Sunrise

Faxing in the age of All IP.
State of affairs in Switzerland.

**This document is meant to help Sunrise business customers get their bearings in regard to faxing and analog/ISDN network deactivation, which is also referred to as "All IP" or "TDM2IP."
It describes the history, technical background, and approaches taken by Sunrise to offer solutions.**

The history of faxing.

Faxing experienced its heyday in the 1970s and 1980s. The introduction of the ISDN network at the beginning of the 1990s and the incorporation of e-mail into business processes seemingly set the stage for the rapid demise of the fax. But as the saying goes, it isn't over until the fat lady sings, and the service is still in use in many companies to this day, albeit in a considerably less widespread form. Its ease of use and legal security are still especially highly valued.

With the migration of existing connections to voice over IP (VoIP) technology, fax devices can in principle still be used, but it will no longer be able to be guaranteed that the technology will transfer the message reliably.

The definition.

Telefax or fax refers to the transmission of pictures comprised of vectors/pixels over a phone network. An image is, quite literally, deconstructed in tones and transmitted in real time over the phone. A variety of fax standards apply here.

The technical standards and limits.

Analog fax devices, which are the most widespread terminal type, function according to the G2 or G3 ITU (International Telecommunications Union) standard. Less common ISDN fax devices use G4. With the deactivation of the analog and ISDN phone network and blanket introduction of Voice over IP, these tones must be converted into digital data packages before transmission, since data is transmitted in digital IP networks exclusively in the form of individual packages.

And that's exactly the difficulty in regard to the transfer of fax messages in IP networks. The loss of individual data packages, which is quite normal and unproblematic for IP networks, can cause significant problems for a fax. While this often manifests itself in a phone call as a faint click or creak that can be compensated for by the human brain, if one or more packages are incomplete or get lost completely while sending a fax, this means that the document displayed to the recipient will be incomplete or might not even arrive (break in the connection).

In IP networks, the path between the sender and recipient is constantly in flux – even if no changes are made to the devices locally. These factors cause quality issues when fax messages are transmitted over VoIP. What makes this even worse is the fact that the longer a fax is, the more probable it is that the aforementioned problems will accumulate.

Sunrise, and any other provider for that matter, is not capable of monitoring and managing all of the factors that come into play along the transmission route. It is for these reasons that no provider can guarantee that a fax will be successfully transmitted over an IP network.

The current standards.

The T.38 fax, or Fax over IP (FoIP) protocol (ITU), has established itself as a standard for fax connections over Voice over IP in recent years. However, many phone service providers do not support this standard or have not taken up a clear position on it. A transmission using the T.38 fax protocol will generally only function when all systems in the entire connection chain support this protocol. As soon as a system fails to support the T.38 protocol, all systems will automatically agree to transmit the message on the voice band using uncompressed audio codec standards, such as G.711. In this context, reference is often made to the combination of dedicated, high-performance Internet connections with quality of service functionality.

At this point, it should be kept in mind that there will always be issues with fax communication, no matter which standard is used, as was the case with the traditional phone networks (TDM). Network providers have never and will never guarantee the transmission of messages between all fax devices in various (international) networks. The sheer number and variety of devices and systems make this technically impossible.

The development in Switzerland.

The telecommunications service plan, which was adopted into the new version by the Bundesrat (Swiss Federal Council) in December of 2016, no longer includes fax service. In the opinion of the Federal Council, there are enough similar or better ways to communication today that are of equal value.

Since the switch to "All IP" is occurring worldwide, holding on to existing analog technologies in Switzerland would make no sense over the long run.

The Sunrise product portfolio.

Sunrise has been using VoIP-based connection products for many years and therefore has extensive experience in connecting business customers. This means that connection via IP to our customers' locations is being set up. This VoIP connection can then be set up on-site with appropriate terminals (CPEs) as a VoIP (SIP trunk) or as an ISDN (BRI or PRI) on the telephone system. As an alternative to the connection of phone systems on-site, Sunrise also offers cloud-based calling solutions.

This means that Sunrise customers will have no problems once traditional ISDN/TDM calling is discontinued by Swisscom, and can decide for themselves at any time when they would like to switch to the world of Voice over IP (VoIP).

The All IP calling products offered by Sunrise support fax transmissions in different ways. However, Sunrise generally cannot guarantee the transmission of faxes due to the limitations described above. Only the "best effort" transmission of faxes is supported.

