# Introduction to Secure Swiss Finance Network (SSFN)

A secure Communication Network for the Financial Community

Webinar | SSFN Team SIX | June 24 & July 1, 2022

# Welcome

***Christopher Koch***
Project Manager SSFN
Banking Services, SIX

# Today, We Want to Dive into Technical Details of the Secure Swiss Finance Network

## Your speakers today

**Christopher Koch**

Senior Strategy Manager
Project Manager SSFN

**Thomas Reske**

Senior Product Manager
Product Manager SSFN

**Beat Stump**

Senior Network Engineer

## Aim of todays webinar

- Introduce and give an Overview of SSFN
- Deepdive into the necessary steps for an Implementation
- Elaborate on time frame

## Some Do's (and Don’ts)

- Do ask questions anytime in the chat, we will either answer immediately or then at the end
- Do make your own notes, however, be aware that this webinar will be recorded and the slides will be made available
- Do turn on your microphone (however not your camera, this is disabled) when asking a question
- Do inform yourself at www.six-group.com/ssfn
- Do reach out to us or to the SSFN service providers for further information

# Agenda

| | | |
|---|---|---|
| 09:30–09:35 | **Welcome** | *Christopher Koch*<br>Project Manager SSFN, SIX |
| 09:35–09:55 | **Overview** | *Thomas Reske*<br>Product Manager SSFN, SIX |
| 09:55–10:35 | **Implementation** | *Beat Stump*<br>Senior Network Engineer, SIX |
| 10:35–11:00 | **Wrap up and Questions** | *Christopher Koch*<br>Project Manager SSFN, SIX |

# Overview

***Thomas Reske***
Product Manager SSFN
Banking Services, SIX

# Four Areas of Activity.

# One Company.

## Exchanges

*Third-largest stock exchange group in Europe*

SIX Swiss Exchange, BME Exchange, BME Derivatives Exchange, SIX Digital Exchange

- Listing
- Trading
- Market Data

## Securities Services

*Unbeatable post-trade services from A to Z and more*

- Clearing
- Settlement and Custody
- Securities Finance
- Tax Services
- Trade Repositories

## Financial Information

*Data You Trust*

- Reference, Corporate Actions and Market Data
- Tax and Regulatory Services
- Indices
- ESG Data
- Display and Data Feed

## Banking Services

*Smooth payment transactions*

- Cash
- Connectivity (Open Banking)
- Debit and Mobile Solutions
- Billing and Payments

# Status Quo:

## Financial Institutions Mostly Use Finance IPNet or Direct Links, in Addition to Standard Internet Connections

**1**
**Finance IPNet**


- Secure, but lack flexibility
- Only direct communication between SIX client and SIX possible – communication across providers not possible
- Direct Connection: Individual Solutions

**2**
**Direct Connection**


**3**
**Internet**


- Flexible
- Allows communication between any party connected to the internet
- Limited protection against cyber risks possible

# Together With Its Partners, SIX Launched the Project to Introduce SSFN as the New Communication Network

SCION was identified as a viable technology for connectivity. Under the leadership of SIX the project brought together a dedicated team of **partners**

- **SIX** (project lead)
- **SNB** (manager SIC)
- **Anapaya** (commercial SCION technology)
- **Sunrise, Swisscom & SWITCH** (partners for connectivity)

**In addition, three banks** actively participated in the **pilot**.

Active **collaboration** in the project

- Set-up a pilot network and performed testing using test traffic
- Defined governance principles
- Identified and partially tested use cases for SSFN or SCION-based networks beyond SIC/euroSIC

**SSFN went live in November 2021 and will replace Finance IPNet in the medium term due to its superior flexibility, resilience and functionality.**

