

Contents

[Telcordia SR-5093 - Documentation Information](#)

| | |
|---|------|
| 1. Introduction | 1-1 |
| 1.1 Purpose and Scope | 1-1 |
| 1.2 Background | 1-1 |
| 1.3 Organization | 1-3 |
| 2. General Information | 2-1 |
| 2.1 Business Drivers for Migration Toward an NGN | 2-1 |
| 2.1.1 Technology Trends | 2-1 |
| 2.1.2 Motivations for Network Evolution | 2-2 |
| 2.2 Key NGN/VOP Operator Services Architecture Objectives | 2-4 |
| 2.3 VOP Architecture | 2-5 |
| 2.3.1 Overview | 2-6 |
| 2.3.2 Functional Elements | 2-7 |
| 2.3.3 Interfaces and Protocols | 2-10 |
| 2.3.4 Migration of VOP Architecture toward NGN | 2-15 |
| 2.4 Operator Services Architecture Description | 2-17 |
| 2.4.1 Description of Operator Services | 2-17 |
| 2.4.2 Description of Current Operator Services Architecture | 2-19 |
| 2.4.3 Provision of Operator Services to NGN/VOP Customers | 2-22 |
| 2.4.3.1 Providing Operator Services to NGN/VOP Customers Using Existing OSSs | 2-22 |
| 2.4.3.2 Migration of OSS Components | 2-24 |
| 2.4.3.3 Migration of OSS Core Switch, EO Operator Services Capabilities, and Feature Nodes | 2-25 |
| 3. NGN/VOP Operator Services Architecture | 3-1 |
| 3.1 Overview | 3-1 |
| 3.2 Functional Elements | 3-4 |
| 3.3 Logical Interfaces | 3-11 |
| 3.4 NGN/VOP Operator Services Architecture Assumptions | 3-17 |
| 3.4.1 General Assumptions | 3-17 |
| 3.4.2 Signaling and Routing Assumptions | 3-19 |
| 3.4.3 Core Network Assumptions | 3-19 |
| 3.4.4 Call Type Assumptions | 3-20 |
| 3.4.5 Resource Management Assumptions | 3-21 |
| 3.4.6 Connection Control Assumptions | 3-22 |
| 3.4.7 Core Network Bearer Connections Assumptions | 3-22 |
| 3.4.8 User and Operator Workstation Interfaces Assumptions | 3-23 |
| 3.4.9 Application Protocol Assumptions | 3-23 |
| 3.4.10 Miscellaneous Assumptions | 3-24 |
| 4. Call Flows | 4-1 |
| 4.1 Call Completion Operator Services | 4-1 |
| 4.1.1 Existing OSS - Forward Routing | 4-1 |
| 4.1.2 Existing OSS - Release to Pivot | 4-4 |

| | | |
|----------|---|-------|
| 4.1.3 | Forward Routing | 4-8 |
| 4.1.4 | Release to Pivot | 4-15 |
| 4.1.5 | Release to Pivot - Remote VFS | 4-19 |
| 4.1.6 | Provision of NGN/VOP Operator Services to PSTN Customer Using Release to Pivot | 4-24 |
| 4.2 | Queuing and Call Distribution | 4-29 |
| 4.2.1 | Queuing and Call Distribution to a Remote OSC | 4-29 |
| 4.2.2 | Queuing and Call Distribution - Unavailable Operators | 4-33 |
| 4.3 | Verbal Request for Data | 4-39 |
| 4.3.1 | Verbal Request for Data for On-Net User | 4-39 |
| 4.4 | Web-Site Assistance | 4-43 |
| 4.4.1 | Web-Site Assistance with Call Completion for On-Net User | 4-44 |
| 4.5 | Messages to Operators | 4-49 |
| 4.5.1 | Incoming Messages to Operators from On-Net User | 4-49 |
| 4.6 | Busy Line Verification/Interrupt | 4-51 |
| 4.6.1 | BLV/I with Existing OSS and On-Net Calling Party and Target Party | 4-51 |
| 4.6.2 | NGN/VOP BLV/I for On-Net Calling Party and Target Party | 4-53 |
| 4.6.3 | NGN/VOP BLV/I with Inward Routing to Existing OSS | 4-56 |
| 4.7 | Alternate Billing | 4-59 |
| 4.7.1 | Collect Call | 4-59 |
| 4.8 | Connection Hold and Ringback | 4-63 |
| 4.8.1 | Connection Hold | 4-63 |
| 4.9 | Transfer | 4-65 |
| 4.10 | 1+ Coin Sent Paid | 4-69 |
| 4.11 | Real-Time Rating | 4-71 |
| 4.11.1 | Time and Charges | 4-71 |
| 4.12 | Intercept | 4-77 |
| 4.13 | Non-published Messaging | 4-79 |
| 4.14 | Monitor | 4-84 |
| 4.14.1 | Supervisor Monitoring- Manual | 4-84 |
| 4.15 | Future NGN/VOP Operator Services Call Flows | 4-88 |
| 4.15.1 | Bearer Redirection Architecture | 4-88 |
| 4.15.1.1 | Generic Call Flows | 4-89 |
| 4.15.1.2 | Simplified Bearer Redirection with Immediate Release | 4-91 |
| 4.15.1.3 | Bearer Redirection for Queueing and Call Distribution (CCA2) Controlling Further Bearer Redirection | 4-94 |
| 4.15.2 | Service-Specific Servers provide Call Completion Operator Services - AIN-like approach | 4-99 |
| 4.15.3 | Provision of NGN/VOP Operator Services to Customer Served by H.323 Network | 4-103 |
| 4.15.4 | Interactions with H.248-Capable Operator Workstations | 4-106 |
| 4.15.5 | Interactions with SIP-Capable Operator Workstations | 4-108 |
| 5. | Information Flows and Protocol Alternatives | 5-1 |

