



Cloud Security in a box!

**Your Digital Sovereignty
with fragmentiX Storage Appliances**

November 2018

Why QSSS?

How does it work?

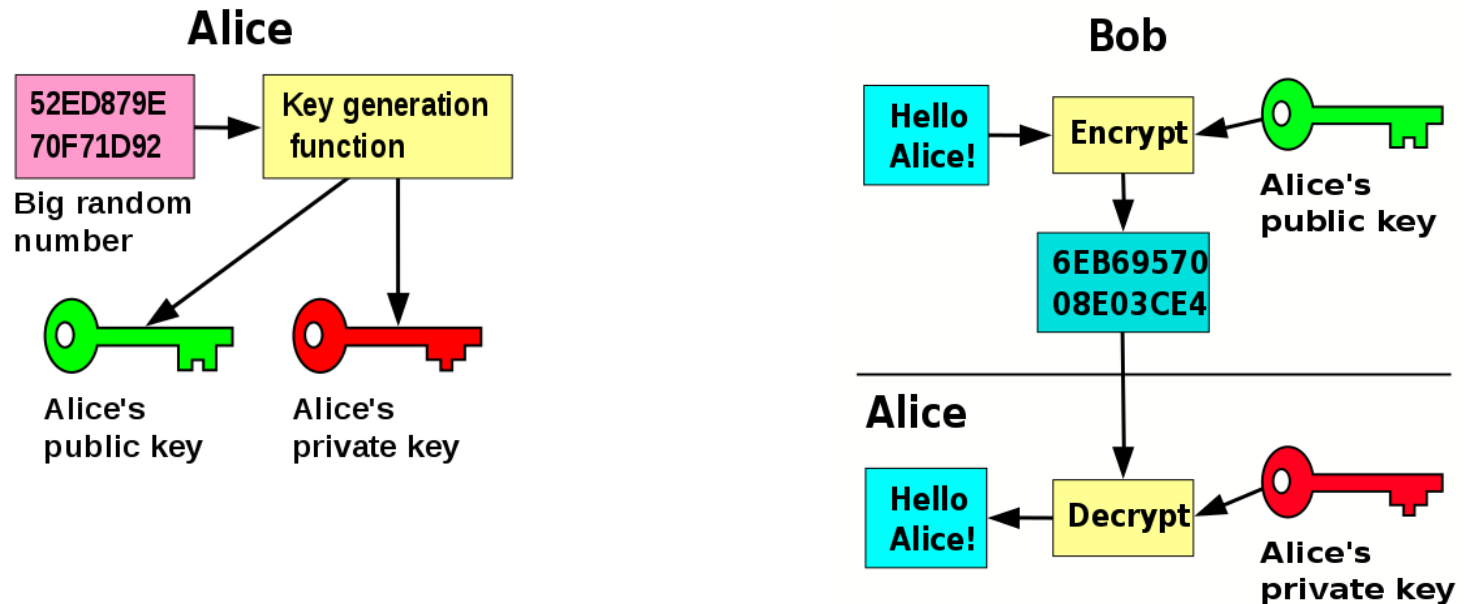
Who is affected?

Digital Sovereignty?

Is there a solution?

Why ?

The essential security measures against theft and espionage in networks and data carriers today mostly depend on encryption using mathematical methods:



Why ?

- Simplified it can be said that most asynchronous encryptions work with $M = p * q$.
- M is the product of two large prime numbers $p * q$
- To calculate p and q with "brute force" potential thieves/spies simply won't do due lack of time.
- Cracking with conventional computers - even supercomputers - takes very, very long without backdoors that were previously deliberately installed... many years!

That's 21 zeros and years!

PC status today **28.000.000.000.000.000.000.000 Jahre**

Why ?

- The quantum computers already available worldwide for governments and corporations need - as soon as they get even more "qubits" - for cracking asymmetric encryptions, which we now consider "SAFE":

- **Quantum computers** very soon

100 sec

That's two zeros and seconds!

Why ?

Also last month, China announced that it would build the **world's biggest quantum research facility**, a \$10 billion center in Hefei, capital of Anhui province, with the aim of building a working quantum computer that could break most any encryption within seconds.

China already has the world's fastest supercomputer, the **Sunway TaihuLight**, which captured the title in the 2016 and 2017 at a competition in Frankfurt, Germany.

Monroe, the Maryland physicist, said China had set a goal of fully constructing the quantum research center within two years.

“If it costs \$10 billion, China will just do it without asking, and they’ll put an army together to do it,” Monroe said. “I don’t think any other government in the world is able to throw together something (so) fast.”

Google, IBM and Microsoft all see huge opportunity in quantum computing and fund research labs. Commercial applications may include determining how polymers go together, mapping the genome, finding oil in complex geology, detecting cancer and handling air traffic.

From <http://www.mcclatchydc.com/news/nation-world/national/national-security/article179971861.html>

Why ?

What does that mean to me?

- Soon it will no longer be sufficient to "just" encrypt data!
- Any solely encrypted file that is stolen today or "recorded" during transport can very soon be read and used by a thief or spy.

Why?

Digital sovereignty - one opinion:

- Every person and every country for itself has the right to digital sovereignty - the sole sovereignty over its own data - and thus its own knowledge.
- Not only national and foreign state institutions will be able to read and possibly also misuse virtually all digital data in the future - criminal actors worldwide will also be even more capable of cracking and using all desired data for their own purposes.

Why?

Digital sovereignty - a contribution:

- fragmentiX has been designed and developed as a means of self-defense and digital sovereignty.
- By using fragmentiX, essential requirements of the GDPR can be met and thus always existing risk can be reduced.

Who is behind it?

- Through intensive cooperation between AIT and a team of ProCom-Strasser GmbH, a market-ready product was developed.
- In July 2018 fragmentiX Storage Solutions GmbH was founded.