# The Journey with SCION Started Over 10 Years Ago

## 2017

**First Contact**

SIX partnership with ZISC

Workshops with ETH

## 2019

**Lab Setup**

Dual carrier setup SwissISD

SIX internal strategy paper

Anapaya collaboration for Setup

Project initiation

## 2020

**Project Kickoff**

Carrier Readiness

POC Setup

Security Assessments

Onboarding of pilot banks

## 2021

**Pilot**

Pilot service onboarding

Pilot member onboarding

TRC and PKI setup

Testing and validation

Network go life

## 2022

**Production**

Operational excellence

Process excellence

Service onboarding

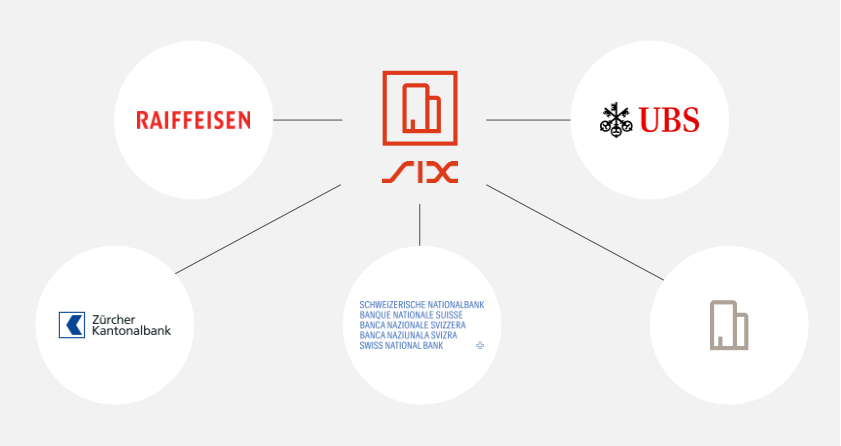
Customer onboarding

# Traditional Interbank Network versus SSFN

## Today

- Private and isolated network
- Mainly focusing on central service provider
- Secure, but limited in network-oriented services

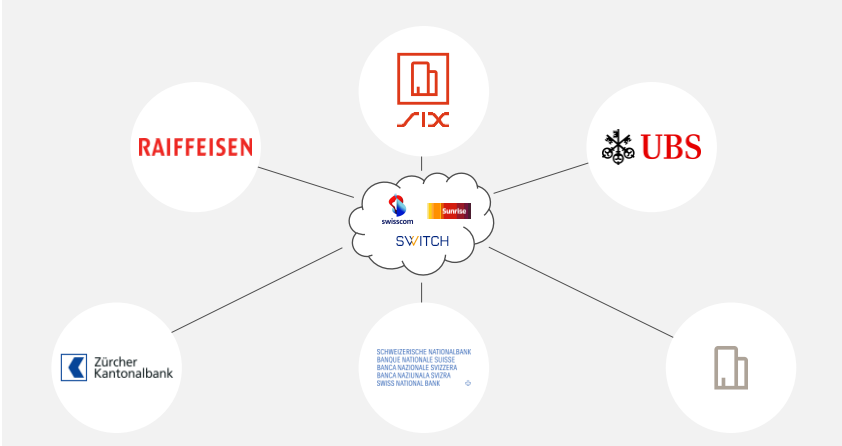
Centralized “Hub and Spoke” architecture (FinanceIP Net)




## SSFN

- Protection against cyber risks
- Flexible any-to-any communication between participants
- Secure and resilient

Community-based, “any-to-any” architecture



# The Governance of SSFN Defines the Rules & Regulations of SSFN – Service Providers Must Qualify

**Basic characteristic of the SSFN**

regulated interaction between users and service providers (with rules defined by the governance and influenceable by users and service providers), but decentralized like the Internet.

Governance SSFN

Run/use SSFN

| Voting members SSFN (SIX, SNB, SWITCH) | SSFN Service provider [1] (Anapaya, service providers SIX, SIX, Sunrise, Swisscom, SWITCH) | SSFN User (SIX customers) |
|---|---|---|
| Responsible for SSFNs rules and a functioning Trust Root Configuration | Providing the necessary services for the data exchange based on the SCION protocol and the SSFN rulebook | Purchase of services from approved SSFN service providers |
| **How to Be Part of SSFN?** | Is accepted as service provider for SSFN, following a transparent onboarding process and contractually confirming to continuously adhere to requirements criteria | Is qualified by using an eligible service from a SIX entity (e.g. SIC) offered via SSFN |



1| Service providers can also offer SCION-related services for other ISD

# On May 20, SIC Announced the Approval for SSFN for the Production Instance of SIC and euroSIC

SIC A25/2022

To the participants in our services
and their software providers

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www.six-group.com

Zurich, 20 May 2022

**Approval of the Secure Swiss Finance Network (SSFN) as a new enhanced gateway for the production instances of SIC and euroSIC**

Dear Sir or Madam,

In November 2021, you were informed by SIC Ltd that the **Secure Swiss Finance Network (SSFN)** would soon go live into production (see circular A35/2021). Since then, the SSFN has been successfully tested by the Swiss National Bank (SNB) and other pilot participants on the test instances of the SIC/euroSIC systems as well as on several other use cases.

