Contingency Plan – 2007/2008

CLARA Network Engineering Group

April 2007

This document presents a description of the engineering contingency plan to sustain RedCLARA network during the period from April/2007 to March/2008.

CLARA/NEG/2007-0018
Version – 1.1

VERSION MANAGEMENT

This document outlines several engineering modifications executed in the backbone of RedCLARA in order to cope with the ALICE project extension granted for the period 2007/2008. When new procedures are required or other changes made, it will be updated accordingly, and the new version release will be recorded in the table below.

Version	Modification	Date	Reviewed by
preliminary	First draft	01-Mar-2007	Eriko Porto
1.0	Corrections and changes	12-Apr-2007	Eriko Porto
1.1	Corrections and changes	17-Apr-2007	Florencio Utreras

Summary

1. Introduction

The ALICE (América Latina Interconectada Con Europa) project was set up in 2003 to develop the RedCLARA network, which provides IP research network infrastructure within the Latin American region and towards Europe (http://alice.dante.net/). The European Commission is actively supporting ALICE and provides co-funding to the project, which constitutes 80% of the project's funding, with the remainder being provided by the project partners.

The EC has asked DANTE to coordinate this project and transfer the knowledge that DANTE has gained over the last decade in Europe to Latin America. The project is managed by DANTE, and has 4 European and 19 Latin American partners. Within Latin America, the technical management of the RedCLARA network is being carried out by CLARA (Cooperación Latino Americana de Redes Avanzadas).

Due to its success, the ALICE project has been granted a first extension from its original end date of May 2006 that last until March 2007, and now the ALICE project has been extended again until 31 March 2008, but for that extension to be granted a strategic engineering plan needs to be implemented.

This document describes the main adjustments that had to be implemented in the network to cope with this new extension, and sustain the original objectives of the ALICE project in the Latin American region by keeping the network IP advanced services, and the connectivity to the LA-NRENs.

2. Topology changes

2.1. Current configuration

Figure 1 illustrates the situation of RedCLARA's backbone by the end of February/2007.The backbone was structured in a ring topology connecting five nodes located in the cities of Sao Paulo (BR), Tijuana (MX), Panama City (PA), Santiago (CL) and Buenos Aires (AR).

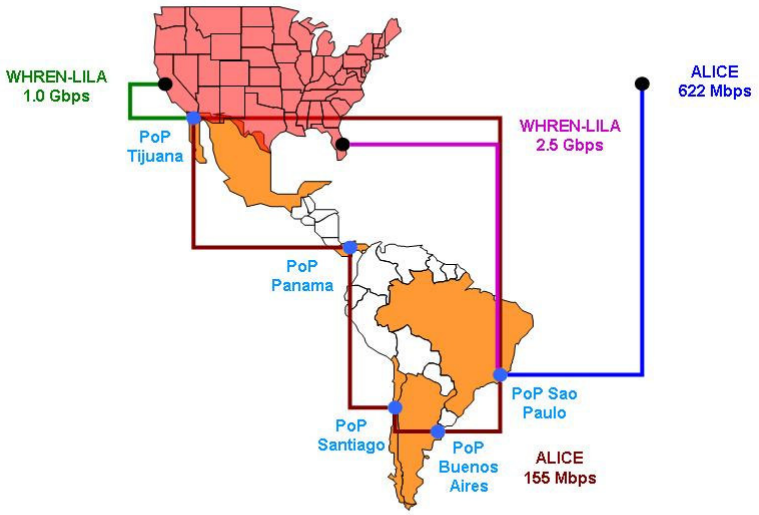

Figure 1 – RedCLARA topology - February/2007

The ALICE project funded the five 155 Mbps links of the backbone ring, and the 622 Mbps link connecting RedCLARA to GEANT – a multi-gigabit pan-European data communications network. The WHREN-LILA (Western Hemisphere Research and Networking – Links Interconnecting Latin America) project (http://whren.ampath.net/), supported by the U.S. National Science Foundation Award #OCI-0441095, provided funds for another two links that connects RedCLARA to the western hemisphere: a 2.5Gbps link connecting Sao Paulo to Miami, which evolved from an original preexistent 622 Mbps link from the late AMPATH project; and another 1Gbps link running over a dark fiber segment established between San Diego and Tijuana.