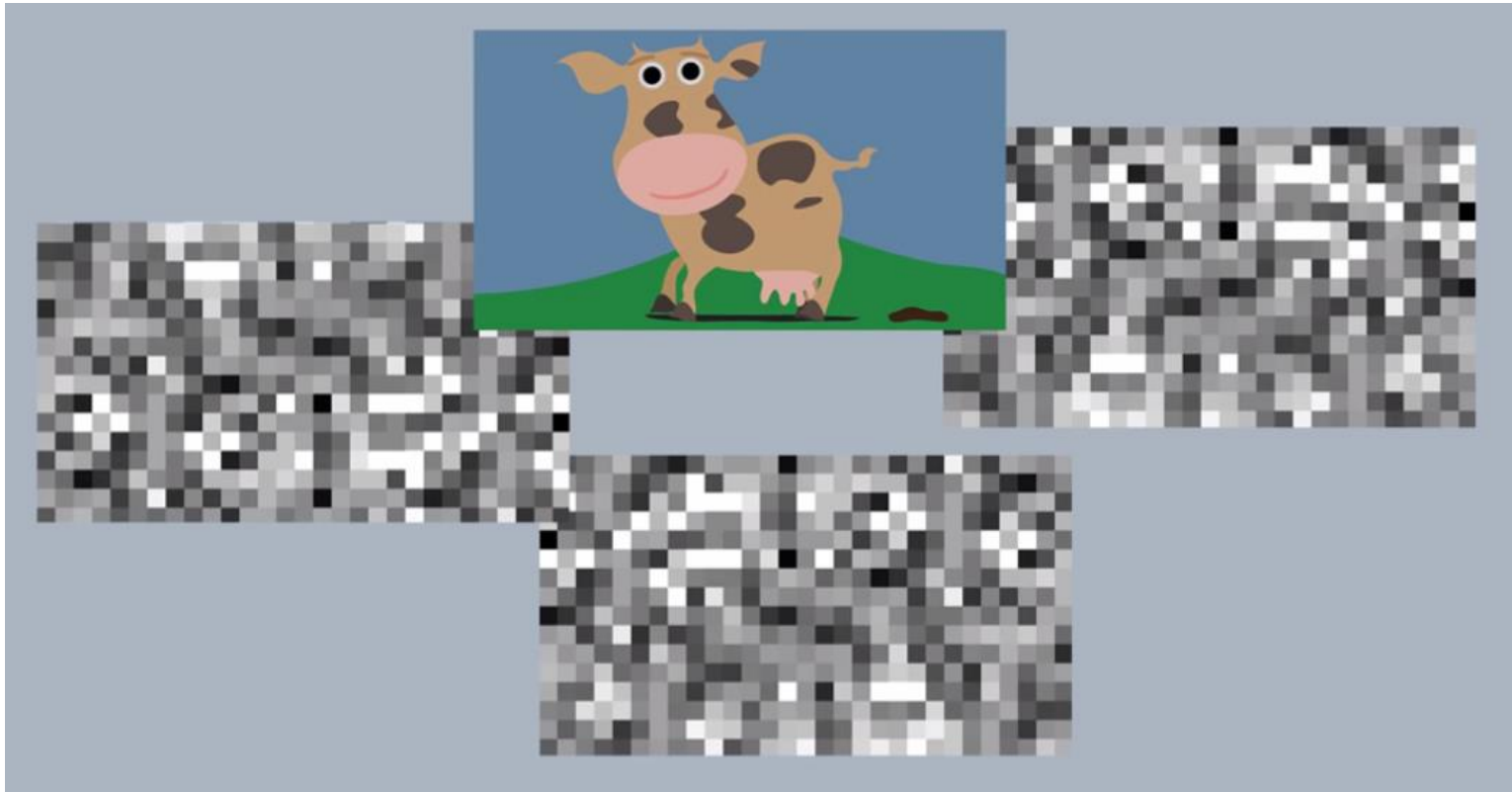
How does that work?

An example:



This image should be protected:

How ?



IT IS DIVIDED INTO 3 FRAGMENTS

How ?



**NONE OF THESE 3 FRAGMENTS ALONE
CONTAINS USEFUL INFORMATION**

How ?



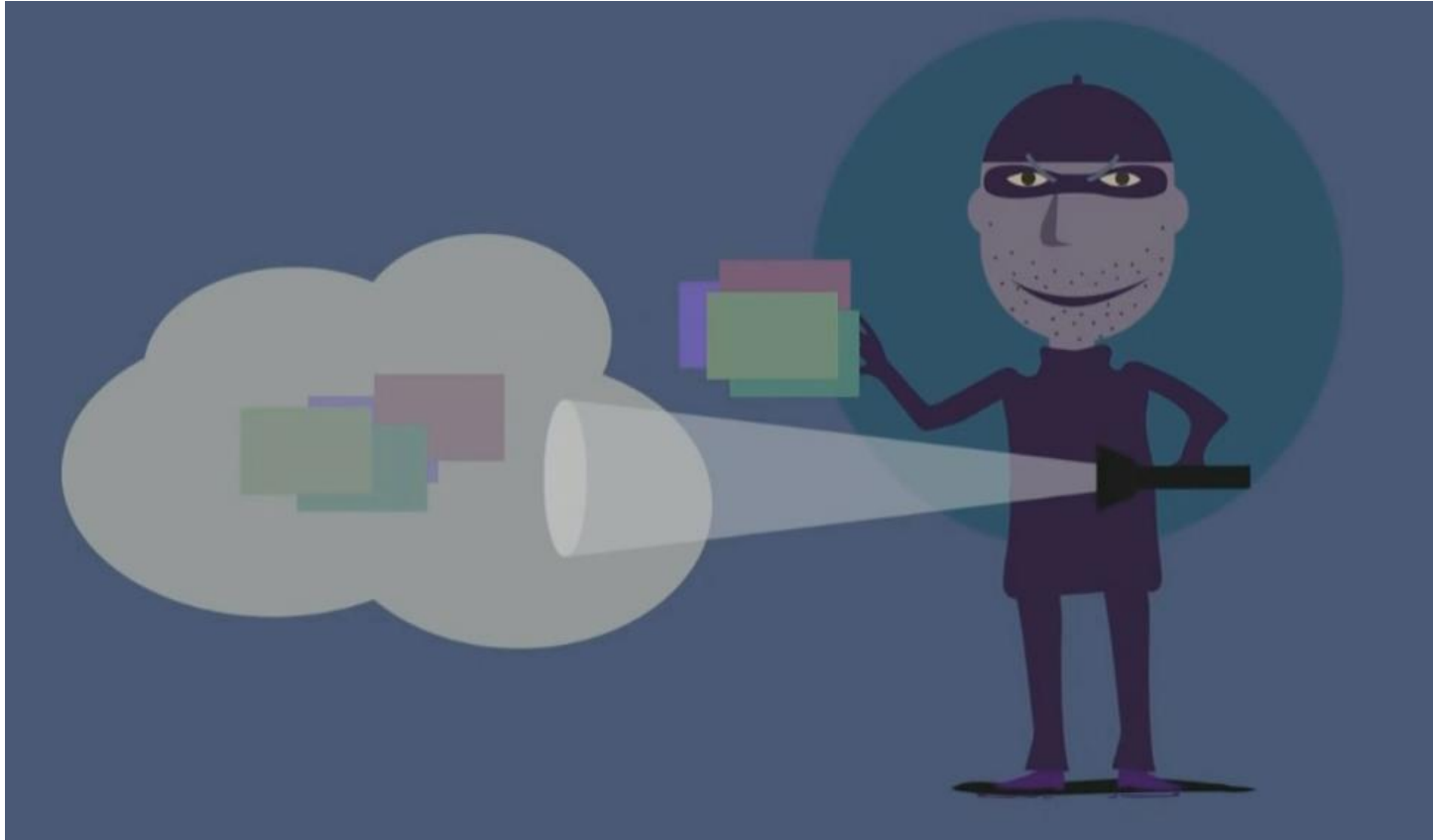
**WITH HARDENED APPLIANCES AND
SUITABLE IT METHODOLOGY**

How ?