Based on the successful pilot operation, the SNB has decided in conjunction with Finance IPNet and SWIFTNet to approve the SSFN as an additional gateway for the production instance of SIC as of 1 June 2022. On the same date, the SSFN will also become available as a gateway for the production instance of euroSIC.

The SSFN is a self-contained communications network and exhibits even greater resilience and reliability when compared to Finance IPNet. These characteristics grant the SSFN significant advantages, especially with regard to the introduction of SICS with Instant Payments. The SSFN ensures fast, secure and continuous data transmission for Instant Payments.

The SNB plans to implement the international recommendations for reducing fraud risks in payment systems regarding endpoint security for SIC participants in the near future. This also includes the secure exchange of data between a SIC participant and its service bureau. The end-to-end use of the SSFN in communications with the SIC system therefore also makes an important contribution towards endpoint security. More detailed information on this topic will be provided at a later date.

Information on the specific procedure for an SSFN connection as well as its use for other SIX services will be provided during webinars in June 2022. Further information primarily intended for network specialists can be found at www.six-group.com/ssfn.

In addition, we wish to inform you that SIX intends to replace all Finance IPNet connections to its services with the SSFN in the medium term. SIX will provide further information on the replacement of Finance IPNet at a later date.

Thank you for taking note and for forwarding this information to the departments concerned. The contact point noted above is available for further information.

Yours faithfully,

SIX Interbank Clearing Ltd

Michael Montoya
Managing Director

Timo Pfahl
Member of the Management Committee

→ … SNB plans to implement the international recommendations for reducing fraud risks in payment systems regarding endpoint security for SIC participants in the near future. This also includes the secure exchange of data between a SIC participant and its service bureau. The end-to-end use of SSFN …

→ … In addition, we wish to inform you that SIX intends to replace all Finance IPNet connections to its services with the SSFN in the medium term. SIX will provide further information on the replacement of Finance IPNet at a later date …

→ Since June 2022, SNB uses SSFN for SIC and euroSIC

# More and More SIX Service Will Be Made Available via SSFN

## SIX services …

| … currently reachable via SSFN | … soon to be reachable via SSFN[1] | … to be reachable in the near future via SSFN[2] | … to be made reachable soon via SSFN[3] |
|---|---|---|---|
| • ATM Monitoring<br>• euroSIC<br>• SIC | • eBill<br>• FTP<br>• … | • Financial Information<br>• Debit Online<br>• webMAX / SECOM | • CO:RE |

Currently reachable via Finance IPNet

Currently reachable via Internet or dedicated managed leased lines

**SIX is committed to make all services currently reachable via Finance IPNet also reachable via SSFN**

1| pending implementation of a DNS (Domain Name System) Service for SSFN
2| pending further testing resp. adjustments to infrastructure
3| after having built a completely new infrastructure

# Implementation

***Beat Stump***
Senior Network Engineer
Banking Services, SIX

# SCION Technology
## Why SCION?

### Address Internet weaknesses:

- Low security
- Very limited control
- No geo-fencing
- High vulnerability
- Hidden “kill switches”
- No QoS or BW-management

### Address drawbacks of private lines:

- High costs
- Closed user group by definition
- Inflexible

### Governance

- Segmentation by Isolation Domains (ISD)
- ISDs define and enforce their own rules
- ISDs work independently