Each WHREN-LILA link gives RedCLARA access to an International Peering Fabric located in each one of the US coasts: the AtlanticWave and the PacificWave exchange facilities, both of which provides multi-layer/multi-protocol services between participating networks, in a Layer 3 distributed peering exchange facility over an Ethernet based infrastructure, with best effort packet exchange and jumbo frame support.

2.2. Changes to the backbone

In order to save resources from the new ALICE project extension funding, some links of the current topology will be removed and new ones will be added, overly changing the configuration of the network.

RedCLARA will initially install a sixth (new) node in the city of Miami (US) that will be able to receive new links and new connection agreements. This node will be initially structured with a Sentry power module for equipment electric feeding remote control, a Cisco 7606 router, and a Dell PowerEdge server for statistics and monitoring capabilities (specifications are provided in Annex A).

The LAUREN initiative is responsible for a donation of three 155 Mbps STM-1 links that will be installed between the following nodes: Panama City (PA) – Miami (US), Panama City (PA) – Santiago (CL), and Santiago (CL) – Sao Paulo(BR).

The implementation of these three links together with the removal of the current Panama City (PA) – Santiago (CL) and the Sao Paulo (BR) – Tijuana (MX) STM-1 ALICE links, will complete the reorganization of the backbone for the new phase of the project. Figure 2 depicts the situation of the topology after the changes.

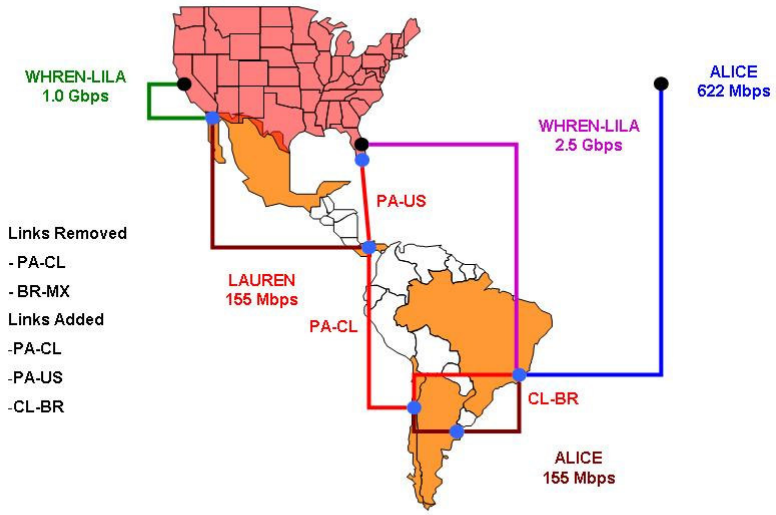

Figure 2 – RedCLARA topology after changes

An agreement with WHREN-LILA will permit to route traffic from both RedCLARA's and WHREN-LILA's PoPs in Miami, thus creating an alternative route to the Atlantic Wave fabric for RedCLARA. Also that agreement will allow for backup traffic between Miami and Sao Paulo, closing the loop to ensure availability of the network, in the case of a link failure between Miami and Panama.

The IP advanced services currently available from the network will not be affected by these modifications. RedCLARA will be able to sustain the connectivity within the Latin America connected partners, and all the international traffic exchange agreements accomplished so far, together with the ability to provide better than best effort service to the clients whenever needed, and compensate for the minor expected increments in some of the round-trip delays observed in the network.

2.3. Changes to the NRENs connections

Some connectivity services for the LA-NRENs will be also restructured in order to save resources and explore better services. The NRENs from Central America will be migrated from the current connections in the node of Tijuana to the new node in Miami.

Also the connection of the NREN from Venezuela (REACCIUN) will be migrated from its current access point in the node in Sao Paulo to the node in Panama, due to another donation from the LAUREN initiative, a DS3 circuit from Panama City (PA) to Caracas (VE).