**EACH FRAGMENT PLACED ON ITS OWN
CLOUD OR LOCAL STORAGE**

How ?



**IF ONE OF THESE FRAGMENTS IS STOLEN
FROM ONE OF THE STORAGES**

How ?



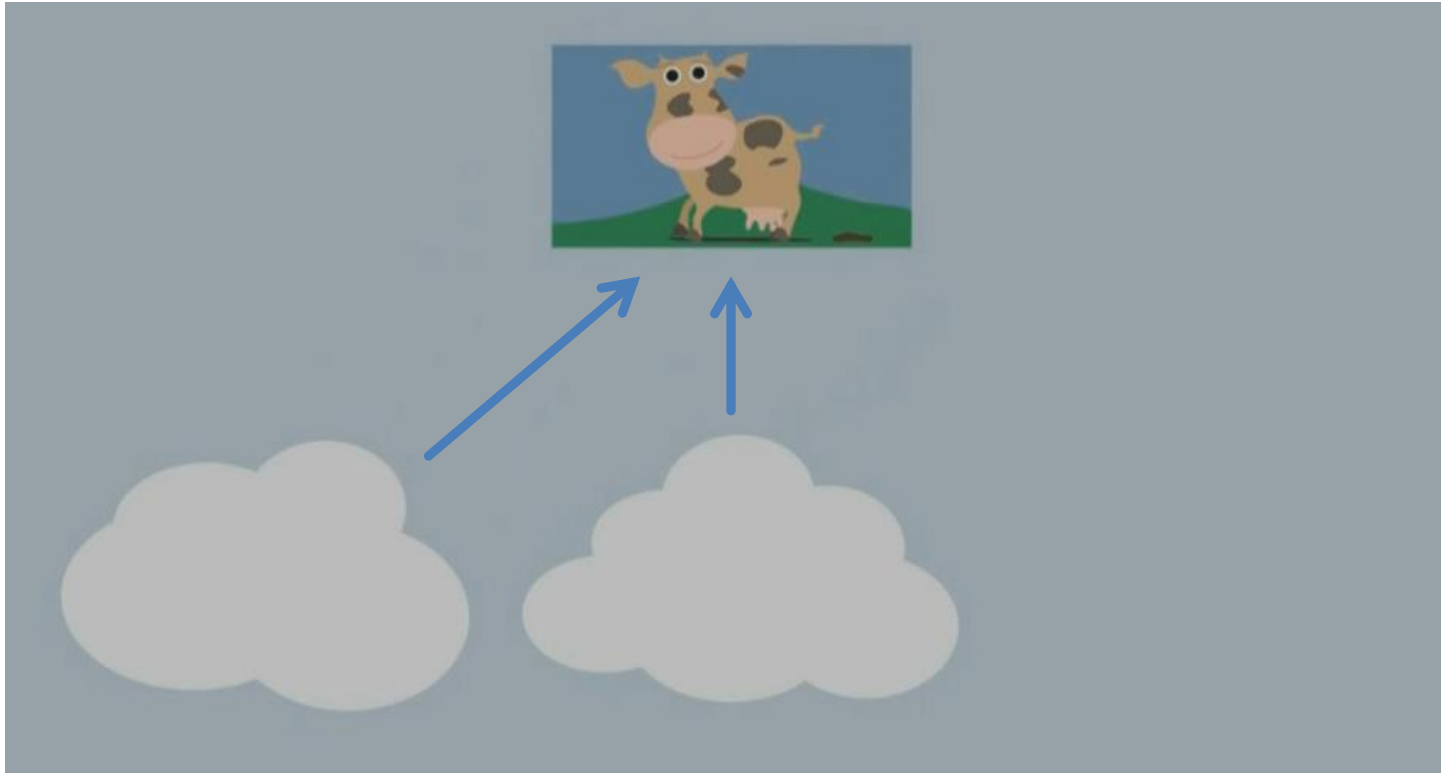
**IT'S COMPLETELY USELESS TO
THE THIEF OR SPY**

How ?



**EVEN IF A SINGLE FRAGMENT
DISAPPEARS... TWO ARE ENOUGH**

How ?



**TO RESTORE THE FILE FROM THE
REMAINING FRAGMENTS**

How ?

- **fragmentiX divides your "secret" into up to 26 fragments - and you can place every single fragment exactly where you want to have it:**
 - **Public Cloud Storage: AWS, ACP Cloud ...**
 - **Private Cloud Storage: freeNAS S3 ...**
 - **Local USB drive / USB Stick**

How?



How?



How ?

- You define the "frX ratio" for your application:

$$\text{frX ratio} = \frac{\text{required number of fragments for recovery}}{\text{created number of fragments}}$$

- In the COW PICTURE example a frX ratio of 2/3 was used, 3 fragments were created and 2 of them - no matter which 2 - are already sufficient for recovery.
- Other examples could be 5/8, 5/16 or 17/26:
- The maximum number of fragments that can be used for an application is limited by the performance and thus the number of locations that can be used by the selected fragmentiX BOX: 8, 16 or 26 with current fragmentiX Generation 1 hardware.

How ?