### Control

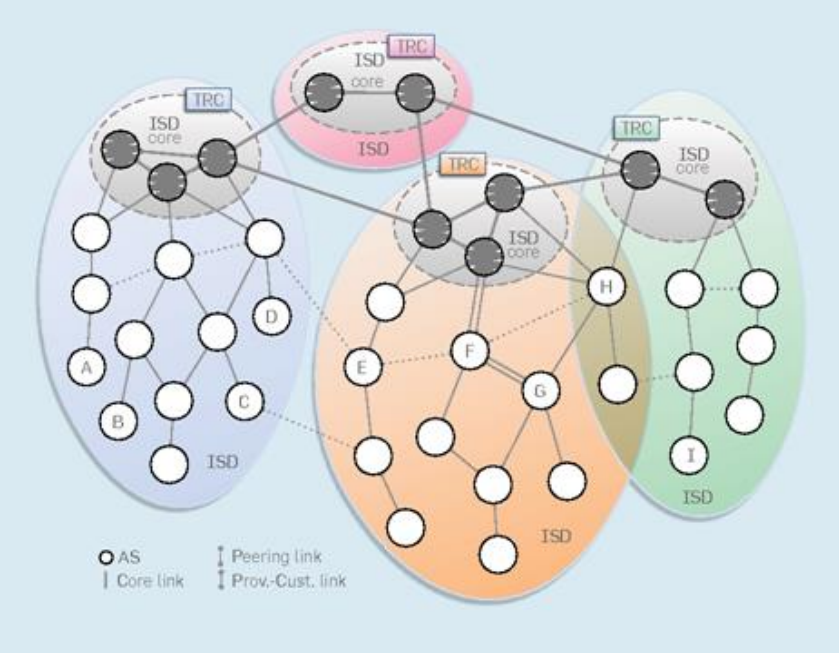
- End to end path control (outbound)
- Path policies for filtering
- Multipath
- Enhanced path selection attributes

### Security

- Security by design
- Cryptographically signed paths for integrity
- ISD local crypto domain
- Integrated protection against cyber risks

# SCION Technology
## How it Works (1/2)

**Schematic view of a SCION network**




- Segregation in Isolation Domains (ISD)
- Within ISD, ISD-core has multiple tasks:
  - Enforce defined principles and definitions
  - Initiate beaconing process (path discovery)
  - Host ISD-local services (crypto, enroll, DNS, etc.)
  - Inter-AS communication
- Path-servers in each AS register all available intra-AS-paths locally and in core
- Path-servers in each ISD-core register all available inter-AS-paths
- Path-server information is assembled and evaluated by sender

# SCION Technology
## How it Works (2/2)

**Also:**

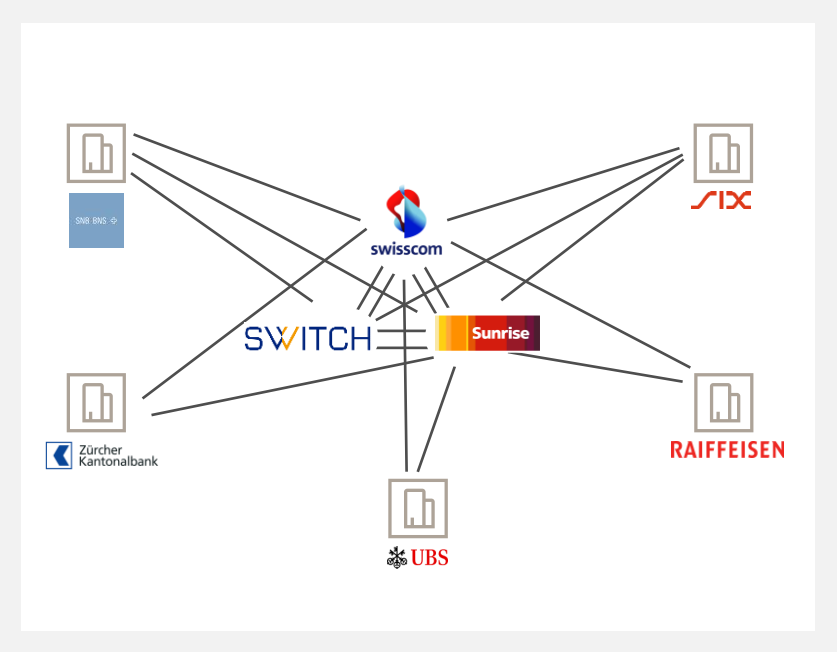
- Underlay independent
- Any-to-Any communication
- Can be used up to host level
- More performance- and energy efficient
- Fast failover

**But:**

- Complex (e.g. certificate handling)
- Not all features implemented yet
- Small product and carrier variety
- No traffic encryption
- Not officially standardized (In progress)
- IP tunnels limit scalability (For SCION IP gateway)

