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SON (Self-Organizing Networks) in the 5G & Open RAN Era: 2022 – 2030 – Opportunities, Challenges, Strategies & Forecasts

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Abstracts

SON (Self-Organizing Network) technology minimizes the lifecycle cost of running a mobile network by eliminating manual configuration of network elements at the time of deployment right through to dynamic optimization and troubleshooting during operation. Besides improving network performance and customer experience, SON can significantly reduce the cost of mobile operator services, improving the OpEx-to-revenue ratio and deferring avoidable CapEx.

Early adopters of SON have already witnessed a multitude of benefits in the form of accelerated 5G NR and LTE RAN (Radio Access Network) rollout times, simplified network upgrades, fewer dropped calls, improved call setup success rates, higher end user throughput, alleviation of congestion during special events, increased subscriber satisfaction and loyalty, operational efficiencies such as energy and cost savings, and freeing up radio engineers from repetitive manual tasks.

Although SON was originally developed as an operational approach to streamline and automate cellular RAN deployment and optimization, mobile operators and vendors are increasingly focusing on integrating new capabilities such as self-protection against digital security threats and self-learning through AI (Artificial Intelligence) techniques, as well as extending the scope of SON beyond the RAN to include both mobile core and transport network segments – which will be critical to address 5G requirements such as end-to-end network slicing.

In addition, with the cellular industry's ongoing shift towards open interfaces, virtualization and software-driven networking, the SON ecosystem is progressively transitioning from the traditional D-SON (Distributed SON) and C-SON (Centralized

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SON) approach to open standards-based components supporting RAN programmability for advanced automation and intelligent control.

The surging popularity of innovative Open RAN and vRAN (Virtualized RAN) architectures has reignited the traditionally niche and proprietary product-driven SON market with a host of open standards-compliant RIC (RAN Intelligent Controller), xApp and rApp offerings, which are capable of supporting both near real-time D-SON and non real-time C-SON capabilities for RAN automation and optimization needs.

SNS Telecom & IT estimates that global spending on RIC platforms, xApps and rApps will reach $120 Million in 2023 as initial implementations move from field trials to production-grade deployments. With commercial maturity, the submarket is further expected to quintuple to nearly $600 Million by the end of 2025. Annual investments in the wider SON market – which includes licensing of embedded D-SON features, third party C-SON functions and associated OSS platforms, in-house SON capabilities internally developed by mobile operators, and SON-related professional services across the RAN, mobile core and transport domains – are expected to grow at a CAGR of approximately 7% during the same period.

The “SON (Self-Organizing Networks) in the 5G & Open RAN Era: 2022 – 2030 – Opportunities, Challenges, Strategies & Forecasts” report presents a detailed assessment of the SON market, including the value chain, market drivers, barriers to uptake, enabling technologies, functional areas, use cases, key trends, future roadmap, standardization, case studies, ecosystem player profiles and strategies. The report also provides global and regional market size forecasts for both SON and conventional mobile network optimization from 2022 till 2030, including submarket projections for three network segments, six SON architecture categories, four access technologies and five regional submarkets.

The report comes with an associated Excel datasheet suite covering quantitative data from all numeric forecasts presented in the report.

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6.10 NTT DoCoMo
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CHAPTER 7: KEY ECOSYSTEM PLAYERS

7.1 Aarna Networks
7.2 Abside Networks
7.3 Accedian

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7.4 Accelleran
7.5 Accuver (InnoWireless)
7.6 Actiontec Electronics
7.7 AI-LINK
7.8 AirHop Communications
7.9 Airspan Networks
7.10 AiVader
7.11 Aliniant
7.12 Allot
7.13 Alpha Networks
7.14 Altiostar (Rakuten Symphony)
7.15 Amazon/AWS (Amazon Web Services)
7.16 Amdocs
7.17 Anktion (Fujian) Technology
7.18 Anritsu
7.19 Arcadyan Technology Corporation (Compal Electronics)
7.20 Argela
7.21 Aria Networks
7.22 ArrayComm (Chengdu ArrayComm Wireless Technologies)
7.23 Artemis Networks
7.24 Artiza Networks
7.25 Arukona
7.26 Askey Computer Corporation (ASUS – ASUSTeK Computer)
7.27 ASOCS
7.28 Aspire Technology (NEC Corporation)
7.29 ASTRI (Hong Kong Applied Science and Technology Research Institute)
7.30 ATDI
7.31 Atesio
7.32 Atrinet
7.33 Aurora Insight
7.34 Aviat Networks
7.35 Azcom Technology
7.36 Baicells
7.37 BandwidthX
7.38 BLiNQ Networks (CCI – Communication Components Inc.)
7.39 Blu Wireless
7.40 Blue Danube Systems (NEC Corporation)
7.41 BTI Wireless
7.42 B-Yond