- A "frX ratio" suitable for a specific application depends on the desired quantifier of usage:
- High availability
- Speed
- Long-term safety
- cost optimization

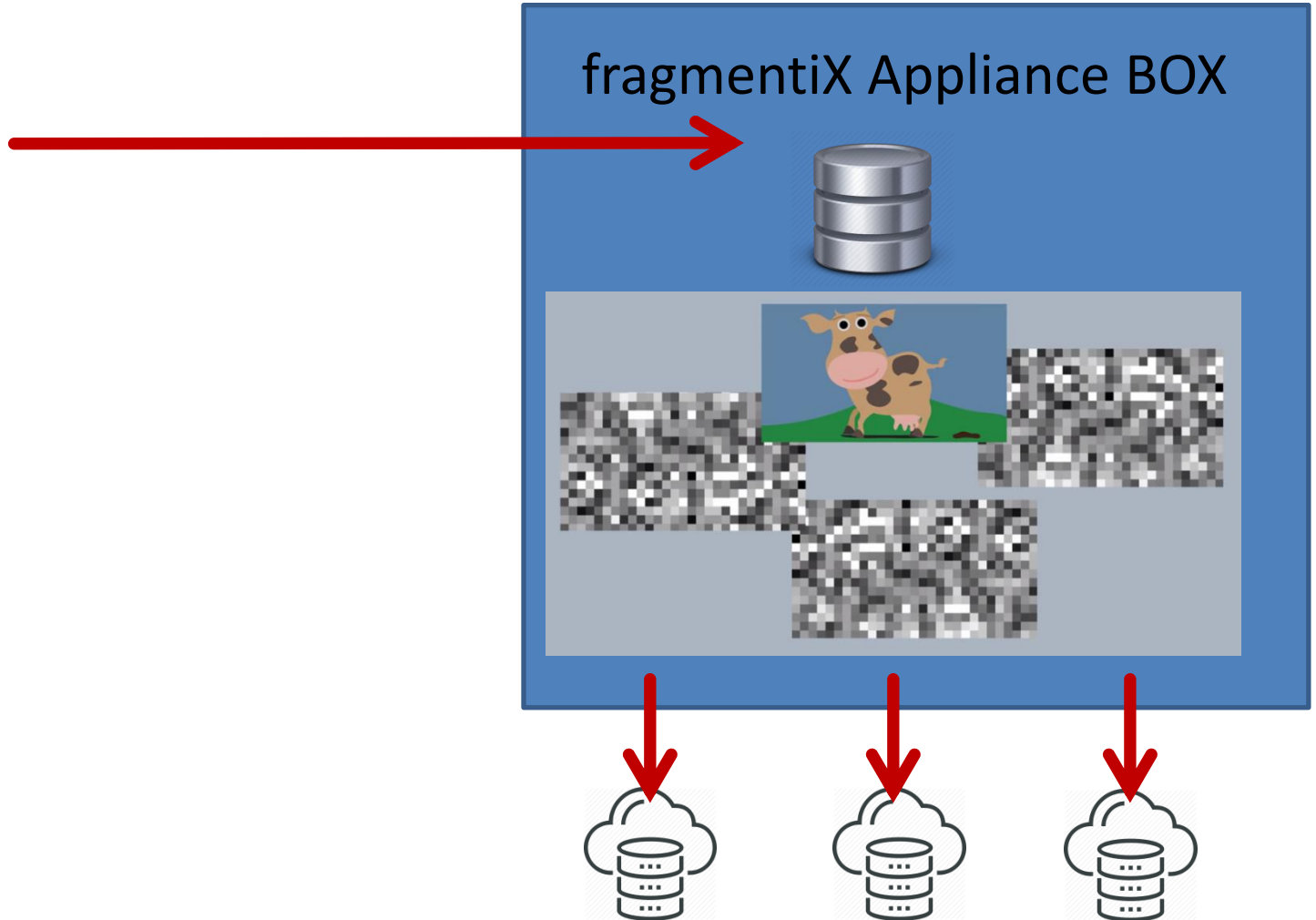
*What can
we achieve?*

Why ?

**YOU DO NOT HAVE TO TRUST ANY
SINGLE PROVIDER, ADMINISTRATOR
OR SERVICE PROVIDER**

**YOU DO NOT NEED TO TRUST
fragmentiX - ONLY YOU DEFINE
WHERE YOUR FRAGMENTS ARE
STORED**

How ?



PUT DATA ?



copy/move data to /frix directory

fragmentiX processing

Distribute parts to different ISPs using more than one NICs

Move to n (here 3) Storages



- location A
- location B
- location C

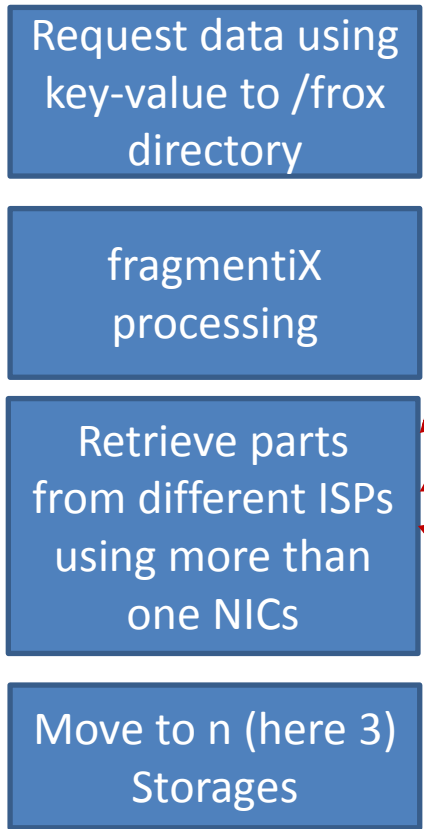
YOUR FRAGMENTED DATA WORTHY OF PROTECTION



GET DATA ?