| | | |
|------|---|--------------|
| 5.1 | Protocol Overview | 5-1 |
| 5.2 | CCA to BTN Interface | 5-3 |
| 5.3 | CCA to Operator Workstation Interface | 5-5 |
| 5.4 | CCA/OS SA to Operator Workstation Interface | 5-6 |
| 5.5 | QCD to Operator Workstation Interface | 5-7 |
| 5.6 | CCA to VFS Interface | 5-8 |
| 5.7 | CCA/OS SA to VFS Interface | 5-8 |
| 5.8 | CCA to Signaling Gateway Interface | 5-8 |
| 5.9 | CCA to Trunk Gateway Interface | 5-9 |
| 5.10 | CCA/OS SA to QCD Interface | 5-9 |
| 5.11 | WCS to QCD Interface | 5-10 |
| 5.12 | WCS to Operator Workstation Interface | 5-11 |
| 5.13 | CCA/OS SA to Agent Message Handler Interface | 5-11 |
| 5.14 | Agent Message Handler to QCD Interface | 5-11 |
| 5.15 | Agent Message Handler to Operator Workstation Interface | 5-11 |
| 5.16 | CCA to CCA Interface | 5-12 |
| 5.17 | CCA to AGW Interface | 5-12 |
| 5.18 | CCA to RGW Interface | 5-12 |
| 5.19 | CCA/OS SA to H.323-capable CPE Interface | 5-12 |
| 5.20 | QCD to Force Management System (FMS) Interface | 5-12 |
| 5.21 | CCA/OS SA to Operator Services Database Interface | 5-13 |
| 5.22 | Operator Workstation to Automated Monitoring System Interface | 5-13 |
| 6. | Recommended Path Forward | 6-1 |
| | Glossary | Glossary-1 |
| | References | References-1 |