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7.43 CableFree (Wireless Excellence)
7.44 Cambium Networks
7.45 Capgemini Engineering
7.46 Casa Systems
7.47 CBNG (Cambridge Broadband Networks Group)
7.48 CCS – Cambridge Communication Systems (ADTRAN)
7.49 Celfinet (Cyient)
7.50 CellOnyx
7.51 Cellwize (Qualcomm)
7.52 CelPlan Technologies
7.53 CGI
7.54 Chengdu NTS
7.55 CICT – China Information and Communication Technology Group (China Xinke Group)
7.56 Ciena Corporation
7.57 CIG (Cambridge Industries Group)
7.58 Cisco Systems
7.59 Cohere Technologies
7.60 Comarch
7.61 Comba Telecom
7.62 CommAgility (Wireless Telecom Group)
7.63 CommScope
7.64 COMSovereign
7.65 Contela
7.66 Continual
7.67 Corning
7.68 Creanord
7.69 DeepSig
7.70 Dell Technologies
7.71 DGS (Digital Global Systems)
7.72 Digitata
7.73 D-Link Corporation
7.74 DZS
7.75 ECE (European Communications Engineering)
7.76 EDX Wireless
7.77 eino
7.78 Elisa Polystar
7.79 Equiendo
7.80 Ericsson

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7.81 Errigal
7.82 ETRI (Electronics & Telecommunications Research Institute, South Korea)
7.83 EXFO
7.84 Fairspectrum
7.85 Federated Wireless
7.86 Flash Networks
7.87 Forsk
7.88 Foxconn (Hon Hai Technology Group)
7.89 Fraunhofer HHI (Heinrich Hertz Institute)
7.90 Fujitsu
7.91 Gemtek Technology
7.92 GENEViSiO (QNAP Systems)
7.93 GenXComm
7.94 Gigamon
7.95 GigaTera Communications (KMW)
7.96 Google (Alphabet)
7.97 Groundhog Technologies
7.98 Guavus (Thales)
7.99 HCL Technologies
7.100 Helios (Fujian Helios Technologies)
7.101 HFR Networks
7.102 Highstreet Technologies
7.103 Hitachi
7.104 HPE (Hewlett Packard Enterprise)
7.105 HSC (Hughes Systique Corporation)
7.106 Huawei
7.107 iBwave Solutions
7.108 iConNext
7.109 Infinera
7.110 Infosys
7.111 InfoVista
7.112 Inmanta
7.113 Innovile
7.114 InnoWireless
7.115 Intel Corporation
7.116 InterDigital
7.117 Intracom Telecom
7.118 Inventec Corporation
7.119 ISCO International

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7.120 IS-Wireless
7.121 ITRI (Industrial Technology Research Institute, Taiwan)
7.122 JMA Wireless
7.123 JRC (Japan Radio Company)
7.124 Juniper Networks
7.125 Key Bridge Wireless
7.126 Keysight Technologies
7.127 Kleos
7.128 KMW
7.129 Kumu Networks
7.130 Lemko Corporation
7.131 Lenovo
7.132 Lextrum (COMSovereign)
7.133 Lime Microsystems
7.134 LIONS Technology
7.135 LITE-ON Technology Corporation
7.136 LS telcom
7.137 LuxCarta
7.138 MantisNet
7.139 Marvell Technology
7.140 Mavenir
7.141 Meta Connectivity
7.142 MicroNova
7.143 Microsoft Corporation
7.144 MikroTik
7.145 MitraStar Technology (Unizyx Holding Corporation)
7.146 MYCOM OSI (Amdocs)
7.147 Nash Technologies
7.148 NEC Corporation
7.149 Net AI
7.150 Netcracker Technology (NEC Corporation)
7.151 NETSCOUT Systems
7.152 Netsia (Argela)
7.153 New H3C Technologies (Tsinghua Unigroup)
7.154 New Postcom Equipment
7.155 Nextivity
7.156 Node-H
7.157 Nokia
7.158 NuRAN Wireless