YOUR DATA WORTHY OF PROTECTION



• location A



• location B



• location C

YOUR FRAGMENTED DATA WORTHY OF PROTECTION



Generation 1 Products

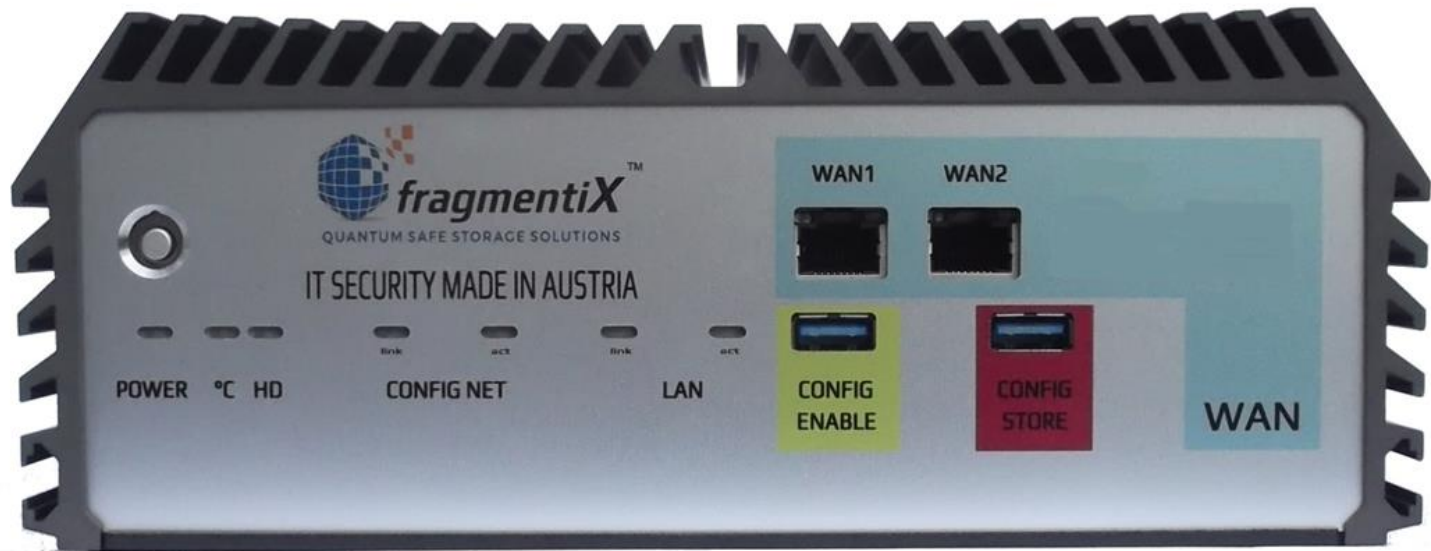
Product	fragmentiX ONE	fragmentiX THREE	fragmentiX FOUR
Use cases	Storage Appliance Box for smaller workgroups or branch offices with up to 10 employees and one or two Internet accesses (e.g. ADSL and LTE routers)	Storage Appliance Box for workgroups or branch offices with up to 30 employees and up to four Internet accesses (e.g. dedicated line, ADSL and 2 x LTE routers)	Storage Appliance Box for large workgroups or branch offices with more than 30 employees and up to eight Internet accesses (e.g. 2 dedicated lines, 2 ADSL and 4 x LTE routers)
Operating system and CPU	Hardened frxOS operating system on Industrial PC with robust hardware, protected BIOS and INTEL 4 core CPU	Hardened frxOS operating system on Industrial PC with robust hardware, protected BIOS and INTEL i5 CPU	Hardened frxOS operating system on Industrial PC with robust hardware, protected BIOS and INTEL i7 CPU
Number of usable locations	8	16	26
NICs: LAN/WAN	2/2	2/4	2/8
Price/piece exkl. VAT.	6.980 €	16.720 €	26.820 €
Maintenance per year	15%	15%	15%
Availability	now	now	now

ATTENTION: Specs can be changed without prior notice!

roadmap

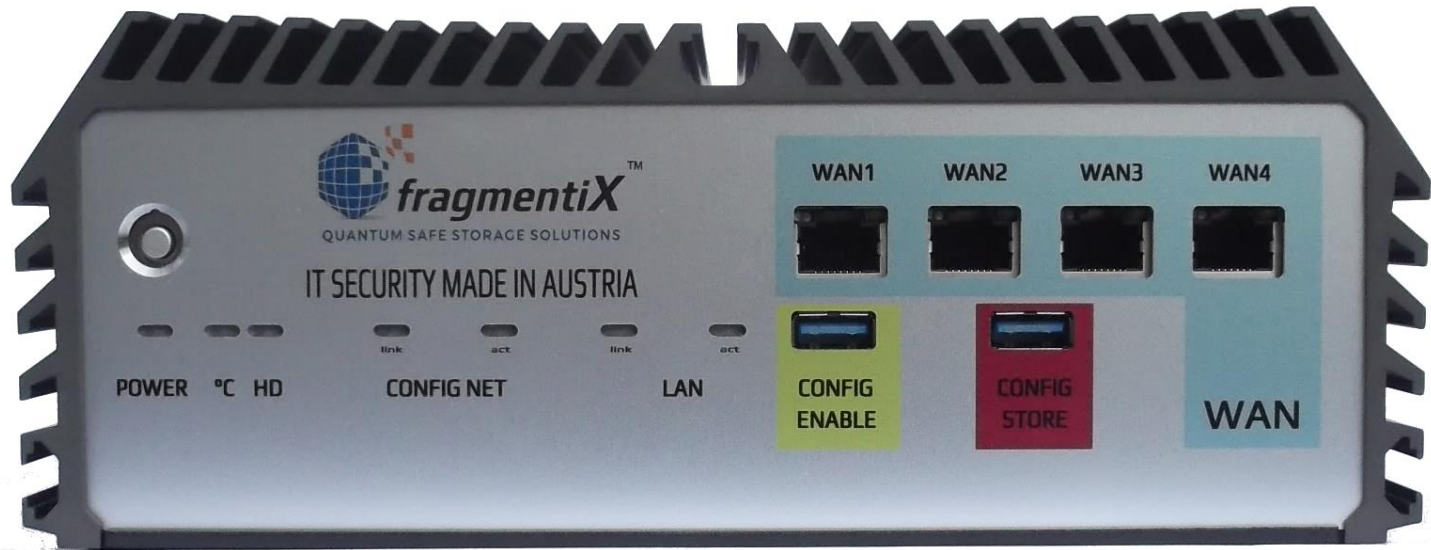
Product	fragmentiX mobile APP	fragmentiX SHARE client	fragmentiX VM	fragmentiX CLUSTER	fragmentiX PARANOIA
Use cases	IOS app & Android app	Software read only/ download only for Windows, Mac and Linux	Virtual frxOS Server for testing and proof of concepts	Cluster for -Data center -Corporate Headquarters - Service provider	Emission-protected hardware for sensitive and mobile applications
Use	Combines three storages to a secure -2 of 3 storages	download only from fragmentiX locations – only available for fragmentiX customers	Economical product variant for private fragmentiX applications and test operations	frxOS on high performance cluster hardware	frxOS on tempered and certified hardware
Number of storages	3 (Apple, Google, Microsoft)	Existing frxOS configs	3 bis 5	26	26
NICs: LAN/WAN	UMTS/LTE or WLAN	n.a.	1/1	8/8 10 Gbit NICs	1/1
Price/piece exkl. VAT.	1,99 €	150 €	to be defined	62.200 €	to be defined
Maintenance/year	free	n.a.	15 %	15%	15%
Availability	Q4/2018	Q4/2018	Q4/2018	Q1/2019	Q1/2019