List of Figures

| | | |
|--------------|---|------|
| Figure 2-1. | High-Level VOP Network Architecture | 2-7 |
| Figure 2-2. | Overview of VOP Physical Interfaces | 2-10 |
| Figure 2-3. | Overview of Logical Interfaces and Protocols for the VOP Architecture | 2-11 |
| Figure 2-4. | OSS Architecture | 2-19 |
| Figure 3-1. | NGN/VOP Architecture - High Level View | 3-1 |
| Figure 3-2. | Operator Services in an NGN/VOP Architecture | 3-3 |
| Figure 3-3. | Overview of Logical Interfaces and Protocols for the NGN/VOP Operator Services Components | 3-11 |
| Figure 3-4. | Bearer and Signaling Transport Stack | 3-20 |
| Figure 4-1. | Existing OSS-Forward Routing | 4-2 |
| Figure 4-2. | Existing OSS-Forward Routing Call Flow | 4-3 |
| Figure 4-3. | Existing OSS- Release to Pivot | 4-5 |
| Figure 4-4. | Existing OSS - Release to Pivot Call Flow | 4-6 |
| Figure 4-5. | Forward Routing | 4-9 |
| Figure 4-6. | Forward Routing Call Flow | 4-11 |
| Figure 4-7. | Release to Pivot | 4-15 |
| Figure 4-8. | Release to Pivot Call Flow | 4-17 |
| Figure 4-9. | Release to Pivot - Remote VFS | 4-19 |
| Figure 4-10. | Release to Pivot - Remote VFS Call Flow | 4-21 |
| Figure 4-11. | Provision of NGN/VOP Operator Services to PSTN Customer Using Release to Pivot | 4-25 |
| Figure 4-12. | Provision of NGN/VOP Operator Services to PSTN Customer Using Release to Pivot - Call Flow | 4-26 |
| Figure 4-13. | Queuing and Call Distribution to Remote OSC | 4-29 |
| Figure 4-14. | Queuing and Call Distribution to Remote OSC Call Flow | 4-31 |
| Figure 4-15. | Queuing and Call Distribution - Unavailable Operators | 4-34 |
| Figure 4-16. | Queuing and Call Distribution - Unavailable Operators Call Flow | 4-36 |
| Figure 4-17. | Verbal Request for Data | 4-40 |
| Figure 4-18. | Verbal Request for Data Call Flow | 4-42 |
| Figure 4-19. | Web-Site Assistance with Call Completion for On-Net User | 4-44 |
| Figure 4-20. | Web-Site Assistance with Call Completion for On-Net User Call Flow | 4-46 |
| Figure 4-21. | Incoming Messages to Operators | 4-49 |
| Figure 4-22. | Incoming Messages to Operators - Call Flow | 4-50 |
| Figure 4-23. | Existing OSS-BLV/I | 4-52 |
| Figure 4-24. | Existing OSS-BLV/I Call Flow | 4-53 |
| Figure 4-25. | NGN/VOP BLV/I | 4-54 |
| Figure 4-26. | NGN/VOP BLV/I Call Flow | 4-55 |
| Figure 4-27. | NGN/VOP BLV/I - Inward Routing | 4-57 |
| Figure 4-28. | NGN/VOP BLV/I - Inward Routing Call Flow | 4-58 |
| Figure 4-29. | Collect Call | 4-59 |
| Figure 4-30. | Collect Call - Call Flow | 4-61 |

| | | |
|--------------|---|-------|
| Figure 4-31. | Connection Hold | 4-64 |
| Figure 4-32. | Connection Hold Call Flow | 4-64 |
| Figure 4-33. | Transfer to Supervisor | 4-66 |
| Figure 4-34. | Transfer to Supervisor - Call Flow | 4-67 |
| Figure 4-35. | 1+Coin Sent Paid | 4-69 |
| Figure 4-36. | 1+Coin Sent Paid Call Flow | 4-70 |
| Figure 4-37. | Time and Charges | 4-72 |
| Figure 4-38. | Time and Charges Call Flow | 4-74 |
| Figure 4-39. | Intercept | 4-77 |
| Figure 4-40. | Intercept Call Flow | 4-78 |
| Figure 4-41. | Non-Published Messaging | 4-79 |
| Figure 4-42. | Non-Published Messaging Call Flow | 4-81 |
| Figure 4-43. | Supervisor Monitoring - Manual | 4-85 |
| Figure 4-44. | Supervisor Monitoring - Manual Call Flow | 4-86 |
| Figure 4-45. | Bearer Redirection | 4-88 |
| Figure 4-46. | Simplified Bearer Redirection | 4-90 |
| Figure 4-47. | Bearer Redirection - Queuing and Call Distribution | 4-96 |
| Figure 4-48. | Service-Specific Servers Provide Operator Services | 4-99 |
| Figure 4-49. | Provision of NGN/VOP Operator Services to Customer Served by H.323 Network | 4-104 |
| Figure 4-50. | H.248-Capable Operator Workstation | 4-107 |
| Figure 5-1. | High Level View of NGN/VOP Architecture | 5-1 |

List of Tables

| | | |
|------------|--|------|
| Table 2-1. | VOP Interface & Protocol Summary | 2-11 |
| Table 3-1. | NGN/VOP Operator Services Interface & Protocol Summary . | 3-12 |