

TK170: CAP Protocol

Duration

2.0 Days

Course Content

1. Introduction to Intelligent Networks

- 1.1 History of Intelligent Networks
- 1.2 Principles of Intelligent Networks
- 1.3 Service Switching Function
 - 1.4 Service Control Function
 - 1.5 Basic Call State Model
 - 1.6 Dialogue Handling
 - 1.6.1 DP Arming/Disarming Rules
 - 1.6.2 Control vs Monitor Relationship
 - 1.7 Evolution of the CAMEL Standard
 - 1.7.1 Third-generation Partnership Project
 - 1.7.2 CAMEL Standards and Specifications
 - 1.8 Principles of CAMEL
 - 1.9 Signalling for CAMEL
 - 1.9.1 MTP3
 - 1.9.2 SCCP
 - 1.9.3 Transaction Capabilities
 - 1.10 Dynamic Load Sharing
 - 1.11 Using Signalling Point Code for Addressing in HPLMN

2. CAMEL Phase 1

2.1 Architecture for CAMEL Phase 1

2.2 Feature Description

2.2.1 Mobile-originated Calls

2.2.2 Mobile-terminated Calls

2.2.3 Mobile-forwarded Calls

2.2.4 Any-time Interrogation

2.3 Subscription Data

2.4 Basic Call State Model

2.4.1 Originating Basic Call State Model

2.4.2 Terminating Basic Call State Model

2.4.3 Detection Points

2.4.4 Points in Call

2.4.5 BCSM State Transitions

2.4.6 gsmSSF Process

2.4.7 Tssf Timer

2.5 CAMEL Application Part

2.5.1 Initial DP

2.5.2 Request Report BCSM

2.5.3 Event Report BCSM

2.5.4 Continue

2.5.5 Connect

2.5.6 Release Call

2.5.7 Activity Test

2.6 Service Examples

2.6.1 Virtual Private Network

2.6.2 Pre-paid Route Home

2.6.3 Short Number Dialling with CLI Guarantee

3. CAMEL Phase 2

3.1 Introduction

3.2 Architecture

3.3 Feature Description

3.3.1 On-line Charging Control

3.3.2 Call Forwarding Notifications

3.3.3 Follow-on Calls

3.3.4 User Interaction

3.3.5 Equal Access

3.3.6 Enhancement of Call Control

3.3.7 Supplementary Service Invocation Notification

3.3.8 Short Forwarded-to Numbers

3.3.9 Conditional Triggering

3.3.10 USSD control

3.4 Subscription Data

3.4.1 Originating CSI

3.4.2 Terminating CSI

3.4.3 Supplementary Service CSI

3.4.4 Translation Information Flag CSI

3.4.5 Unstructured Supplementary Service Data CSI

3.4.6 USSD Generic CSI

3.5 Basic Call State Model

3.5.1 Originating Basic Call State Model

3.5.2 Terminating Basic Call State Model

3.6 Interaction with GSM Supplementary Services

- 3.6.1 Line Identification
- 3.6.2 Call Forwarding
- 3.6.3 Explicit Call Transfer
- 3.6.4 Call Waiting
- 3.6.5 Call Hold
- 3.6.6 Completion of Calls to Busy Subscribers
- 3.6.7 Multi-party
- 3.6.8 Closed User Group
- 3.6.9 Call Barring
- 3.6.10 User-to-user Signalling
- 3.6.11 Call Deflection

3.7 Interaction with Network Services

- 3.7.1 Basic Optimal Routing
- 3.7.2 Immediate Service Termination
- 3.7.3 Operator-determined Barring
- 3.7.4 High-speed Circuit-switched Data
- 3.7.5 Multiple Subscriber Profile

4. CAMEL Phase 3

4.1 General Third-generation Networks

- 4.1.1 UMTS Network Architecture
- 4.1.2 2G Cell Planning vs 3G Cell Planning
- 4.1.3 Location Information
- 4.1.4 Split-MSC Architecture
- 4.1.5 CAMEL Phase 3 Features

4.2 Call Control

- 4.2.1 Subscribed Dialed Services

- 4.2.2 Serving Network-based Dialed Services
- 4.2.3 CAMEL Control of Mobile Terminated Calls in VMSC
- 4.2.4 CAMEL Service Invocation at Call Failure
- 4.2.5 Service Interaction Control
- 4.2.6 Call Gapping
- 4.2.7 Support of Long Forwarded-to numbers
- 4.2.8 On-line Charging Enhancements
- 4.2.9 Multiple Subscriber Profile