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7.161 Omnitele
7.162 Opanga Networks
7.163 Openet (Amdocs)
7.164 P.I. Works
7.165 Parallel Wireless
7.166 Phluido
7.167 Picocom
7.168 Pivotal Commware
7.169 Polte
7.170 Potevio (CETC – China Electronics Technology Group Corporation)
7.171 Qualcomm
7.172 Quanta Computer
7.173 Qucell Networks (InnoWireless)
7.174 RADCOM
7.175 Radisys (Reliance Industries)
7.176 Rakuten Symphony
7.177 Ranplan Wireless
7.178 Red Hat (IBM)
7.179 RED Technologies
7.180 RIMEDO Labs
7.181 Rivada Networks
7.182 Rohde & Schwarz
7.183 Ruijie Networks
7.184 RunEL
7.185 SageRAN (Guangzhou SageRAN Technology)
7.186 Saguna Networks (COMSovereign)
7.187 Samji Electronics
7.188 Samsung
7.189 Sandvine
7.190 Sercomm Corporation
7.191 Signalwing
7.192 Siklu
7.193 SIRADEL
7.194 Skyvera (TelcoDR)
7.195 SOLiD
7.196 Sooktha
7.197 Spectrum Effect

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7.198 SSC (Shared Spectrum Company)
7.199 Star Solutions
7.200 STL (Sterlite Technologies Ltd.)
7.201 Subex
7.202 Sunwave Communications
7.203 Systemics-PAB
7.204 T&W (Shenzhen Gongjin Electronics)
7.205 Tarana Wireless
7.206 TCS (Tata Consultancy Services)
7.207 Tech Mahindra
7.208 Tecore Networks
7.209 Telrad Networks
7.210 TEOCO
7.211 ThinkRF
7.212 TI (Texas Instruments)
7.213 TietoEVRY
7.214 Tr?pico (CPQD – Center for Research and Development in Telecommunications, Brazil)
7.215 TTG International
7.216 Tupl
7.217 ULAK Communication
7.218 Vavitel (Shenzhen Vavitel Technology)
7.219 VHT (Viettel High Tech)
7.220 VIAVI Solutions
7.221 VMware
7.222 VNC – Virtual NetCom (COMSovereign)
7.223 VNL – Vihaan Networks Limited (Shyam Group)
7.224 WDNA (Wireless DNA)
7.225 WebRadar
7.226 Wind River Systems
7.227 Wipro
7.228 Wiwynn (Wistron Corporation)
7.229 WNC (Wistron NeWeb Corporation)
7.230 XCOM Labs
7.231 Xingtera
7.232 ZaiNar
7.233 Z-Com
7.234 Zeetta Networks
7.235 ZTE

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7.236 Zyxel (Unizyx Holding Corporation)

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8.12 Middle East & Africa
  8.12.1 SON

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8.12.2 Conventional Mobile Network Planning & Optimization
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LIST OF COMPANIES MENTIONED

3GPP (Third Generation Partnership Project)
Aarna Networks
Abside Networks
Accedian
Accelleran
Accuver
Actiontec Electronics
ADTRAN
AI-LINK
AirHop Communications
Airspan Networks
AiVader
Aliniant
Allot
Alpha Networks
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Altiostar
Amazon
Amdocs
Am?rica M?vil
Anktion (Fujian) Technology
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Arcadyan Technology Corporation
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Azcom Technology
Baicells
BandwidthX
beCloud (Belarusian Cloud Technologies)
Beeline Russia
Bell Canada
Betacom
Bharti Airtel
BLiNQ Networks
Blu Wireless
Blue Danube Systems
BT Group
BTC (Botswana Telecommunications Corporation)
BTI Wireless
B-Yond
CableFree (Wireless Excellence)
CableLabs
Cambium Networks
Capgemini Engineering
Casa Systems
CBNG (Cambridge Broadband Networks Group)
CCI (Communication Components Inc.)
CCS (Cambridge Communication Systems)
CCSA (China Communications Standards Association)
Celfinet (Cyient)
CellOnyx
Cellwize
Celona
CelPlan Technologies
CETC (China Electronics Technology Group Corporation)