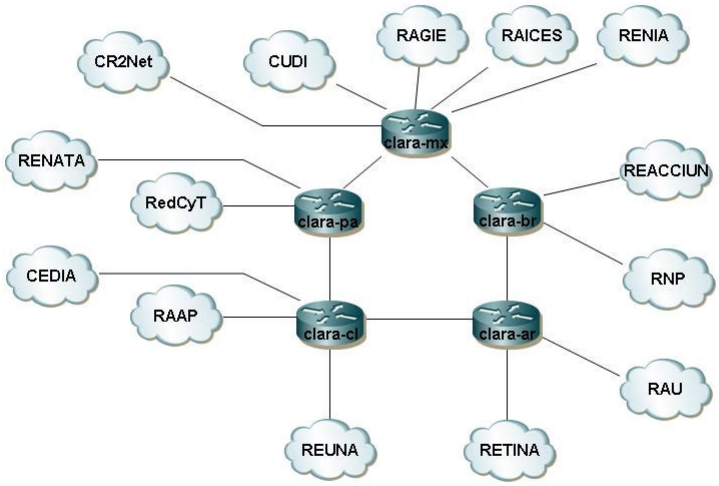

Figure 3 – NRENs connectivity – March/2006

Figure 3 shows the NRENs connectivity to the previous ring configuration of RedCLARA's backbone, the way it was established by March/2006.

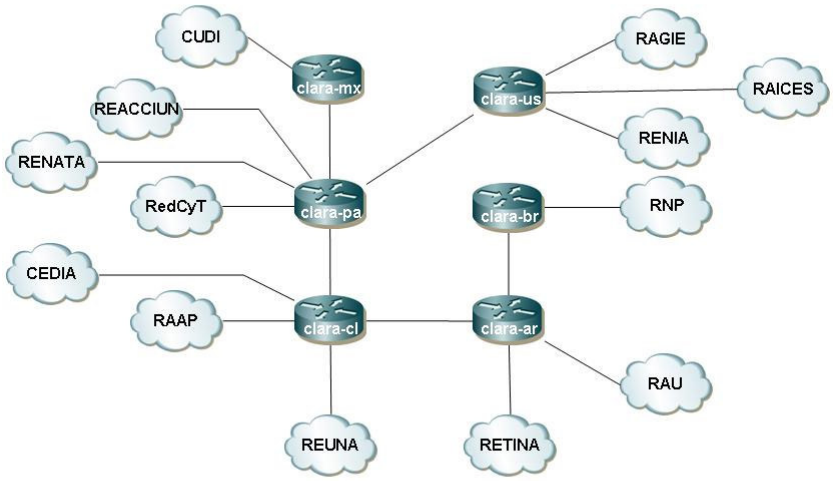

Figure 4 – NRENs connectivity for the new backbone

Figure 4 shows the new distribution of the NRENs connectivity after the reorganization of RedCLARA's backbone.

Annex A – Miami PoP equipment configuration

The Tables 1, 2 & 3 below provide the specification for the equipment installed in the PoP of Miami (US).

Table 1 – Cisco Router

Item	Item Quant.	Quant.	Part Number	Description
				Cisco 7606 – Miami PoP
1	1	1	CISCO7606	Cisco 7606 Chassis
		1	FAN-MOD-6HS	High Speed Fan Module for CISCO7606 Chassis
		2	WS-SUP720-3CXL	Catalyst 6500/Cisco 7600 Sup 720 Fabric MSFC3 PFC3CXL
		2	MEM-RSP720-2G	RSP 720 2-GB memory upgrade
		2	MEM-RS720-CFL1G	1-GB Compact Flash memory
		2	PWR-2700-DC/6	2700 W DC Power Supply for 7606
		1	GLC-LH-SM	GE SFP, LC connector LX/LH transceiver
		3	GLC-SX-MM	GE SFP, LC connector SX transceiver
		1	S763AEK9-12233SRA	Cisco 7600-SUP720 IOS ADVANCED ENTERPRISE SERVICES SSH
		1	7600-SIP-400	Cisco 7600 Series SPA Interface Processor-400
		1	SPA-4XOC3-POS	4-port OC3/STM1 POS Shared Port Adapters
		2	SFP-OC3-MM	OC-3/STM-1 SFP, MM, SR
		1	SFP-OC3-IR1	OC-3/STM-1 SFP, SM, IR-1
		1	SFP-OC3-LR1	OC-3/STM-1 SFP, SM, LR-1
		1	7600-SIP-200	Cisco 7600 Series SPA Interface Processor-200
		1	MEM-SIP-200-1G	1 GB Memory for 7600 SIP-200
		1	SPA-8X1FE-TX-V2	Cisco 8-Port Fast Ethernet (TX) Shared Port Adapter
		2	7606-PEM-CVR	Cisco 7606 PEM Cover