4.3 CAMEL Control of GPRS

- 4.3.1 Network Architecture
- 4.3.2 Subscription Data
- 4.3.3 GPRS State Models
- 4.3.4 CAP v3 Operations for GPRS
- 4.3.5 On-line Charging for GPRS
- 4.3.6 Quality of Service
- 4.3.7 Routing Area Update
- 4.3.8 Network-initiated PDP Context Establishment
- 4.3.9 Secondary PDP Context
- 4.3.10 Impact on CDRs
- 4.3.11 Operator-determined Barring
- 4.3.12 GPRS Roaming Scenarios
- 4.3.13 Enhanced Data Rates for GSM Evolution

4.4 CAMEL Control of MO-SMS

- 4.4.1 Network Architecture
- 4.4.2 CAMEL Control of MO-SMS
- 4.4.3 Subscription Data

4.4.4 SMS State Model

4.4.5 Information Flows

4.4.6 Information Reporting and SMS Steering

4.4.7 Charging and Call Detail Records

4.4.8 Supplementary Services and Operator-determined Barring

4.4.9 Service Examples

4.4.10 International Roaming

4.5 Mobility Management

4.5.1 Description

4.5.2 Subscription Data

4.5.3 Information Flows

4.5.4 Service Examples

4.6 CAMEL Interaction with Location Services

4.7 Active Location Retrieval

4.8 Subscription Data Control

4.8.1 Network Architecture

4.8.2 Any-time Subscription Interrogation

4.8.3 Any-time Modification

4.8.4 Notify Subscriber Data Change

4.9 Enhancement to USSD

4.10 Pre-paging

5. CAMEL Phase 4

5.1 General

5.1.1 Specifications Used for CAMEL Phase 4

5.1.2 Partial CAMEL Phase 4 Support

5.2 Call Control

- 5.2.1 Basic Call State Models
- 5.2.2 Call Party Handling
- 5.2.3 Network-initiated Call Establishment
- 5.2.4 Optimal Routing of Basic Mobile-to-mobile Calls
- 5.2.5 Alerting Detection Point
- 5.2.6 Mid-call Detection Point
- 5.2.7 Change of Position Detection Point
- 5.2.8 Flexible Warning Tone
- 5.2.9 Tone Injection
- 5.2.10 Enhancement to Call Forwarding Notification
- 5.2.11 Control of Video Telephony Calls
- 5.2.12 Control of SCUDIF Calls
- 5.2.13 Reporting IMEI and MS Classmark
- 5.3 GPRS Control
- 5.4 SMS Control
 - 5.4.1 Mobile-originated SMS Control
 - 5.4.2 Mobile-terminated SMS Control
- 5.5 Mobility Management
- 5.6 Any-time Interrogation
 - 5.6.1 ATI for CS Domain
 - 5.6.2 ATI for PS Domain
- 5.7 Subscription Data Control
- 5.8 Mobile Number Portability
 - 5.8.1 Call Routing
 - 5.8.2 MNP SRF Query by gsmSCF
 - 5.8.3 Non-standard MNP Solutions

5.9 Control of IP Multimedia Calls

5.9.1 Rationale of CAMEL Control of IMS

5.9.2 The IM-SSF

5.9.3 Registration

5.9.4 IMS Call Control

5.9.5 CAMEL Application Part for IMS Control

5.9.6 Supported Call Cases for IMS Control

5.9.7 Service Example

6. Charging and Accounting

6.1 Architecture

6.2 Call Detail Records

6.2.1 Overview of Call Detail Records

6.2.2 CAMEL-related Parameters in CDRs

6.2.3 Composite CDRs

6.3 Transfer Account Procedure Files

6.4 Inter-operator Accounting of CAMEL Calls

6.4.1 Clearing House

6.4.2 CAMEL Invocation Fee

6.5 Correlation of Call Detail Records

6.5.1 Call Reference Number

6.5.2 MF Calls

6.5.3 SCP-initiated Calls

6.6 Global Call Reference

6.7 Call Party Handling CDRs

7. 3GPP Rel-6 and Beyond

7.1 General

7.2 Enhancements to 3GPP Rel-6

7.2.1 Enhanced Dialed Service

7.2.2 Handover Notification Criteria

7.2.3 Enhancement to SCUDIF Control

7.2.4 Reporting User-to-user Information

7.2.5 Enhancement to User Interaction

7.3 Enhancements to 3GPP Rel-7

7.4 Enhancements to 3GPP Rel-8