

Voice over IP & MPLS

17 - 21 August 2009
Gaborone, Botswana



COMMONWEALTH
TELECOMMUNICATIONS
ORGANISATION

www.cto.int

Register by
17th July 2009
for a 10% discount!



Overview

This course is designed to foster a good understanding of Voice over IP (VoIP) and Multi Protocol Label Switching (MPLS) technologies and its deployment scenarios.

As the course will provide participants with the critical knowledge to function in an efficient ICT environment, it is a must for anyone wishing to obtain an in-depth knowledge of VoIP and MPLS technologies.

It will cover the following topics:

- Background knowledge on VoIP and MPLS technologies
- Understanding of VoIP and MPLS technologies and their architecture
- The relationship between legacy network and MPLS technologies
- The benefits of deploying VoIP and MPLS technologies
- Possible scenarios for the deployment of VoIP and MPLS technologies

For more programmes and courses run by the PDT contact us at:
Tel: +44 (0) 208 600 3800 **Fax:** +44 (0) 870 0345 626 **Email:** programmes@cto.int

Course programme may change due to unforeseen circumstances

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Learning outcomes

On completion of the course, participants will be able to:

- Understand VoIP technology and architecture
- Name the protocols used in VoIP
- Name the advantages and disadvantages of VoIP
- Understand MPLS technology and its architecture
- Understand the benefits of MPLS in terms of its ability to be deployed over legacy and next generation networks

Key objectives

This course will equip participants with the necessary knowledge and skills to:

- Understand what VoIP is
- Understand VoIP technology and architecture
- Describe how VoIP works
- Explore possible deployment scenarios based on other telco models
- Understand what MPLS is
- Explain the elements of an MPLS network
- Understand the development of IP MPLS as an overlay network architecture
- Understand the challenges facing communications companies and how MPLS networks can address these challenges

Who should attend

- Telecoms professionals such as engineers and network deployment professionals
- Anyone who are keen on understanding VoIP and MPLS and the relationship between these technologies.

Learning environment

- Traditional classroom including collaborative learning. Use of presentations, group learning, class exercises, case studies and problem solving.

Additionally, the course will be supported with a case study of a virtual network deployed by Telkom South Africa.

Pre-requisites

- Knowledge of legacy networks (intermediate level)
- Knowledge of next generation networks (NGN) at a basic level, will be an added advantage

Course content

VOICE OVER IP (VoIP)

- 1 **Definition**
- 2 **An overview of packet-based networks:**
 - o Asynchronous transfer mode (ATM)
 - o Frame relay
 - o X.25
- 3 **Historical background of VoIP**
- 4 **The H323 standard as used in VoIP**
- 5 **Internet protocol facts about:**
 - o Types of connections
 - o Guarantees
 - o Error checking and corrections
 - o Packet delivery
 - o Routers
 - o Internet protocol headers
- 6 **VoIP basic telephony operation covering**
 - o IP telephony via a voice gateway
 - o Personal computer (PC) based telephony
 - o Fax-fax based telephony
- 7 **Understanding VoIP network requirements**
- 8 **VoIP and the OSI reference model**
- 9 **Protocol structure of VoIP including the mapping of IP protocols and the different types of protocols as used in the H.323 standard.**
- 10 **How VoIP calls are made**
- 11 **VoIP benefits including:**
 - o Cost reduction
 - o Simplification
 - o Consolidation
- 12 **VoIP applications and implementations**
- 13 **Quality of service (QoS) issues and challenges:**
 - o Delay
 - o Jitter
 - o Echo
 - o Packet loss

Course content

MULTI PROTOCOL LABEL SWITCHING (MPLS)

- 1 What is MPLS?
- 2 Traditional routing and packet switching
- 3 MPLS basics
- 4 MPLS and the OSI reference model
- 5 MPLS architecture build up
- 6 Understanding MPLS network components including:
 - o Label edge routers (LERs)
 - o Label switching routers (LSRs)
 - o Forward equivalence class (FEC)
 - o Labels and label bindings
 - o Label creation
 - o Label distribution
- 7 MPLS operation in terms of how a packet travels through an MPLS network which includes the following steps:
 - o label creation and distribution
 - o table creation at each router
 - o label-switched path creation
 - o label insertion/table lookup
 - o packet forwarding
- 8 MPLS applications including but not limited to:
 - o improving packet-forwarding performance in the network
 - o supporting QoS and CoS for service differentiation
 - o supports network scalability
 - o integrating IP and ATM in the network
 - o building interoperable networks
- 9 The benefits of MPLS which include the following:
 - o The use of one unified network infrastructure
 - o Better IP over ATM integration
 - o Border gateway protocol (BGP)-free core
 - o The peer-to-peer model for MPLS VPN
 - o Optimal traffic flow
 - o Traffic engineering
- 10 MPLS and virtual private networks (VPN) supporting VoIP in an IP network.

