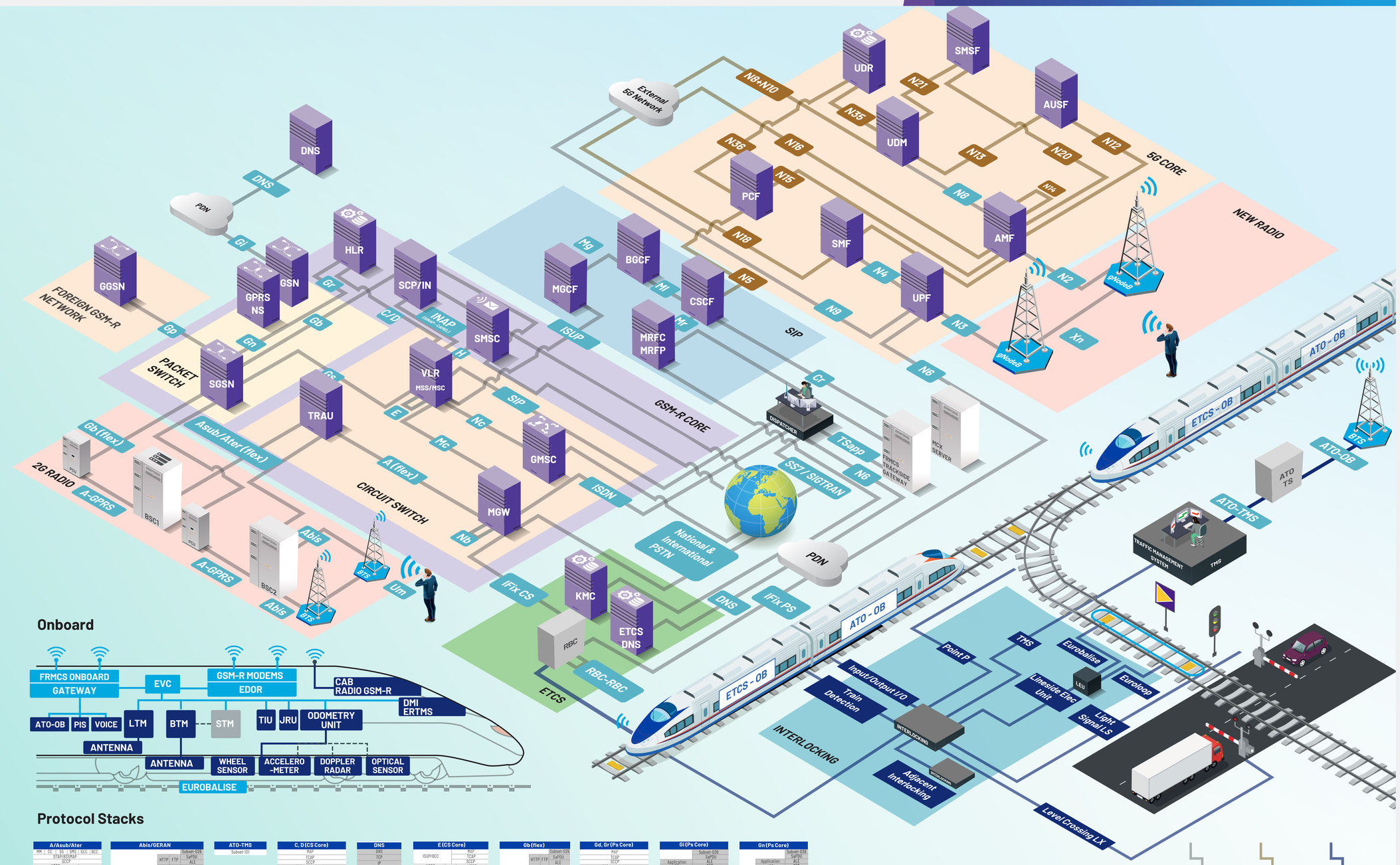
RAILWAY NETWORK ARCHITECTURE

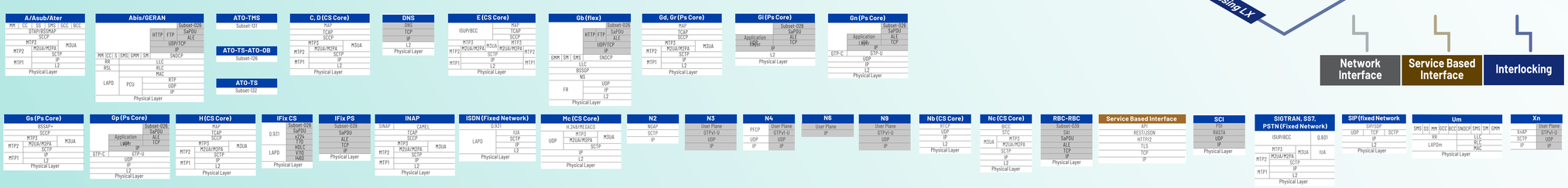
GSM-R, FRMCS, MCS, ETCS, ATO, INTERLOCKING

