



California
DEPARTMENT OF TECHNOLOGY
Office of Technology Services

Quarterly Network Forum

February 16, 2016



Opening and Introduction

Brian Parks

Branch Chief

Enterprise Network Branch



Agenda

- **9:00 - 9:05 AM** **Opening and Introductions**
Brian Parks - Branch Chief, Enterprise Network Branch
- **9:05 - 9:20 AM** **Information Sharing**
Brian Parks - Branch Chief, Enterprise Network Branch
- **9:20 - 9:35 AM** **Network Infrastructure Changes**
Gregory Parks - Supervisor, Customer Systems & Security Engineering Unit
- **9:35 - 10:05 AM** **Service Improvements**
Curtis Cadwallader - Supervisor, Operations Center
Gary Jellis - Supervisor , Network Architecture & Security Engineering Unit
AbdulMalik AbdulRahman-Wells, Network Engineer, Network Architecture & Security Engineering Unit
- **10:05 - 10:20 AM** **Break (15 minutes)**
- **10:20 - 10:25 AM** **Security**
Chris Demaree – Network Engineer, Network Management Engineering Unit
- **10:25 - 10:30 AM** **CGEN**
Maujala Price – Section Manager, Network Engineering Section
- **10:30 - 10:45 AM** **CALNET**
Jann Biggs - Branch Chief, CALNET Program Branch
- **10:45 - 11:00 AM** **Q & A / Closing**



**Statewide
Telecommunications
and Network Division
(STND)**

Barbara Garrett
Deputy Director
Statewide Telecommunications
and Network Division (STND)

Brian Parks
DPM IV
Enterprise Network
Branch

Jann Biggs
DPM IV
CALNET Program Branch

Maujala Price
DPM III
Network Engineering
Section

Cindy Sherrets
DPM III
Network Service
Management Section

Mehdi Ghomeshi
DPM III
Network Management
Systems Section

Vacant
DPM II
STND Business Support
Section

Vacant
DPM II
CALNET Contract Services
Section

Vacant
DPM II
CALNET Program
Oversight Section

Gary Jellis
SSS III (Sup)
Network Architecture
& Security Engineering

Scott Murray
DPM II
Vendor Management

Caroline Lim
SSS III (Sup)
Network Management
Engineering

Gregory Parks
SSS III (Sup)
Customer Systems &
Security Engineering

Eric Gaines
DPM II
Network Provisioning

Fatima Arvizo
DPM II
Network Asset Management

Rich Hall
DPM II
Network Engineering
Operation



Information Sharing

Brian Parks

Branch Chief

Enterprise Network Branch



New Network PM Window

- More projects, more changes
- Maintenance freeze requests also increasing
- Remaining PM windows reserved for major changes
- Additional network PM window has been established





New Network PM Window, Con't.

- The new PM window will occur weekly Wednesday night/Thursday morning from 12:01 AM to 6:00 AM
 - Only network domain level and standard changes will be performed during this scheduled PM
 - Domain Level – The change impacts only one customer; no other CABs are involved
 - Standard Level – Scriptable, repeatable, low risk changes performed regularly without incident that impact only the submitter's unit or Remedy Support Group





FY 2015-16 Network Rate Changes

- The purpose of these rate changes are to:
 - Bring each service as close to break-even as possible
 - Provide new technologies while reducing overall costs
- Analysis of cost, revenue and utilization data was performed to develop the rate changes
- Overall rate package savings for CDT customers at current workload levels:
 - An estimated \$3.7 million for FY 2015-16
 - An estimated \$5.8 million for FY 2016-17





FY 2015-16 Network Rate Changes

- This rate package includes the following rate adjustments and new service rates with effective dates as listed below:



Service	Effective Date
California Government Enterprise Network (CGEN) Site Connectivity Changes	January 1, 2016
CGEN Infrastructure	January 1, 2016
CGEN OPTEMAN/OPTEWAN (OEM/OEW) Transport Service	July 1, 2016
Dedicated Firewall/Demilitarized Zone (DMZ)	July 1, 2016
Managed Services in CalCloud	January 1, 2016
Electronic Commerce (E-Commerce) Services	January 1, 2016
Tenant Managed Services (TMS) Basic Network Connectivity	January 1, 2016
ListServ E-mail Distribution	January 1, 2016
Open Systems Storage	January 1, 2016
Windows Application Hosting	July 1, 2016
Mainframe Disk Storage	January 1, 2016
Mainframe Tape Storage	January 1, 2016
Linux Application Hosting	July 1, 2016



