

## 1. ABOUT THIS CONNECTION POLICY

- 1.1. TENET provides research and education networking services (“REN services”) to campuses of South African education and research institutions and associated support institutions in the public sector that connect to the network operated by TENET (“the REN Network”).
- 1.2. This connection policy is a public document. It reflects TENET’s enduring respect for the norms, rules and established good practices that characterise research and education networking worldwide. It is important for connecting institutions and their users to know and abide by the practices and rules of research and education networking. It is important for other RENs to be able to assess TENET’s bona fides as an REN operator and decide whether or not they want to enter into interconnection agreements with TENET.
- 1.3. The connection policy provides answers to questions like:
  - What kinds of organisations are entitled to connect to the REN Network and use TENET’s REN services?
  - What service contracts must connecting institutions enter into with TENET?
  - To what extent may an organisation that is connected to the REN Network allow other organisations to connect to the REN Network via that same connection? For example, may a university provide Internet access to schools in its area by allowing the schools to connect to the university’s network?
  - To what extent may an organisation that connects to the REN Network provide REN services to users and locations that are not on the organisation’s own premises? For example, may a university onward-provide REN services to its staff and students in their private lodgings?
  - With what kinds of other networks will the REN Network interconnect? What rules govern the route announcements and traffic flows at such interconnects?

The connection policy does not deal with questions of governance, operational responsibility, technology standards, service levels, acceptable use, cost-recovery or charges.

- 1.4. TENET reserves the right to amend this Connection Policy. Notice of any significant amendments will be given to all Participating Institutions and by publication on TENET’s web site. This version may already have been superseded. The latest version is available from TENET’s web site.

## 2. COST RECOVERY AND PARTICIPATING INSTITUTIONS

- 2.1. As a non-profit company incorporated in terms of the Companies Act, TENET has no shareholders or other owners to whom surplus assets may be distributed. However TENET may and does charge Participating Institutions at rates that recover the costs of providing services.
- 2.2. A Participating Institution is an institution that has a REN Service Agreement with TENET currently in force.

## 3. REN NETWORK CONNECTIONS

- 3.1. For purposes of this Connection Policy, “a REN Connection” is an asset that is held by a person or organisation “the connecting party”, and comprises (a) standing permission from TENET to use some

or all of the REN services, and (b) agreed means by which the connecting party's network connects physically to the REN Network and has access to some or all of the REN services.

3.2. A key attribute of a REN Network Connection is the hand-off location – i.e. the location of the point at which operational responsibility changes between TENET and the connecting party.

3.3. The paragraphs below distinguish several important types of REN Network Connection.

#### 3.4. Direct On-Site Connections

A Direct On-Site Connection is a connection to the REN Network in which the hand-off location is at the connecting site itself – i.e. in which the terminating equipment at the connecting site is directly on the REN Network and under TENET's operational management.

Any Direct On-Site Connection enables the connecting site network to use the REN Layer 3 services, including interconnections with other REN Network sites, and, depending upon the intercontinental bandwidth ordered for the site, with other RENs world wide and the Internet generally. In addition, a Direct On-Site Connection will normally enable the connecting site to use TENET's Layer 2 services, such as the setting up and use of private VLANs within the REN Network.

Both Meraka (as part of the SANReN Project) and TENET have and are providing Direct On-Site REN Network Connections. New Direct On-Site REN Network Connections will be provided to on a campus-by-campus basis as agreed between the Participating Institution concerned and Meraka or TENET.

#### 3.5. Direct PoP Connections

A Direct PoP Connection to the REN Network is one in which the hand-off location is not at the connecting site itself but within a REN Network Point-of-Presence (PoP),

i.e. in which TENET operates neither the terminating equipment at the connecting site nor the local access circuit between the connecting site and the NREN PoP.

Any Direct PoP Connection enables the connecting site to use the REN Layer 3 services, including interconnections with other REN Network sites and, depending upon the international bandwidth ordered for the site, with other RENs world wide and the Internet generally.