VIAVI Solutions

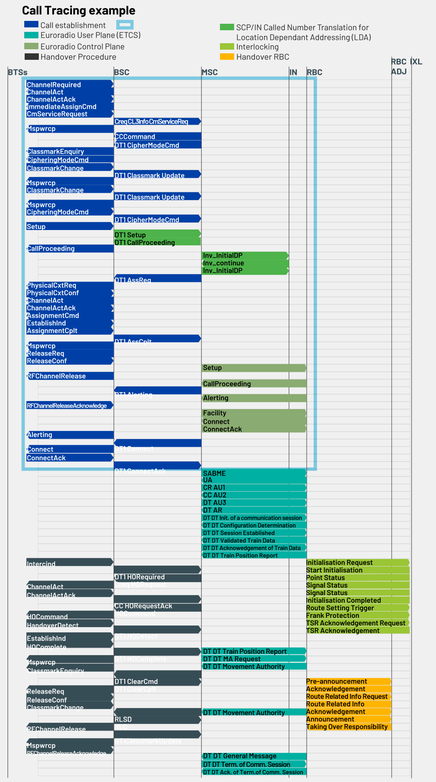


Onboard

Protocol Stacks



Call Tracing example



Acronyms & Glossary

Protocols

ALE	ERA SUBSET-098	Adaptation Layer Entity
BCC	3GPP 24.069	Broadcast Call Control
BICC	ITU-T Q.1901/3GPP 29.205	Bearer Independent Call Control
BSSAP	3GPP 29.018	Base Station System Application Part
BSSGP	3GPP 48.018	Base Station System GPRS Protocol
BSSMAP	3GPP 48.008	Base Station System Mobile Application Part
CAMEL	3GPP 23.078	Customized Application for Mobile Network Enhanced Logic
CAP	3GPP 29.078	CAMEL Application Part
CC	3GPP 24.008	Call Control
DTAP	3GPP 48.008	Direct Transfer Application Part
GCC	3GPP 24.068	Group Call Control
GMM	3GPP 24.008	GPRS Mobility Management
GSMS	3GPP 23.040, 3GPP 24.011 GPRS	Short Message Service
GTP-C	3GPP 29.060 GPRS	Tunneling Protocol - Control Plane
GTP-U	3GPP 29.060 GPRS	Tunneling Protocol - User Plane
H.248	3GPP 29.232	Gateway Control Protocol (H.248, Megaco)
HDLC	ISO3309,4335,7776,7809	High Level Data Link Layer Control
INAP	3GPP 29.078	Intelligent Network Application Protocol
IP	RFC 791	Internet Protocol
ISDN	ITU-T Q.952, 931	Integrated Services Digital Network
ISUP	ITU-T Q.763	ISDN User Part
IUA	RFC 4233	ISDN User Adaptation
LAPD	ETSI 300.125	Link Access Procedure on the D-Channel
LLC	ETSI TS 101.351	Link Layer Control
M2UA	RFC 3331	MTP2 User Adaptation Layer
M2PA	RFC 4165	MTP 2 Peer Adaptation layer
M3UA	RFC 3332, RFC 4666	MTP3 User Adaptation Layer
MAC	3GPP 25.321	Medium Access Control
MAP	3GPP 29.002	Mobile Application Part
MM	3GPP 24.008	Mobility Management
MTP2	ITU-T Q.703	Message Transfer Part - Level 2
MTP3	ITU-T Q.704	Message Transfer Part - Level 3
MTP3b	ITU-T Q.2210	Message Transfer Part - Level 3 - Broadband
NbUP	3GPP 29.415	Nb User Plane Protocol
NS	3GPP 48.016	Network Service
RAN	3GPP 25.005	Radio Access Network
RAN flex	3GPP 23.236	RAN flex
RLC	3GPP 25.322	Radio Link Control
RR	3GPP 44.018	Radio Resource
RRC	3GPP 25.331	Radio Resource Control
RSL	3GPP 48.058	BSC-BTS interface
RTP/RTPC	RFC 3550	Real-time Transport Protocol (Control)
SaPDU	ERA Subset-037	Safety Protocol Data Unit
SCCP	ITU-T Q.711- 714, Q.773	Signaling Connection Control Part
SCTP	RFC 4960	Stream Control Transport Protocol
SINAP	7mm FS.0	SSF-SCF and SRF-SCF Interface Specification
SIP	3GPP 23.231	Session Initiation Protocol
SIP-I	ETSI TS 23.231	Session Initiation Protocol
SIP-R	ETSI 103.389	Session Initiation Protocol
SM	3GPP 24.008	Session Management
SMS	3GPP 23.040, 3GPP 24.011	Short Message Service
SNDCP	ETSI TS 101 297	Sub Network Dependent Convergence Protocol
SS	3GPP 24.080	Supplementary Service
STC	ITU-T Q.2150	Signaling Transport Converter
T70	ITU-T T.70	Telematic Services
TCAP	ITU-T Q.773	Transaction Capabilities Application Part
TCP	RFC 793	Transmission Control Protocol
UDP	RFC 768	User Datagram Protocol
VTID	ITU-T V.110	Data Communication Over Telephone Network
X.224	ITU-T X.224	Data Networks and Open System Communication
Eirene FRS		ERA V8.0.0
Eirene SRS		ERA V8.0.0
ERTMS/GSM-R Quality of Service Test Specification		UIC O-2475: V4
FIS for the RBC/RBC Handover		ERA Subset-039
Follow-Me		3GPP 23.094
GSM-R Interfaces Class 1 Requirements		ERA Subset-093
SRS ERTMS/ETCS language		ERA Subset-026
Usage of the UUE in the GSM-R Environment		ETSI TS 102 810 / UIC O-2740