FY 2015-16 Network Rate Changes

■ CGEN Site Connectivity Changes:

- One time activities performed by CDT staff specifically for provisioning or changing customer connectivity
- The rates recover the costs associated with CDT staff completing the request
- Vendor one-time charges for related services are billed as pass-through costs and will be billed separately





FY 2015-16 Network Rate Changes

■ CGEN Site Connectivity Changes Rates:

Service Code	Service Description	Billing Metric	January 2016		
			Current Rate	Proposed Rate	Change
New	CGEN Bandwidth Change-With Change in Transport Type	One-time, per change	N/A	\$1,500	N/A
New	CGEN Bandwidth Change- Without Change in Transport Type	One-time, per change	N/A	\$650	N/A
New	CGEN Bandwidth Change-Foreign/TMS-B	One-time, per change	N/A	\$350	N/A
New	CGEN Bandwidth Change-Fiber Ring Service	One-time, per change	N/A	\$350	N/A
N603	OTech Install T-1 and below	One-time, per install	\$2,500	\$1,200	-52.0%
N603	OTech Install Above T-1	One-time, per install	\$6,000	\$3,250	-45.8%
N604	Site Delete	One-time, per delete	\$1,000	\$500	-50.0%





FY 2015-16 Network Rate Changes

■ CGEN Infrastructure:

- Formerly known as the iHub/Internet Access Service
- Provides the statewide network infrastructure that supports CGEN

- Includes three iHubs, the interconnecting circuits, and Internet connections
- Each iHub is in a different geographic location with vendor diversity
 - Sacramento; Bay Area; Southern California

■ Rate reductions resulted from:

- Customers utilizing higher bandwidth CGEN connection speeds than projected
- Reduction of vendor circuit costs and internet access costs





FY 2015-16 Network Rate Changes

■ CGEN Infrastructure Rates:

Service Code	Service Description	Billing Metric	January 2016		
			Current Rate	Proposed Rate	Change
T201	56K CGEN Infrastructure Connection	Per Connection	\$42	\$38	-9.5%
T204	T-1 CGEN Infrastructure Connection	Per Connection	\$105	\$94	-10.5%
T207	2MB CGEN Infrastructure Connection	Per Connection	\$126	\$113	-10.3%
T210	5MB CGEN Infrastructure Connection	Per Connection	\$302	\$271	-10.3%
T213	10MB CGEN Infrastructure Connection	Per Connection	\$588	\$527	-10.4%
T216	20MB CGEN Infrastructure Connection	Per Connection	\$924	\$828	-10.4%
T219	50MB CGEN Infrastructure Connection	Per Connection	\$1,680	\$1,506	-10.4%
T221	100MB CGEN Infrastructure Connection	Per Connection	\$2,520	\$2,259	-10.4%
T224	500MB CGEN Infrastructure Connection	Per Connection	\$3,360	\$3,012	-10.4%
T227	1G CGEN Infrastructure Connection	Per Connection	\$4,200	\$3,766	-10.3%
T230	5G CGEN Infrastructure Connection	Per Connection	\$5,880	\$5,272	-10.3%
T233	10G CGEN Infrastructure Connection	Per Connection	\$6,720	\$6,025	-10.3%





FY 2015-16 Network Rate Changes

■ CGEN OEM/OEW Transport Service:

- Provides the CDT infrastructure that allows all OEM/OEW circuits to connect to the data centers
- The rate is being increased to recover the expenses associated with providing this service
- Customer impact – 58 departments
 - Increased costs range from \$86 to \$15,761 annually
 - Average increase = \$4,417
 - Median increase = \$3,060
- A newer, less expensive, and more robust switched Ethernet service is available
 - AT&T Switched Ethernet (ASE) – host circuits being provisioned