fragmentiX ONE



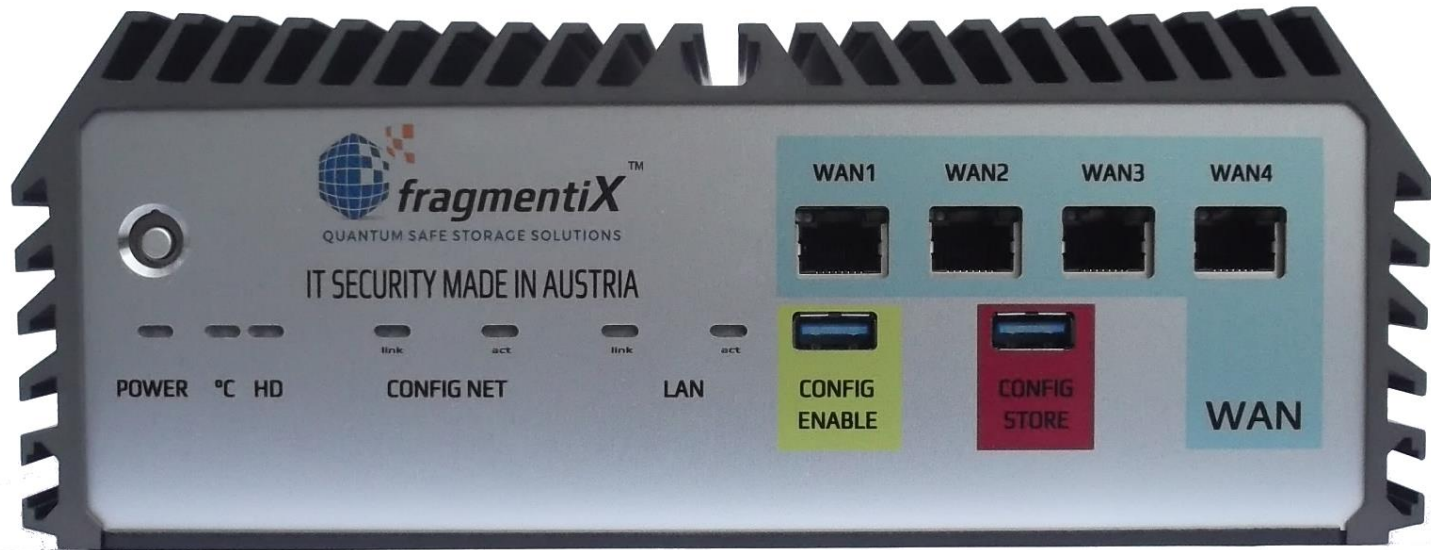
2 x LAN interfaces (1 x LAN as network drive, 1 x CONFIG ONLY)
2 x WAN interfaces for the use of multiple Internet accesses
Up to 8 addressable locations - Cloud S3 or USB disk / stick
frxOS hardened operating system

fragmentiX THREE



2 x LAN interfaces (1 x LAN as network drive, 1 x CONFIG ONLY)
4 x WAN interfaces for the use of multiple Internet accesses
Up to 16 addressable locations - Cloud S3 or USB disk / stick
frxOS hardened operating system

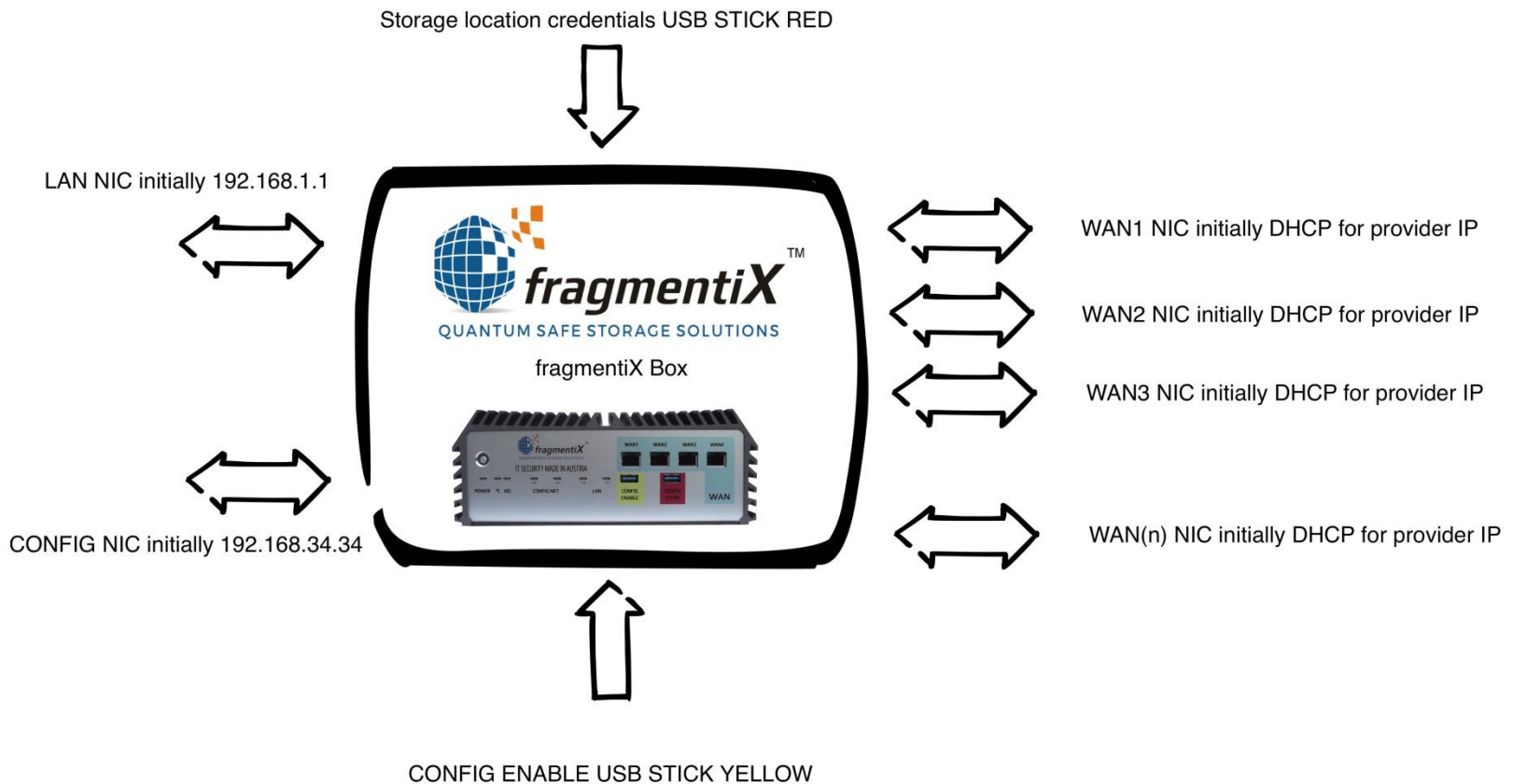
fragmentiX FOUR



- 2 x LAN interfaces (1 x LAN as network drive, 1 x CONFIG ONLY)**
- 8 x WAN interfaces for the use of multiple Internet accesses**
- Up to 26 addressable locations - Cloud S3 or USB disk / stick**
- frxOS hardened operating system with optional IP packet obfuscation**

How ?