# SCION Technology
## SSFN Specific Attributes

**Schematic view of the SSFN network**




- SSFN is NOT connecting other ISDs
- Based on Anapaya SCION IP gateways (SIG) at customers (No Hosts as of now)
- Onboarding via SIX
- Certificate validity
  - Initial AS certificate: 30 days
  - Regular AS Certificate: 3 days
  - CP Intermediate Certificate: 26 months
  - CP Root Certificate: 11 years
- Requirements for admission to SSFN
  - Participant of Swiss financial market
  - Not limited to participants IN Switzerland
  - Professional & secure operation of SCION gateway
- Only global unique public addressing allowed

# Verified SSFN Access Patterns
## Carrier Service Offering

### Managed Service (dependent on offering):

- Carrier takes on responsibility for SCION
  - Gateway Operations
  - Certificate handling
- Carrier may take care of addressing
  - Assign Public IP Range
  - Translate private to public IPs
- Regular Carrier Uplink for customers
  - Static or Dynamic
  - Redundancy based on known patterns
- May involve multiple carriers

### Unmanaged Service:

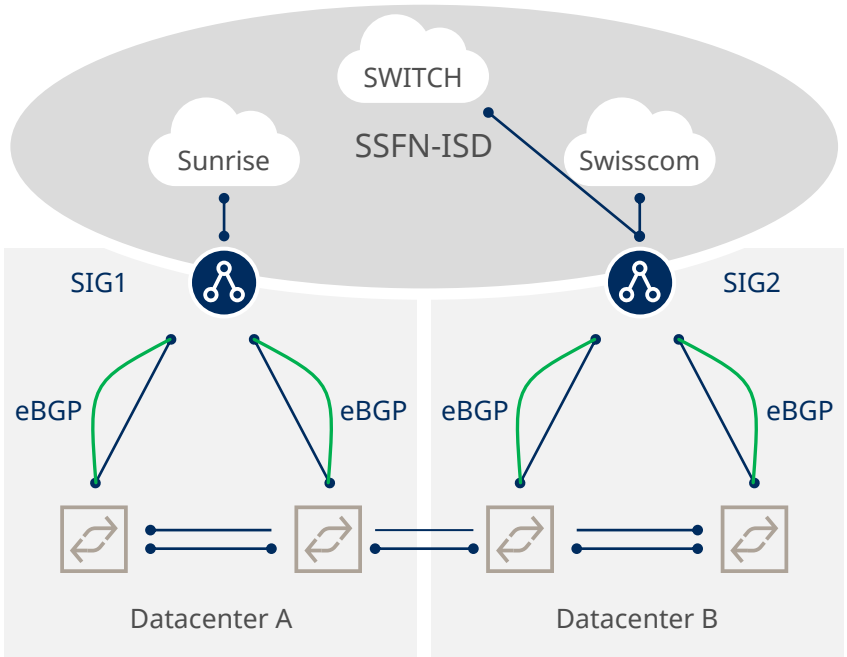
- Customer order & operate SCION gateways
- Customer responsible for cert handling
- Customer uses own (dedicated) public IPs
- Customer takes care of redundancy model
- Carriers offer SCION enabled uplinks
- Carriers support activation (as usual)

| | CH | Europe | USA | Asia |
|---|---|---|---|---|
| Swisscom | ■ | ■ | ■ | ■ |
| Sunrise | ■ | □ | □ | □ |
| SWITCH | ■ | □ | □ | □ |