Products	Supports faxing
Business Voice Direct	Fax Group 3 (G3) national and international*
Sunrise Office pro PBX local	T.38 (if the PBX used supports this protocol)**
Business cloud PBX	Fax Group 3 (G3) national and international*
Sunrise Office pro PBX cloud	Fax Group 3 (G3) national and international*
Sunrise Office pro Basic Voice	Fax Group 3 (G3) national and international*
Unified Communications as a Service	Project-dependent

* Fax devices with a group 3 modem should be set for a maximum transmission speed of 9600 kbit/s.
** No T.38 support when using the BRI/PRI gateway.
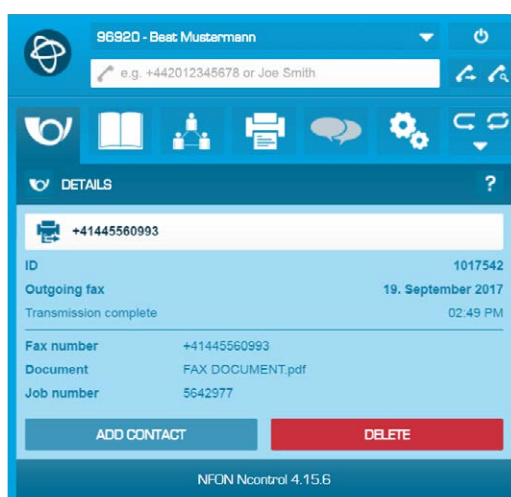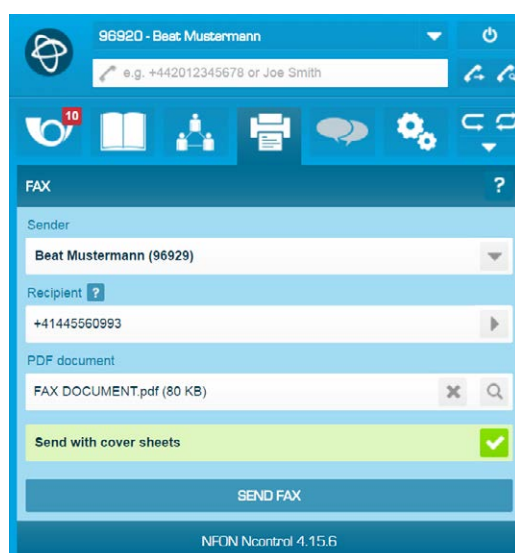
Pictures: eFax user interface of the Business cloud PBX or Sunrise Office pro PBX cloud

Transmission of PDF documents as a fax with tracking of the sending process and fax receipt via e-mail.

The settings on the fax device.

Transmission problems caused by the settings on the terminal device, such as reduction of resolution/error correction and transmission speed, can often be avoided.

Sunrise recommends generally reducing the transmission speed to 9600 kbit/s and switching off automatic error correction (ECR) on the faxing device. When sending a longer fax, Sunrise recommends dividing it up and sending several smaller faxes (max. 5 pages/message).

eFax by Sunrise.

Electronic faxing is a transitional technology that connects analog faxing with digital e-mail.

The fax server of the Business cloud PBX or Sunrise Office pro PBX cloud is capable of processing large quantities of multi-paged faxes quickly and reliably.

It is possible to take advantage of the full range of features offered by the eFax service by ordering a Business cloud PBX or Sunrise Office pro PBX. Incoming faxes are forwarded to an e-mail address. Outgoing faxes are sent through the web user portal as a PDF attachment.

The fax is a product type that is undoubtedly destined for extinction. Today, however, it remains an indispensable tool for many companies. Sunrise has been offering reliable solutions that make use of Voice over IP for years now. These serve companies of every size.

Glossary

ATA	Analog Telephone Adapter – for connecting one or more analog terminal devices or fax devices to the Voice over IP network.
BRI	Basic Rate Interface – basic connection that consists of two 64 kbit/s data channels and one signaling channel. This allows up to two telephone calls to be made simultaneously.
Cloud calling	Phone solution without a local phone system. All functions are provided through infrastructures in the Sunrise (Cloud) network.
ECM	Error Correction Mode – error correction parameter on the fax device
eFax	Solution for transmitting faxes through IP networks. An incoming fax is transmitted as an e-mail with a PDF attachment. Outgoing faxes can be sent over the Internet as PDF documents.
G.711	Standard for transmission of voice and data without compression as an analog audio signal.
Group 2 fax (G2 ITU)	Outdated fax standard
Group 3 fax (G3 ITU)	By far the most widespread fax transmission standard or analog fax terminal device type.
Group 4 fax (G4 ITU)	Extremely rare fax standard for the transmission of digital data in the ISDN network; group 4 fax machines can only be used with ISDN connections.
ISDN	Integrated Services Digital Network
ITU	International Telecom Union
PBX	Privat Branch eXchange respectively telephone system
PRI	Primary Rate Interface – a primary multiplex connection that consists of a signaling channel and 30 data channels at 64 kbit/s, which permits up to 30 phone calls simultaneously.
PSTN	Public Switched Telephone Network – a traditional phone network that is based on transmission via copper cable.
QoS	Quality of Service – standard for prioritizing voice data in IP networks
T.38	Protocol for transmitting faxes in IP networks in digital form. A real-time connection between the receivers is necessary. Please note: T.38 is only supported by IP fax devices. Existing analog fax devices do not support the T.38 protocol!
TDM	Time Division Multiplexing is a method for transmitting independent signals over a shared line. This process is used, among other things, for ISDN connections and, unlike Voice over IP (IP package-based transmission), is often used in the conceptual sense as a replacement for traditional digital calling.
VoIP	Voice over Internet Protocol (voice transmission in data networks)

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