Using the Dynamic Circuit Network: A Brief Tutorial

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Overview

- What is DCN?
- How do I connect to DCN?
- How do I request circuits?
- How do I write my own DCN application?
- Where can I learn more?
What is DCN? - Overview

• Create point-to-point circuits
• End-user or application sends request to control plane software
• Control plane software automates the set up and tear down of circuits
• Multi-domain circuits coordinated using internationally developed protocol
What is DCN? – Internet2 DCN
What is DCN? – Global Network
What is DCN? – Control Plane

• Interdomain Controller (IDC)
  • Accepts circuit requests
  • Coordinates requests with other domains
• Domain Controller (DC)
  • Manages local resources
  • Set-up/tear-down circuits in local domain
What is DCN? – Control Plane
What is DCN? – DCN Software Suite

• OSCARS (IDC)
  - Open source project maintained by Internet2 and ESNet

• DRAGON (DC)
  - NSF-funded
  - Open source project maintained by MAX, USC ISI EAST, and George Mason University

• Version 0.3 of DCNSS released April 18, 2008
How do I connect? – Overview

1. Physical connection
2. Access to control plane software
How do I connect? – Physical Connection

- Internet2 Connectors
  - Connect to Internet2 DCN
- Universities and campuses
  - Contact Internet2 Connector
How do I connect? – Software Configuration

- Option 1: No local IDC
- Option 2: Install local IDC
How do I connect? – Software Configuration

• **Option 1: No local IDC**
  - Statically configure your local network
  - Applications/Users can dynamically request circuits from the nearest IDC
How do I connect? – Software Configuration

• Option 1: No local IDC
How do I connect? – Software Configuration

- **Option 2: Install local IDC**
  - i.e. DCN Software Suite
How do I connect? – Software Configuration

• Option 2: Install local IDC
How do I request a circuit? - Clients

- User-initiated
  - OSCARS Web Page
  - Simple command-line tools
- Program-initiated
  - Phoebus
    - Transparently request circuit upon data transfer initiation
  - Custom applications you build!
How do I request a circuit? - Requests

• Minimum set of required information
  • Source and Destination
  • Start and End Time
  • Bandwidth
  • Description

• Additional fields available
  • VLAN range
  • Path
  • more…
How do I request a circuit? - Interfaces

• Web User Interface (WBUI)
  • Java servlet interface used by OSCARS web page
  • Not intended for use by other applications

• Web Service API
  • XML-based API intended for use by applications
    • E.g. Phoebus, LambdaStation, TeraPaths
How do I request a circuit? - WBUI

- You may test the WBUI on Internet2’s test IDC
  - Go to http://test-idc.internet2.edu
  - Login with guest/guest
  - Click “Create Reservations” and enter:
    - Source: test-newy.dcn.internet2.edu
    - Destination: test-chic.dcn.internet2.edu
    - Bandwidth: 100
    - Purpose of Reservation: [your name] testing
    - VLAN: any
How do I request a circuit? – WS API

• Used by applications to contact IDC
• Authenticate using an X.509 certificate
  • Generate with command-line tools
  • Have CA sign (Internet2 has test CA)
• Message format defined in DICE Control Plane group
• Custom applications should use this interface
How do I write my own DCN application?

• Java library for making DCN calls
• Can call simple command-line client directly from application
• Google Summer of Code students will be developing PERL, C, and Python libraries
Summary

• Need a physical connection as well as control plane software to connect to DCN
• DCN software available to install and run
• An API exists to write your own DCN applications and more coming
Where can you learn more?

• DCN Software Suite
  • https://wiki.internet2.edu/confluence/display/DCNSS/Home
• Java Client API
  • https://wiki.internet2.edu/confluence/display/CPD/OSCARS+Client +Java+API
• Test IDC Guide
  • https://wiki.internet2.edu/confluence/display/DCNSS/Internet2%27s +Test+IDC
• Obtaining a Test Certificate
  • https://wiki.internet2.edu/confluence/display/CPD/How+to+Request +an+IDC+User+Certificate