# Verified SSFN Access Patterns

## Deployment Topology – Site Redundant

**SSFN Site Redundant Access**

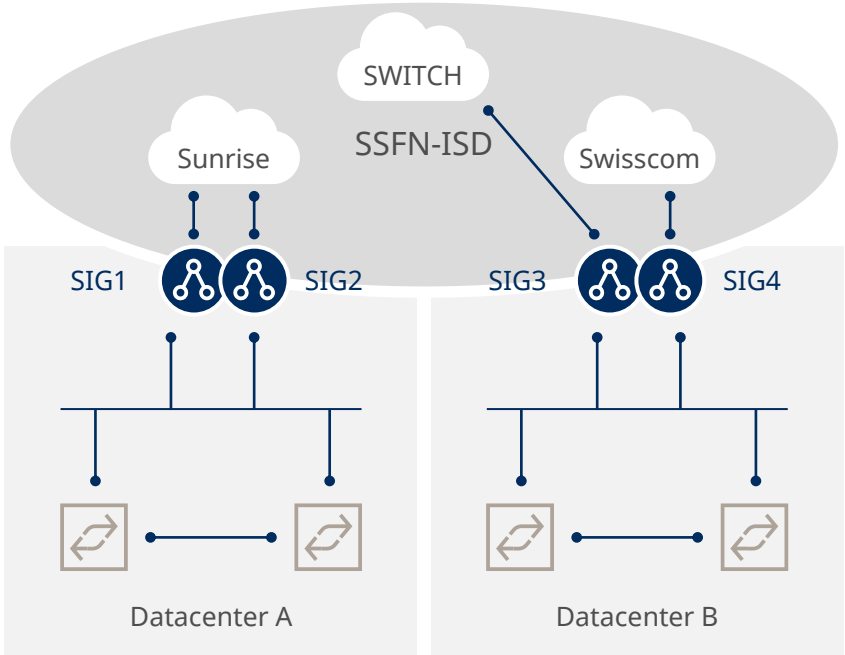



- One gateway per datacenter
- Single or dual AS (ISD-AS)
- Cross-Site routed access platform
- Active / Active across the datacenters
- One or multiple carrier uplinks per gateway
- BGP between Gateway and access platform
  - Allows site control
  - Allows withdrawal (in case of carrier uplink error)
- Route-maps to control advertisement from/to SSFN
- Path-filter deny routing across the remote gateway
- SGRP Endpoint filters on gateway control in- and outbound routes per member
- Same public IPs advertised via datacenters A and B

# Verified SSFN Access Patterns

## Deployment Topology – Static Cluster

**SSFN Static Cluster Access**




- One Gateway Cluster per datacenter
- Single or dual AS (ISD-AS)
- Site local access platform / Firewall uplink
- Active / Standby across the datacenters
- One carrier uplink per gateway
- Layer 2 Segment across the gateways
- Virtual IP across both gateways (VRRP)
- Static  Routing to gateways (with tracking)
- SGRP Endpoint filters on gateway control in- and outbound routes per member
- Dedicated public IPs advertised via datacenters A and B

# Verified SSFN Access Patterns

## Recommended Implementation Process

**01** Analyze the existing connections;
define the configuration of the SSFN connection;
define the SIX services to be accessed via the SSFN

**02** Obtain and install the SCION connection(s) and gateway(s)

**03** Apply for a SSFN certificate

**04** Install the SSFN certificate; test the SSFN connection

- The SSFN connection is provided by SSFN service providers without involvement of SIX
- SSFN service providers are willing to support in setting up an SSFN connection
- SIX provides guidance on verified access patterns

**05** Connect test instances of SIX service(s) via SSFN and perform connection tests

**06** Connect production instances of SIX service(s) via SSFN

- SIX services including security measures remain as-is when connecting via SSFN
- Going forward, SSFN specific service addressing applies
- Finance IPNet is maintained for now