FY 2015-16 Network Rate Changes

■ OEM/OEW and ASE Cost Comparison:

CIR	OEM Transport	OEM Total Monthly	ASE Total Monthly	Difference
5 Mbps	\$ 68.00	\$ 1,245.54	\$ 1,015.42	230.12
10 Mbps	\$ 135.00	\$ 1,789.27	\$ 1,298.27	491.00
20 Mbps	\$ 210.00	\$ 2,330.29	\$ 1,674.70	655.59
50 Mbps	\$ 383.00	\$ 3,461.78	\$ 2,600.23	861.55
100 Mbps	\$ 575.00	\$ 4,715.01	\$ 3,660.34	1,054.67
150 Mbps	\$ 768.00	\$ 6,325.00	\$ 4,997.31	1,327.69
250 Mbps	\$ 768.00	\$ 6,547.88	\$ 5,076.62	1,471.26
500 Mbps	\$ 768.00	\$ 6,653.38	\$ 5,198.65	1,454.73
1000 Mbps	\$ 958.00	\$ 7,686.87	\$ 6,257.71	1,429.16



FY 2015-16 Network Rate Changes

■ CGEN OEM/OEW Transport Service Rates:

Service Code	Service Description	Billing Metric	July 2016		
			Current Rate	Proposed Rate	Change
T601	2MB OEM/OEW Port Connection	Per Connection	\$16	\$29	81.3%
T603	4MB OEM/OEW Port Connection	Per Connection	\$32	\$58	81.3%
T605	5MB OEM/OEW Port Connection	Per Connection	\$38	\$68	78.9%
T607	10MB OEM/OEW Port Connection	Per Connection	\$75	\$135	80.0%
T609	20MB OEM/OEW Port Connection	Per Connection	\$117	\$210	79.5%
T611	50MB OEM/OEW Port Connection	Per Connection	\$213	\$383	79.8%
T613	100MB OEM/OEW Port Connection	Per Connection	\$320	\$575	79.7%
T615	500MB OEM/OEW Port Connection	Per Connection	\$427	\$768	79.9%
T617	1G OEM/OEW Port Connection	Per Connection	\$533	\$958	79.7%
T619	5G OEM/OEW Port Connection	Per Connection	\$747	\$1,343	79.8%
T621	10G OEM/OEW Port Connection	Per Connection	\$853	\$1,534	79.8%



FY 2015-16 Network Rate Changes

■ Dedicated Firewall/DMZ Rate:

- Provides and enforces secure access between an internal network and Internet, Extranet or Intranet links
- The Firewall/DMZ scales to meet a range of customer requirements and network sizes
- Hardware and Maintenance costs have increased while utilization of the service has remained constant

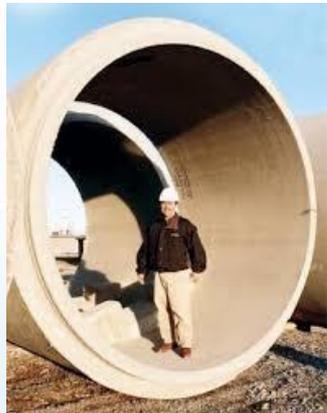


Service Code	Service Description	Billing Metric	July 2016		
			Current Rate	Proposed Rate	Change
N606	Dedicated Firewall/DMZ	Per DMZ/Month	\$165	\$215	30.3%



FY 2015-16 Network Rate Changes

- **TMS Basic Foreign Connectivity Rate:**
 - This service provides connectivity to the CDT network from a customer's TMS Basic environment
 - Two new rates have been established to meet the needs of customers who require more bandwidth than currently available



			January 2016		
Service Code	Service Description	Billing Metric	Current Rate	Proposed Rate	Change
New	5G TMS Basic Foreign Connection	Connection, per month	N/A	\$3,500	N/A
New	10G TMS Basic Foreign Connection	Connection, per month	N/A	\$4,750	N/A



Expanded Fiber Ring Services (FRS)

- What is FRS?
- Who is using FRS?
- FRS Enhancements
- Future Plans





Network Infrastructure Changes

**Gregory Parks, Supervisor
Customer Systems & Security
Engineering Unit**



Migration of Legacy Proxy Services to OTech Server Load Balancing and Reverse Proxy Service

- California Department of Technology is Migrating its Gateway Security from a legacy solution to current technology
- Protecting Our IT Environments from Internet Threats while Providing Load Balancing and Reverse Proxy Service





Migration of Legacy Proxy Services to OTech Server Load Balancing and Reverse Proxy Service

■ Why are we doing this?

