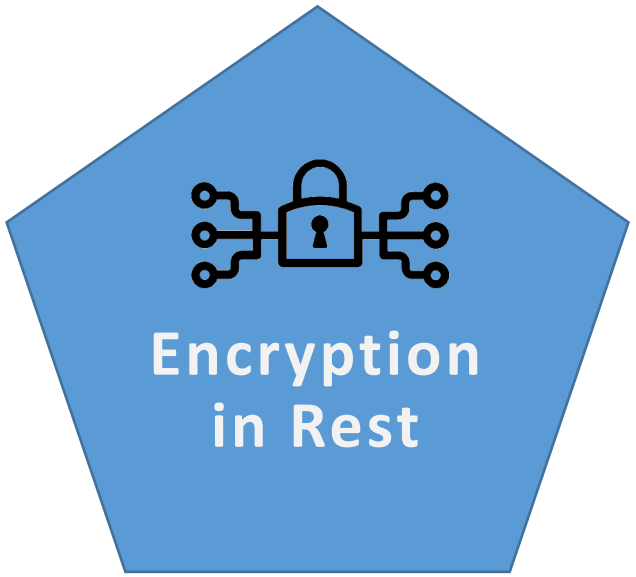
Types of Encryption

Asymmetric



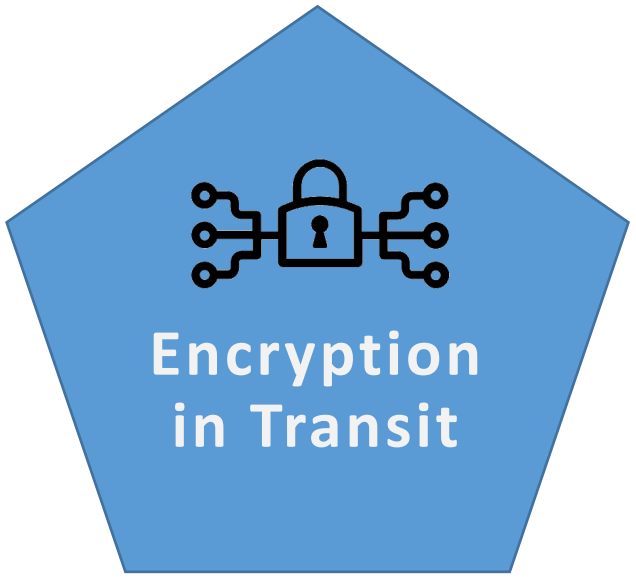
- Set of keys (Public and Private) where one is use to encrypt and other to decrypt
- Computationally more expensive, but solves the key handling problem

Encryption in Rest



- By default all storage services encrypted data at rest
- 256-bit AES encryption
- Keys are stored in Azure Key Vault

Encryption in transit



- Any communication over the internet to Azure services is typically encrypted via SSL/TLS protocols
- Utilize site-to-site VPN or point-to-site VPN connections
- Or utilize ExpressRoute
- ExpressRoute communication is a private connection and not encrypted but workloads can be encrypted via SSL/TLS
- Storage services can be configured to require secure transfer

Types of Encryption

Deterministic encryption:

- This will always generate the same encrypted value for any plain text value.
- You can perform point lookups, equality joins, grouping and indexing on encrypted columns.

Randomized encryption:

- This is more secure than deterministic encryption because the encrypted value is generated in a less predictable manner.
- But you can’t perform searching, grouping, indexing or joins on encrypted columns.

Types of Encryption

Column Encryption Key (CEK)

- Used to encrypt values in specific columns
- Encrypted versions of each CEK is stored in the database.

Column Master Key (CMK)

- Used to encrypt all the CEKs
- Must be stored externally in a secure key store
- Key store providers: Azure key vault, certificate store, HSM