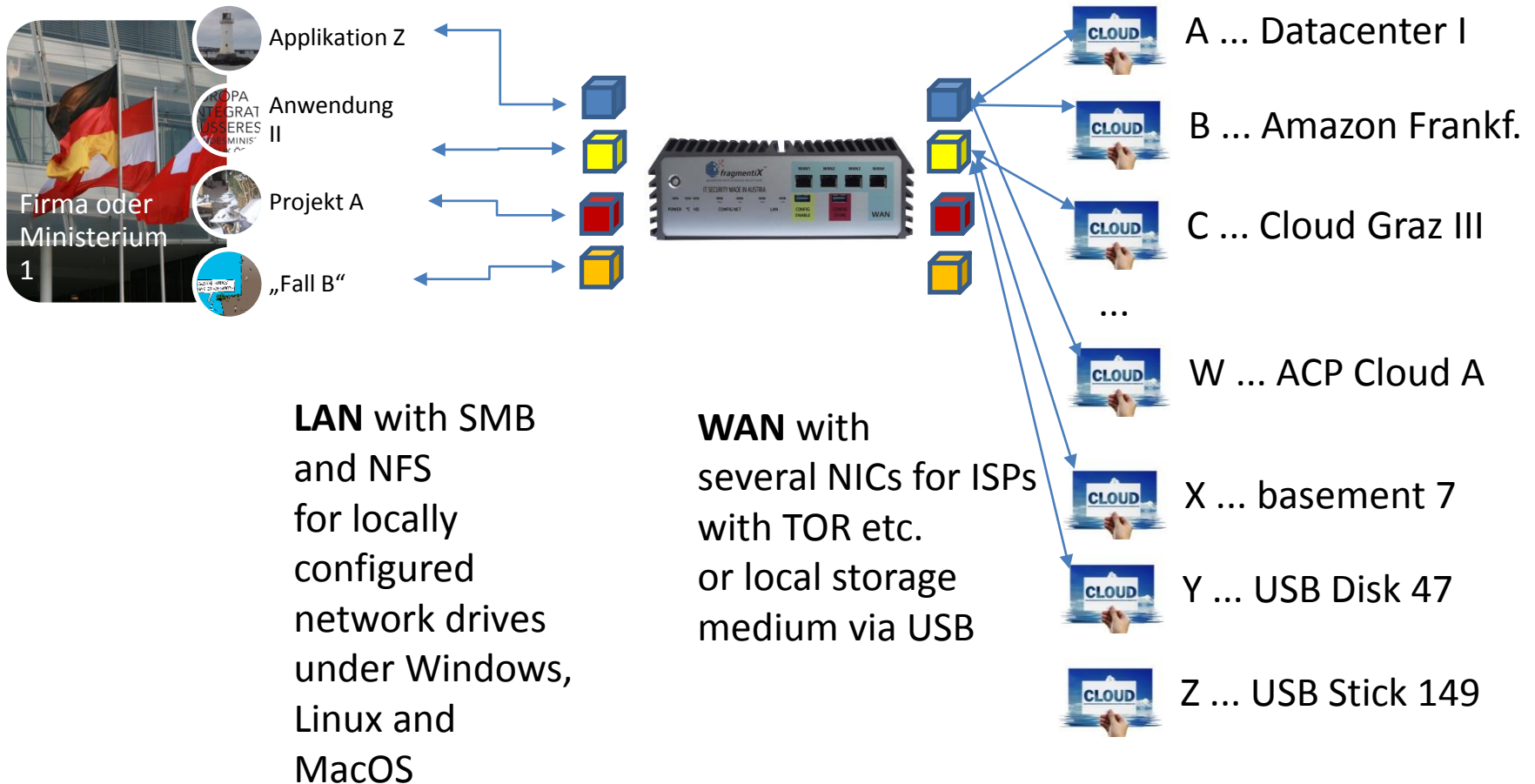
fragmentiX application examples



How ?