#### 3.6. Indirect Connections

An Indirect Connection is one provided to the connecting party by a Participating Institution that has itself one of the above types of Direct Connection and that is willing, subject always to the eligibility criteria in 4.3 below, to allow the connecting party's network to connect to its network, either directly or indirectly via a proxy server or other device, and hence, via the Participating Institution's own Direct Connection, to use the REN services.

Thus an indirect connection comprises two components – the ("downstream") connection between the connecting party's network and that of the Participating Institution, and the ("upstream") connection, being the Participating Institution's own Direct Connection to the REN Network.

The handoff location for an Indirect Connection is the same as that for its upstream Direct Connection.

The provision of Indirect Connections by Participating Institutions is subject to the policies set out in 4.3 and 4.4 below.

The Indirect Connection mechanism allows Participating Institutions to extend the benefit of the REN services to other research and education organisations, and especially to smaller ones such as schools, museums, non-profit R&D start-ups and learned societies. It also allows Participating Institutions to permit individuals that have a direct association with the Institution and so have the Institution's permission to connect to the campus network from remote locations (e.g. staff from home or while

traveling abroad, registered students from their digs, research associates from their places of work) to also utilize the REN services via such remote connections to the campus network.

## 4. POLICIES APPLICABLE TO REN NETWORK CONNECTIONS

### 4.1. Rules of the REN game

In general, commercial Internet Service Providers will accept any individual or organisation that is willing to enter into a service contract as a customer. By contrast, RENs provide services only to universities, research institutions and other organisations for which education or research, or the support thereof, is a prime purpose.

RENs in different countries differ from one another with regard to the precise eligibility criteria. While all RENs allow public universities and public research institutions to connect, some disallow profit-seeking private universities and research centres.

Many RENs allow secondary and even primary schools to connect. Some RENs allow start-up firms located in local science parks and innovation hubs to connect.

The eligibility criteria for REN Network connections appear in the following sections.

### 4.2. Eligibility for a Direct Connection

Direct Connections to the REN Network will not be provided to any entity that is not a Participating Institution i.e. that has not entered into a REN Service Agreement with TENET (see 2 above). This applies to both Direct On-Site and Direct PoP Connections.

### 4.3. Eligibility for Indirect Connections

Apart from entities that meet the eligibility criteria for Direct Connections, Participating Institutions may provide Indirect Connections to the following types of organisations and persons:

- All schools that are recognized as such by the National and/or Provincial Departments of Education;
- Further Education and Training Colleges;
- Public museums and art galleries;
- Non-profit R&D start-up entities;
- Learned societies;
- Non-profit entities (non-profit companies, trusts, associations not-for-gain) that the Participating Institution collaborates with or supports in educational, research and/or community engagement endeavours;
- Individuals, such as staff, registered students, research associates that have an enduring contractual association with the Participating Institution, in terms of which they have the Institution's permission to connect to the campus network and use its services from remote locations, such as from home, while travelling abroad, normal places of work.

### 4.4. Provision of Indirect Connections

A Participating Institution may provide Indirect Connections to eligible organisations or persons via any campus or site of the Participating Institution that has a Direct Connection to the REN Network; subject to the conditions set out in this Connection Policy.

An Indirect Connection is provided to a single organisation or person (“the indirectly connecting party”) for its/his/her own use, which use shall comply with TENET’s Acceptable Use Policy.

An Indirect Connection shall not be provided to any person or entity that itself provides connectivity to other parties.

No organisation or person with an Indirect Connection may use that Indirect Connection to provide any other organisation or person with connectivity to the REN Network.

A Participating Institution that provides an Indirect Connection shall contract with the indirectly connecting party on terms which (a) specify the applicability of the TENET AUP and provides a link to it, (b) prohibit any further distribution or resale of the connectivity provided and (c) provide the right to suspend and/or terminate the provision of the indirect connection where there is a breach of (a) or (b).

The circuit via which the downstream connection (see 3.6) of an Indirect Connection is realised may be provided by or on behalf of the Participating Institution or by or on behalf of the indirectly connecting party.

Neither TENET nor any of its upstream service providers has any contractual relationship with or obligations towards organisations or persons with Indirect Connections.