- Updating services and hardware in support of our customers
- Improve access control to resources by external and internal clients
- Optimizing application performance
- Reduce load on application servers

■ Why the new technology?

■ It Provides:

- Forward and Reverse Web Proxy
- Load Balancing
- SSL Off Loading
- Opportunity for future service offerings





Migration of Legacy Proxy Services to OTech Server Load Balancing and Reverse Proxy Service



■ Process used in migrating

- New IPs
- Changes made on new infrastructure without impact to existing business
- Validating testing with CDT
- Cutover of DNS to new IP addresses to complete migration

■ OTech assistance during migration

- OTech Network Engineer assist with all migrations
- Continued support after migration



Migration of Legacy Proxy Services to OTech Server Load Balancing and Reverse Proxy Service

Successful Migrations include the following customers:



Skip t

Controller Betty T. Yee
California State Controller's Office



Migration of Legacy Proxy Services to OTech Server Load Balancing and Reverse Proxy Service

- All migrations from the legacy solution to the Server Load Balancing/Reverse Proxy service will be completed by 2nd quarter, 2016
- Customers should submit a Service Request (SR) for the migration from the legacy solution to the Server Load Balancing/Reverse Proxy service

SERVICE
REQUEST





Service Improvements

Curtis Cadwallader, Manager, Operations Center

Gary Jellis, Supervisor, Network Architecture & Security Engineering Unit

**AbdulMalik AbdulRahman-Wells, Network Engineer, Network
Architecture & Security Engineering Unit**



Incident Management & Service Desk

Curtis Cadwallader, Manager

Operations Center



OTech Incident Management

- Objective is to **restore normal service operation as quickly as possible** and minimize the adverse impact on business operations



Incident Definition

- **An incident is defined as an unplanned, unexpected or unexplained disruption in service**
- **This is any event which is not part of the standard operation of a service and which causes or may cause an interruption to or a reduction in the quality of the service that is provided**



Incident Management Process

- **Identification**
 - Observation & Reporting
- **Assessment**
 - Information Gathering
 - Categorization & Prioritization
- **Assignment**
 - Service Area
 - CGEN Vendor



Incident Management Process, con't

- **Notification**
 - High Priority Notification
 - Critical Priority Notification
 - Major Incident Notification

- **Escalation**
 - Internal / External

- **Resolution**
 - Monitor / Close



Service Desk Roles & Responsibilities

- Gather Information
- Assess Impact
- First Call Resolution
- Assign INC to Support Team
- Escalate
- Facilitate Major Incident Communications





Prioritization & Escalation

- **Prioritization Matrix**
 - **Impact & Urgency**

- **Manager On Duty (MOD)**
 - **Authority to escalate**



Major Incident

- Declared for significant service disruptions that have high impact and urgency
- Factors considered:
 - Health & Safety
 - Financial Impact
 - Impact to the Citizens of California
- Primary Goal – to alert affected customers and enable them to plan accordingly



Reload Program

Gary Jellis, Supervisor

**Network Architecture & Security
Engineering Unit**



OTech Network Reload Program

■ Requirements to Reload Equipment

- Audit Compliance

- IOS Updates

- Uptime Bugs

- Security Information Response Team (SIRT) Notices

Requirements





OTech Network Reload Program

■ Benefits of Reloading Equipment

■ Refreshes Memory

■ Verifies Hardware

■ Tests Redundancy



AVAILABILITY

■ Uncovers Weaknesses in System Failover



OTech Network Reload Program

■ Execution Strategy to Reload

- Equipment Inventory List
- Vendor Code Level Recommendations
- E-Health Reports to Create Reload Schedule
- Utilize the Maintenance Windows