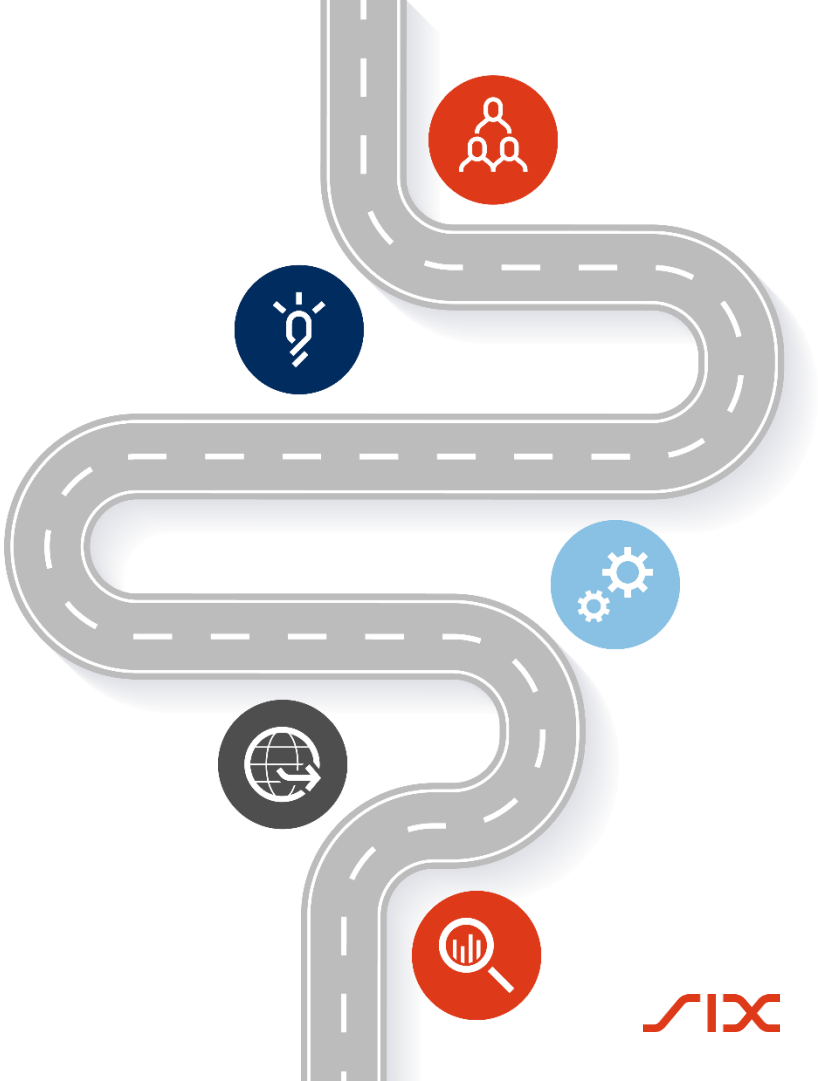
# Lessons Learned
## Technology

### Implementation

- Not all features are implemented yet
- Best practices must be evaluated for your specific needs
- Building a secure, but flexible PKI for purpose is challenging
- There are black spots

### Surroundings

- Sources of knowledge are limited
- The community is limited
- Increased technology risk dependent on market adoption
- Increased technology risk for conceptual errors



# Lessons Learned
## Product

**The gateway is not a router**

- Server operation skills are beneficial
- Management integration is more demanding
- Extra hardening effort is required

**The product is (still) NEW**

- It is undergoing changes
- Careful testing is required

**Anapaya is a startup**

- Processes and structures are being established
- Less formalism on the good side
  (e.g. feature requests)
  but also on the bad side
  (e.g. operations)