Entities/Acronyms

ATO	Automatic Train Operation	MSC/MSS	Mobile Switching Center or Server
BSC	Base Station Controller	OCS	Online Charging System
BSS	Base Station System	OFCS	Offline Charging System
BTM	Balise Transmission Module	OPH	Operational Purpose Handset
BTS	Base Transceiver Station	P-Point	
Codec	Coder/Decoder	PBW	Power Band Width
CS	Circuit Switch	PCU	Packet Control Unit
CSD	Circuit Switched Data	PDN	Public Data Network
DMI	Driver Machine Interface	PDI	Process Data Interface
DNS	Domain Name System	PS	Packet Switch
EDOR	ETCS Data Only Radio IC	PSD	Packet Switched Data
ERTMS	European Rail Train Management System	PSTN	Public Switch Telephone Network
ETCS	European Train Control System	R4	Release 4
EVC	European Vital Computer	R99	Release '99
FRMCS	Future Railway Mobile Communication System	RASTA	Rail Safe Transport Application
GGSN	Gateway GPRS Support Node	RBC	Radio Block Center
GMM	GPRS Mobility Management	SCI	Standard Communication Interface
GMSC	Gateway MSC	SGSN	Serving GPRS Support Node
GPRS	General Packet Radio Service	SIGTRAN	Signaling Transport
GSC	AS Group Communication Service - Application Server	SMSC	Short Message Service Center
GSM	Global System for Mobile communications	SS7	Signalling System Number 7
GSM-R	GSM-R for Railway	STM	Synchronous Transfer Mode
HLR	Home Location Register	SUA	SCCP User Adaptation
I/O	Input/Output	TCC	Traffic Control Center
ILS	Interlocking	TDS	Train Detection
IN	Intelligent Network	TIU	Telecommunication Interface Unit
ITU	International Telecommunication Union	TRAU	Transcode Rate Adapter Unit
JRU	Juridical Recording Unit	UE	User Equipment (+MS)
KMC	Key Management Centre	UP	User Plane
L2	Layer 2	VLR	Visitor Location Register
LEU	Lineside Electronic Unit		
LS	Signal		
LX	Level Crossing		
MCPTT	Mission Critical Push To Talk - Application Server		
MCS	Mission Critical Services		
MGCF	Media Gateway Control Function		
MGW	Media Gateway		
MS	Mobile Station (+UE)		

References

3GPP	http://www.3gpp.org
ERA	http://www.era.europa.eu
ETSI	http://www.etsi.org/standards
IETF/RFC	https://datatracker.ietf.org
ITU-T	http://www.itu.int
UIC	http://uic.org

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