VPN Migration

AbdulMalik AbdulRahman-Wells

Network Engineer

Network Architecture & Security Engineering Unit



Secure Mobility Client Deployment

- CDT is migrating customers to a new mobility client (SSL VPN)
- CWS was the pilot customer for this process



SSL VPN (Secure Mobility Client)

- SSL VPN is not a new technology, however a new mobility client is available
- The traditional VPN Group/Password combination has been replaced by a URL



Mobility Client Requirements

- Installations require Administrative Rights
- Desktop Support teams can deploy the mobility client with deployment software like SCCM
- The mobility client can be installed using MST templates to provide additional features
- A mobility client Administrator Guide will be available for identifying additional functionality
- Software updates/patches will be pushed; no Administrative privileges



Future VPN Functionality

- In order to adhere to the State Administrative Manual (SAM), CDT will pilot Two-Factor Authentication with RSA Hardware/Software Tokens
- A rate adjustment will be required to recover additional expenses



**Break
(15 minutes)**



DNS Firewall

Global Load Balancing

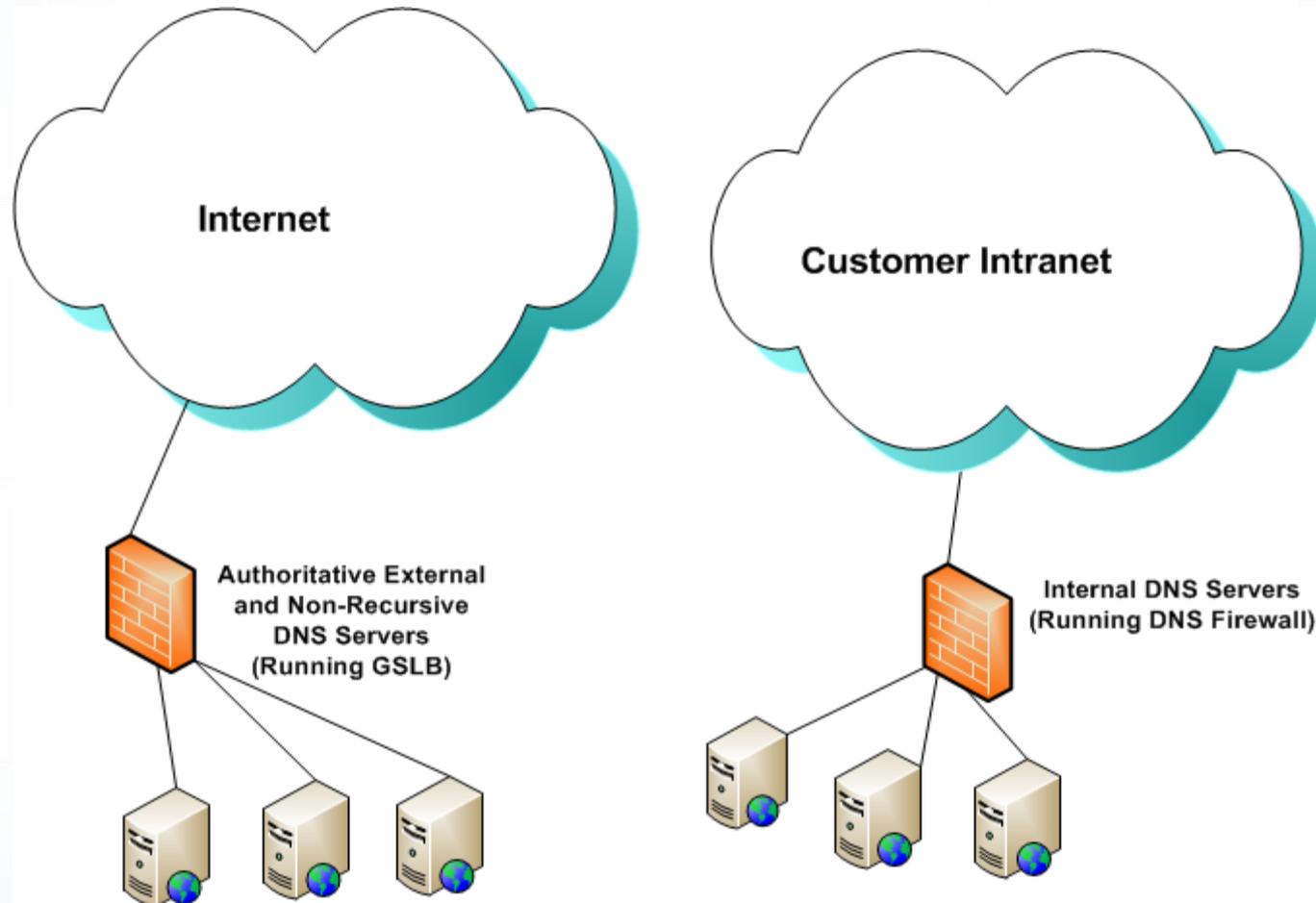
Chris Demaree

Network Engineer

Network Management Engineering Unit



Topology





DNS Firewall

■ Findings

- Prevents Advanced Persistent Threats (APTs) and malware from leaking data via DNS queries
- Notifications are generated whenever suspicious DNS queries are encountered
- Adds to 'Defense in Depth' by monitoring DNS queries for suspect behavior as they are requested
- Enhances existing IPS deployments



Global Load Balancing

■ General Information

- DNS Traffic Control is also known as Global Server Load Balancing (GSLB)
- Dynamically changes DNS resolution based on the health, load or application topology when a DNS lookup is requested
- Provides automatic failover between hosts located in Gold Camp or Vacaville



Global Load Balancing

■ Findings

- GSLB dynamically updates DNS records when a server fails and when it recovers, based on pre-defined fail-over rules
- Reduces outage duration by eliminating manual DNS updates during and after an outage event
- Works with existing load balancing technologies



CGEN



**Maujala Price
Manager**

Network Engineering Section