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CGI
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China Mobile
CICT – China Information and Communication Technology Group (China Xinke Group)
Ciena Corporation
CIG (Cambridge Industries Group)
Cisco Systems
Claro Colombia
Cohere Technologies
Comarch
Comba Telecom
CommAgility
CommScope
Compal Electronics
COMSovereign
Contela
Continual
Corning
CPQD (Center for Research and Development in Telecommunications, Brazil)
Creanord
Datang Telecom Technology & Industry Group
DeepSig
Dell Technologies
DGS (Digital Global Systems)
Digitata
DISH Network Corporation
D-Link Corporation
DSA (Dynamic Spectrum Alliance)
DT (Deutsche Telekom)
DZS
ECE (European Communications Engineering)
EDX Wireless
EE
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Elisa
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Errigal

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ETRI (Electronics & Telecommunications Research Institute, South Korea)
ETSI (European Telecommunications Standards Institute)
EXFO
Fairspectrum
Federated Wireless
FiberHome Technologies
Flash Networks
Forsk
Foxconn (Hon Hai Technology Group)
Fraunhofer HHI (Heinrich Hertz Institute)
Fujitsu
Gemtek Technology
GENEViSiO
GenXComm
Gigamon
GigaTera Communications
Globe Telecom
Google
Groundhog Technologies
Guavus
HCL Technologies
Helios (Fujian Helios Technologies)
HFR Networks
Highstreet Technologies
Hitachi
Hitachi Kokusai Electric
Hitachi Vantara
HPE (Hewlett Packard Enterprise)
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Keysight Technologies
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KMW
KPN
Kumu Networks
Kuzey K?br?s Turkcell
Kyivstar
Lemko Corporation
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Lextrum
Liberty Global
life:)/BeST (Belarusian Telecommunications Network)
lifecell Ukraine
Lime Microsystems
Linux Foundation
LIONS Technology
LITE-ON Technology Corporation
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Nextivity
NGMN Alliance
Node-H
Nokia
NTT DoCoMo
NuRAN Wireless
Nutaq Innovation
NXP Semiconductors
Oceus Networks
Omnitele
ONF (Open Networking Foundation)
OnGo Alliance
Ooredoo
Ooredoo Algeria
Ooredoo Tunisia
Opanga Networks
Openet
Opticoms
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Redline Communications
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Rivada Networks
Rohde & Schwarz
Ruijie Networks
RunEL
SageRAN (Guangzhou SageRAN Technology)
Saguna Networks
Samji Electronics
Samsung
Sandvine
SCF (Small Cell Forum)
Sercomm Corporation
Shyam Group
Signalwing
Siklu
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SIRADEL
SK Telecom
Skyvera (TelcoDR)
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T&W (Shenzhen Gongjin Electronics)
Tarana Wireless
TCS (Tata Consultancy Services)
Tech Mahindra
Tecore Networks
Telecom Argentina
Telef?nica Germany
Telef?nica Group
Telkomsel
Telrad Networks
Telstra
TEOCO
Thales
ThinkRF
TI (Texas Instruments)
TietoEVRY
TIM (Telecom Italia Mobile)
TIM Brasil
TIP (Telecom Infra Project)
TPG Telecom
Tr?pico
TSDSI (Telecommunications Standards Development Society, India)
Tsinghua Unigroup
TTA (Telecommunications Technology Association, South Korea)
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Unizyx Holding Corporation
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VHT (Viettel High Tech)
Vi (Vodafone Idea)
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Virgin Media O2
VMware
VNC (Virtual NetCom)
VNL (Vihaan Networks Limited)
Vodafone Germany
Vodafone Group
Vodafone Ireland
Vodafone Italy
Vodafone T?rkiye
WBA (Wireless Broadband Alliance)
WDNA (Wireless DNA)
WebRadar
Wind River Systems
WInnForum (Wireless Innovation Forum)
Wipro
Wireless Telecom Group
Wistron Corporation
Wiwynn
WNC (Wistron NeWeb Corporation)
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