# Wrap up and Questions

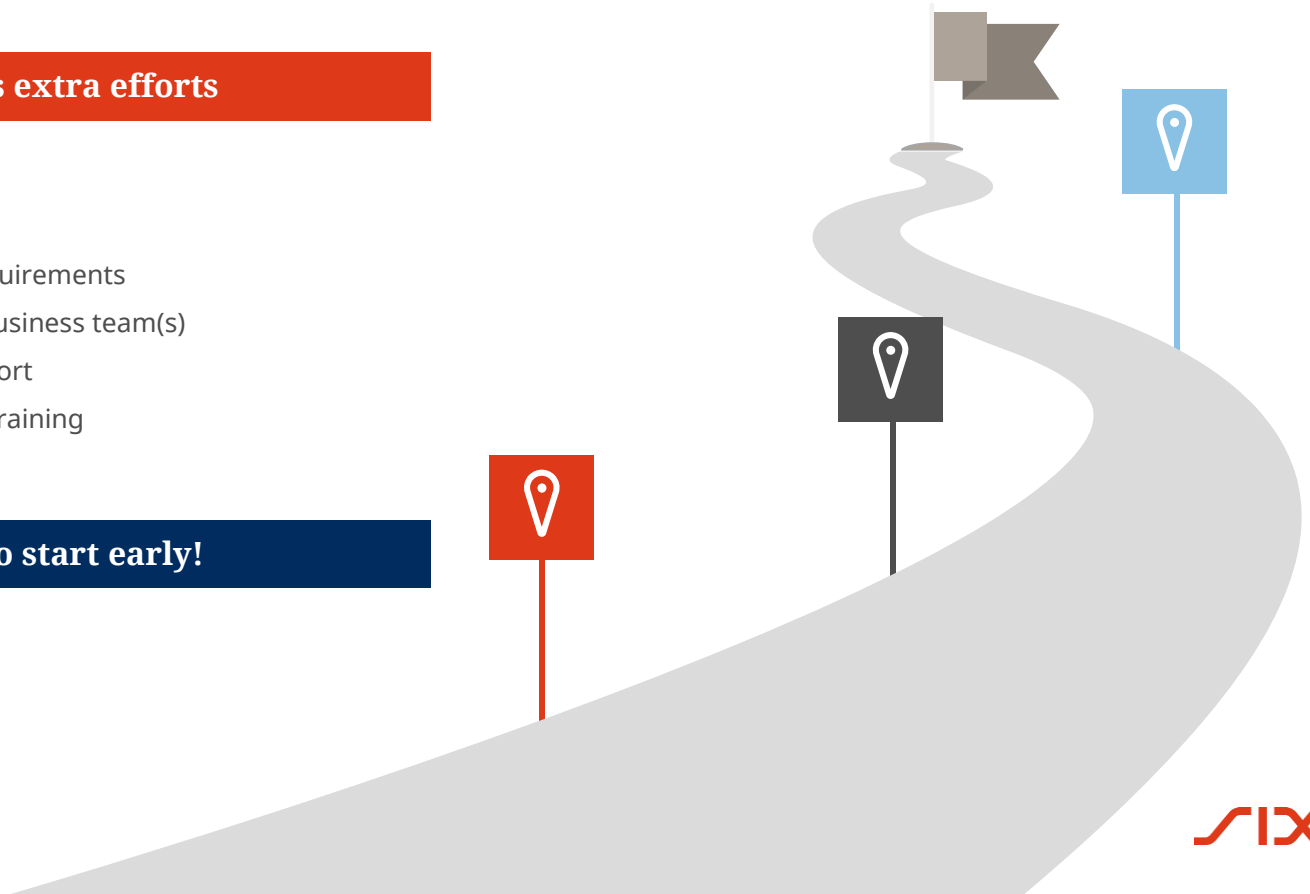
***Christopher Koch***
Project Manager SSFN
Banking Services, SIX

# Lessons Learned
## Project

**New technology demands extra efforts**

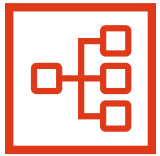
- Dream big, start small
- Manage expectations
- Know your processes and requirements
- Align networking team and business team(s)
- Don’t hesitate to ask for support
- Perform repetitive testing & training
- Use all learning opportunities

**Extra Time is required, so start early!**



# Financial Institutes Should Start Planning Now to Be Able to Profit from the Superiority of SSFN

- Time required **to setup a SSFN** access is estimated at around **3–6 months** (but can take longer due to lead times)
- Main resources: **bank network specialists**, defining the SSFN access, obtaining the necessary SCION connection(s), SCION gateway(s) and SSFN certificate, and thus setting up the SSFN access
- **Running costs** of a SSFN access is estimated to be a **medium 5-digit figure p.a.**



- **SSFN connections** can be used **for SIX services**[1] currently reachable by Finance IPNet **AND** to exchange data with **other SSFN users OR** between various locations of a company
- The **decomissioning date** for Finance IPNet will be defined for each service and communicated at a later date
- SNB plans to implement endpoint security in the near future, requiring the **secure exchange of data between a SIC participant and its service bureau**

- **SSFN users** can influence the development of SSFN by participating in user forums
- The SCION technology can be **leveraged for further use cases**, such as ensuring availability of connections of remote workforce or specific websites (e.g. eBanking)
- SSFN service providers (currently: Anapaya, Sunrise, Swisscom, SWITCH) are **happy to support you**



1| pending availability


Q&A

# Contact & Resources

**SIX BBS Ltd**
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www.six-group.com

## Resources

**SSFN:**
PM-SSFN@six-group.com
www.six-group.com/ssfn

**SCION:**
https://www.scion-architecture.net/

**SSFN Service Providers:**
https://content.anapaya.net/the-secure-swiss-finance-network
https://www.sunrise.ch/business/en/enterprise/internet-networking/business-wan/scion
https://www.swisscom.com/scion
https://www.switch.ch/scion/

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