Table 2 – Dell PowerEdge server

Item	Item Quant.	Quant.	Part Number	Description
				Dell Server
2	1	1	PowerEdge 1950	Dual Core Intel Xeon 5148LV, 4MB Cache, 2.33GHz & 1333MHz FSB
		1	Memory	4GB 667MHz (2x2GB) - Dual Ranked DIMMs - Energy Smart 4G2E6D
		1	Backplane	1x4 Backplane for Energy Smart Chassis with 2.5-inch Hard Drives
		1	Primary Controller	SAS 5/i Integrated - No RAID SAS5I
		1	HD Configuration	Integrated SAS/SATA No RAID - SAS 5/i Integrated MSS
		1	Primary HD	73GB, SAS, 2.5-inch, 10K RPM Hard Drive 73A125
		1	2nd HD	73GB, SAS, 2.5-inch, 10K RPM Hard Drive 73A125
		1	Network Adapter	Dual Embedded Broadcom® NetXtreme II 5708 Gigabit Ethernet NIC
		1	Power Supply	Non-Redundant Power Supply NRPS
		1	CD/DVD Drive	24X IDE CD-ROM 24XCD

Table 3 – Sentry power module

Item	Item Quant.	Quant.	Part Number	Description
				Sentry -48 VDC Power Distribution
3	1	1	4805/35-XLS-12	2x100A (-48) VDC Inputs, 8x10A max and 4x70A max outlets
		4	GMT fuses	5 Amps maximum
		2	GMT fuses	7.5 Amps maximum
		2	GMT fuses	10 Amps maximum
		2	TPC fuses	40 Amps maximum
		2	TPC fuses	75 Amps maximum

Annex B – IP addresses allocation

Below in Table 4 are provided the IP addresses assigned to the new connections as an update from the previous document published by the NEG: *CLARA/NEG/2004-0001 - IPv4 addressing and routing plan for CLARA network*.

Table 4 – IP addresses allocation

Router	Interface	Destination	IP address
clara-br	POS2/0	PoP Tijuana (MX)	200.0.204.5
	POS2/1	PoP Buenos Aires (AR)	200.0.204.38
	POS2/2	PoP Santiago (CL)	200.0.204.10
	POS3/0	PoP GEANT – Madrid (ES)	62.40.105.14
	Loop0	Loopback0	200.0.205.5
	Loop1	Loopback1	200.0.205.6
clara-mx	POS2/0	PoP Panama City (PA)	200.0.204.13
	POS2/1	PoP Sao Paulo (BR)	200.0.204.6
	Loop0	Loopback0	200.0.205.13
	Loop1	Loopback1	200.0.205.14
clara-pa	POS2/0	PoP Santiago (CL)	200.0.204.21
	POS2/1	PoP Tijuana (MX)	200.0.204.14
	POS2/2	PoP Miami - EUAI	200.0.204.46
	POS2/3	PoP Santiago (CL)	200.0.204.25
	Loop0	Loopback0	200.0.205.21
	Loop1	Loopback1	200.0.205.22
clara-cl	POS2/0	PoP Buenos Aires (AR)	200.0.204.29
	POS2/1	PoP Panama City (PA)	200.0.204.22
	POS2/2	PoP Sao Paulo (BR)	200.0.204.9
	POS2/3	PoP Panama City (PA)	200.0.204.26
	Loop0	Loopback0	200.0.205.29
	Loop1	Loopback1	200.0.205.30
clara-ar	POS2/0	PoP Sao Paulo (BR)	200.0.204.37
	POS2/1	PoP Santiago (CL)	200.0.204.30
	Loop0	Loopback0	200.0.205.37
	Loop1	Loopback1	200.0.205.38
clara-us	POS1/0/0	PoP Panama City (PA)	200.0.204.45
	Loop0	Loopback0	200.0.205.45
	Loop1	Loopback1	200.0.205.46