TENET deems networks that have Indirect Connections via a Participating Institution to be integral parts of the institutional network of the Participating Institution, and holds the Participating Institution responsible for all aspects of such Indirect Connections and the use that is made of them.

#### 4.5. Charges for Indirect Connections

Participating Institutions that provide Indirect Connections may charge the beneficiary institution or person at a rate that recovers the *marginal direct cost* to the Participating Institution of providing the Indirect Connections.

Within 14 days of being so requested by TENET, the Participating Institution shall provide details of the Indirect Connections that it is providing, including the identities of the beneficiaries and bandwidths, and the charges that it is imposing in respect of these Indirect Connections.

#### 4.6. Independent IP address space

All IP address prefixes that are routed across the REN Network to and from connecting sites must be held by the connecting Institution either as a direct end-user provider-independent allocation or as an assignment from TENET in its role as a Local Internet Registry. TENET will not accept a connection from a site if the site’s network uses IP address prefixes that originate with the networks (ASNs) of commercial operators or other third parties.

This applies equally to Direct and Indirect Connections (see 5.1 for the rationale).

Except in the circumstances considered in 4.7 below, TENET will announce sites’ address prefixes on behalf of the site as originating within TENET’s network.

#### 4.7. BGP connections

TENET will exchange BGP route announcements with Participating Institutions that require this, in accordance with established Internet practice.

In such cases, sites may announce their prefixes to the REN Network as originating within the connecting Participating Institution’s network. The restrictions specified in 4.6 apply to all routes announced in this way to the REN Network.

#### 4.8. No announcement to third parties of routes learned from the REN Network

Where a Participating Institution provides Indirect Connections to one or more entities in terms of this Connection Policy, the Participating Institution may exchange route announcements with such entities and may announce to such entities the routes that it has learned from the REN Network.

Apart from the circumstances contemplated in the previous paragraph, no Participating Institution that exchanges route announcements with the REN Network may announce to any third party network routes that it has learned from the REN Network.

No entity that has an Indirect Connection to the REN Network may announce to any other network routes that it has learned from the REN Network.

### 5. EXTERNAL INTERCONNECTIONS

#### 5.1. Interconnection obligations specific to RENs

In general, when RENs interconnect and exchange route announcements with other RENs, the routes that they announce to each other are “REN routes” – i.e. routes that have both source and destination within RENs and which lie entirely within RENs.

Consequently, TENET must be in a position to ensure that when routes are announced to other RENs, including other African NRENs as well as regional RENs such as UbuntuNet, Géant and Internet2, it announces only routes to the REN Network.

#### 5.2. Connectivity to other South African networks

##### 5.2.1. Settlement-free peering interconnections

The REN Network’s connectivity to other networks in South Africa is realised in the first instance, through a number of settlement-free peering interconnections with a number of individual operators at South African Internet Exchanges.

##### 5.2.2. Contracted transit service

Connectivity to the entire South African Internet is ensured through a transit contract with a major commercial operator.

##### 5.2.3. Private peering interconnections

Where a Participating Institution that has a Direct Connection has a substantial and sustained connectivity requirement between its own network and that of some external entity, the Participating Institution may request TENET to allow that external entity to establish a private peering interconnection with the REN Network.

#### 5.3. Connectivity to UbuntuNet, to Géant and other RENs, and to the Internet world wide

The REN Network’s connectivity to Géant and other RENs worldwide, as well as to the Internet generally, is realised through the UbuntuNet Hubs in Europe. Géant provides REN-transit to UbuntuNet – i.e. connectivity not only to Géant itself but to all RENs across the World with which Géant interconnects. UbuntuNet has transit agreements with a number of major operators ISPs and has settlement-free peering connections with a large number of commodity networks.

Thus in terms of AS paths, UbuntuNet is the REN Network’s upstream provider of both REN connectivity and general Internet access.

#### 5.4. Future developments

As UbuntuNet develops its infrastructure within Africa, the REN Network will be able to connect via UbuntuNet to other African NRENs directly – i.e. via routes that remain within Africa rather than routing via London.