fragmentiX application examples

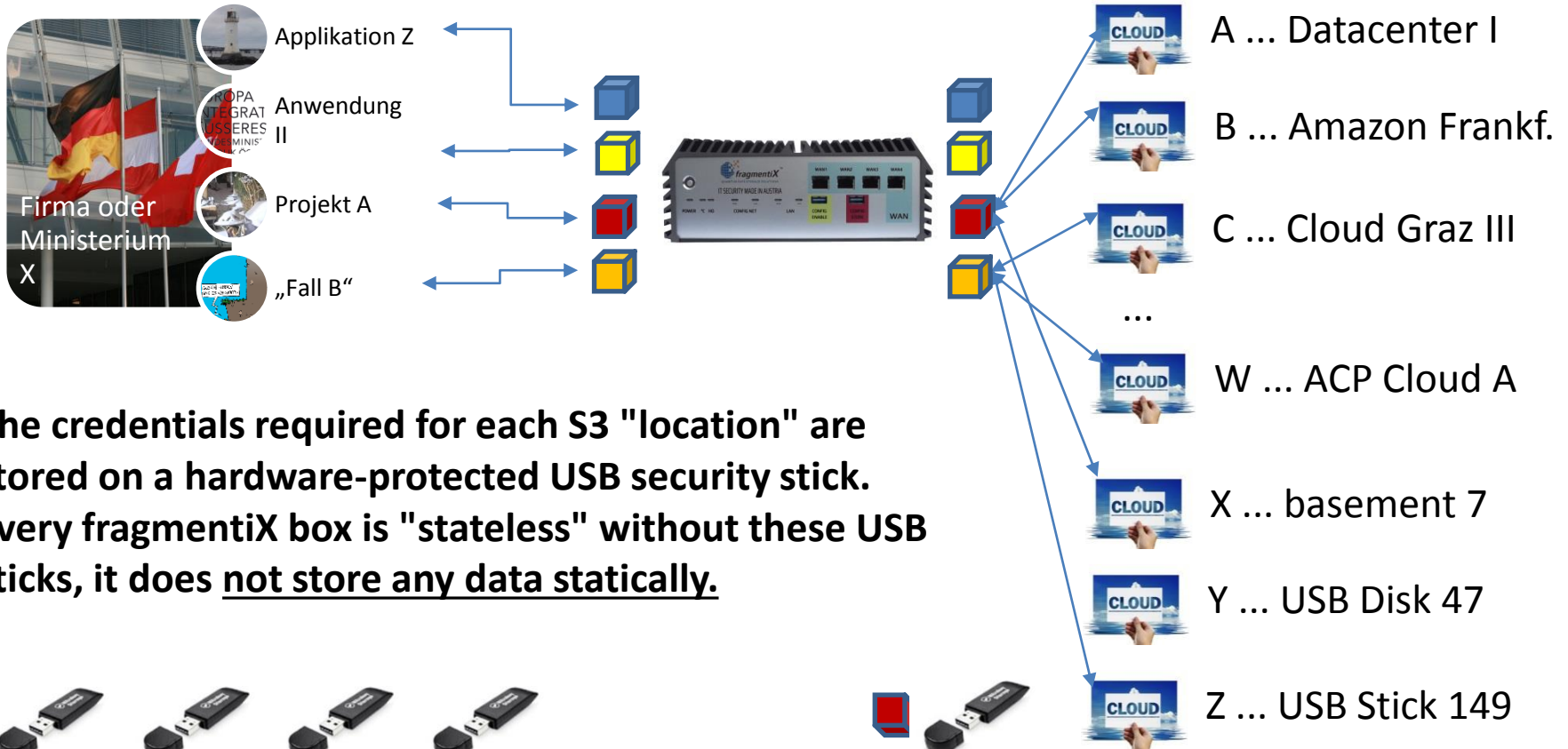
fragmentiX FOUR BOX with 26 pcs. S3 or USB memory "locations"



How ?

fragmentiX application examples

fragmentiX FOUR BOX with 26 pcs. S3 or USB memory "locations"



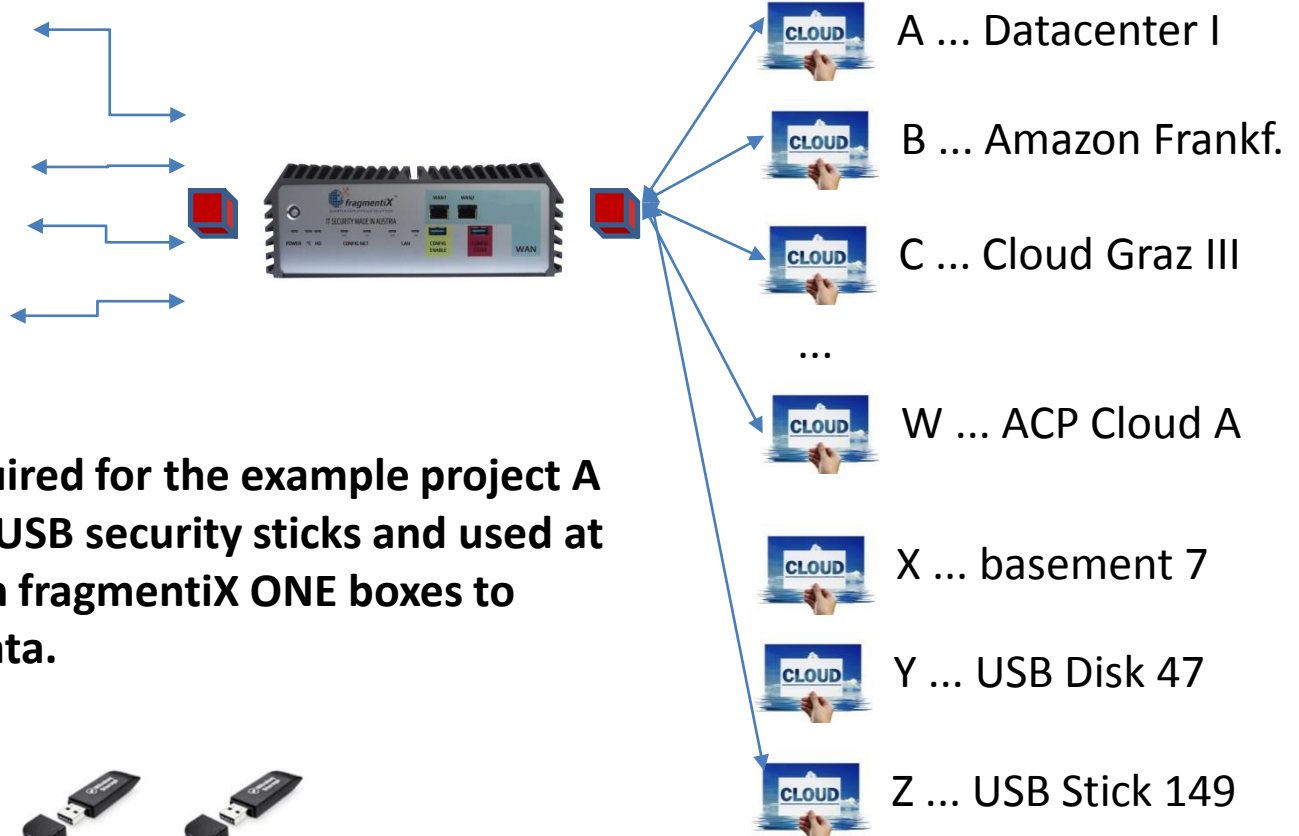
The credentials required for each S3 "location" are stored on a hardware-protected USB security stick. Every fragmentiX box is "stateless" without these USB sticks, it does not store any data statically.



How?

fragmentiX application examples

fragmentiX ONE BOX with 8 pcs. S3 or USB memory "locations"



The 4 S3 credentials required for the example project A are stored on e.g. 5 RED USB security sticks and used at 5 different locations with fragmentiX ONE boxes to access the "Project A" data.



Which services do fragmentiX customers get?

- The software updates and security patches are provided free of charge within the first 12 months from the date of purchase.
- Subsequently Update Service for 15% of purchase price per year
- Additional measures to improve and achieve the widest possible digital sovereignty are explained and recommended.

Additional services

A large number of fragmentiX users will have a very high demand for S3 compatible public cloud storage:

Through a joint purchase of storage contingents coordinated by fragmentiX, significantly lower prices per TB can be achieved for each user.



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