Course leader



Bhekisisa Nelson Nkosi

Bhekisisa Nelson Nkosi is a highly qualified Learning and Development Specialist at Telkom South Africa's Centre for Learning. His specialist areas are wireless communications, installation and maintenance of exchange lines, customer premise and PBX equipment, including all integrated value add products (IVAPs).

Besides the above, Bhekisisa has trained extensively on broadband technologies, next generation networks, IP, ISP related courses and contact centre support services.

Bhekisisa is a qualified assessor and moderator registered with the Information System, Electronic & Telecommunications Technologies Sector Education Training Authority of South Africa (ISETT-SETA)

Hosted by:

Botswana Telecommunications Corporation

In partnership with:

Telkom South Africa

About the CTO

The Commonwealth Telecommunications Organisation (CTO) is an international development partnership between Commonwealth and non-Commonwealth governments, business and civil society organisations.

It provides the international community with effective means to help bridge the digital divide and achieve social and economic development through the use of Information and Communication Technologies (ICT) in the specific areas of Telecommunications, IT, Broadcasting and the Internet.

About the programme for development and training (PDT)

Managed by the CTO, the PDT is a unique low-cost membership programme providing needs-based professional training and capacity building courses on telecommunications policy, regulation, technologies and telecoms business management.

The PDT has delivered over 3600 bilateral training and consultancy projects, covering every aspect of the telecommunications industry, training over 35,000 professionals in 33 countries of the Commonwealth.

For more programmes and courses run by the PDT contact us at:

Tel: +44 (0) 208 600 3800
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See more information on our website

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Please fill in this application form and fax it back to +44 208 600 3819 or return it to the CTO at the address below. Please use CAPITAL LETTERS.

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Job title

Organisation

Address

City Postcode Country

Tel Mobile Fax

Email

Authorising line manager's name

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Payment options

1) Select delegate rate

	Standard rate	Early registration/Group discounts*
CTO members	<input type="checkbox"/> £701	<input type="checkbox"/> 10%
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Others	<input type="checkbox"/> £1,132	<input type="checkbox"/> 10%

* two or more delegates from same organisation

2) Payment mode (choose one option only)

Invoice
Invoice me at the above address (Discounts do not apply, payment must be received by us prior to event).

Cheque
Cheque enclosed payable to 'CTO HQ'

Bank transfer
Make payments to: Couetts Co.
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A/C Name: CTO; A/C Number 083675071
Reference: GB72COUT18000208367507
Sort Code: 18-00-02; Swift Code: COUT GB22

Credit Card: Visa / Mastercard (delete as appropriate)

Card holder's name

Card holder's billing address (if different from above)

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Valid from Expiry date 3 digit security code

Signature

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Additional information

To help us improve our services to you and your organisation, please tell us more about yourself and your organisation.

Your role in the organisation	Your area of work in the organisation	
<input type="checkbox"/> Strategic / executive	<input type="checkbox"/> Business development	<input type="checkbox"/> Marketing and sales
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<input type="checkbox"/> Other		

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-  Fill in and fax this form back to **+44 208 600 3819**
-  Call the programme team at **+44 208 600 3800**
-  Email this completed form back to **register@cto.int**

EARLY REGISTRATION DISCOUNT

45 days prior to start of event

NEED HELP?

Call us now on **+44 208 600 3800** or e-mail the programme team at **programmes@cto.int**

Summary Terms and Conditions

The CTO will endeavour, as can be reasonably expected, to ensure that the course is delivered to meet delegates' expectations. Registration is subject to availability and payment received by the deadline, where specified for each course. Dates may be subject to changes. Travel, accommodation, daily transportation to venue, subsistence and other costs are the sole responsibility of the delegate and are not included in the above fees.

Applicants are responsible for their visa arrangements and other formalities wherever required. Course bookings may be cancelled at the discretion of the CTO or its partners. Applicants paying by bank transfer are responsible for bank charges and any other such costs and should ensure the exact amount in GBP Sterling is credited in the CTO bank account. Applicants requiring additional information prior to their booking should ensure they provide sufficient time before the booking deadline.

Cancellation rules apply, as summarised above. For a full version of our Terms and Conditions, please visit our website at www.cto.int.

Withdrawals / Cancellations / Refunds

For delegate cancellations/withdrawals, the following refund rules apply:

- 31 days or more prior to event: the full amount less a handling charge of £55
- 30 days or less prior to event: no refund

For CTO cancellations/withdrawals, delegates are entitled to a 100% refund within 60 days of the cancellation/withdrawal. Refunds will be made by bank transfer only.

Data Protection / Privacy

The CTO does not sell, rent or lease its customer information to third parties. We may, from time to time, contact you on behalf of a third party/partner about a particular offering that may be of interest to you. In those cases, your unique personally identifiable information (email, name, address, telephone number) is not transferred to the third party/partner.

In addition, we may share your information with trusted partners to help us perform statistical analyses, send you by e-mail or postal mail, provide customer support, or arrange for deliveries or other such services.

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