Shift in Edge Device Management

Current Situation OTech Templates

OTech dictated ACL & Protocols.

Site LAN Definition

State Legacy Network Protocols

State Program ACLs

Proposed Refinement: OTech Production Configurations

Site LAN Definition

State Legacy Network Protocols

State Program ACLs

OTech Overlay Definition

- 2 Stage Routing Plan
- Available Transport Encryption

Device Configuration

- Network Access Definition
- Network Management Definition
- Device IP Address

Device Vendor Software

Access Device

Access Circuit

- **Orange Shading:**
CDT scripting with vendor remote hands

- **Green Shading:**
Vendor provides the initial configuration and CDT controls the complete production configuration file



CGEN NextGEN

- **Testing of Overlay technologies is complete**
 - **DMVPN was selected**
 - Open Standard
 - Widely accepted
 - STND Network Engineers already experienced
- **Working with Vendors**
 - CGEN NextGen implementation
 - Identifying requirements
- **Working with CALNET contract program**
 - Determine what contract modifications may be required





CGEN NextGEN

- **Early Adopter Program**
 - 5 – 15 sites (Ideally)

- **Interested?**
 - Work out details
 - Contact Maujala Price:
 - Maujala.Price@state.ca.gov



Yes... I'm Interested!



CALNET

Jann Biggs

Branch Chief

CALNET Program Branch



Extension of CALNET 2

CALNET 2 orders will only be allowed for services that are not available on CALNET 3.

- **CALNET 2 9-1-1 Services:**
 - Transition/Migration and invoicing of all 9-1-1 Services must be completed by January 29, 2018
- **CALNET 2 Cable and Wire Services:**
 - No new Cable and Wire Service orders may be submitted or accepted after January 29, 2017
 - Implementation and invoicing of all Cable and Wire Services must be completed by January 29, 2018
- **CALNET 2 Equipment:**
 - Equipment shall be ordered, received, and invoiced no later than January 29, 2018





CALNET 3 Changes

Category 10: Satellite; IFB – C

■ Category 10.1

- Satellite phones with associated service plans. Various satellite phones will be available along with monthly and usage based plans. In addition, the following services will be available:
 - BGAN equipment with associated plans
 - MSAT G2 equipment with associated plans

■ Category 10.2

- Satellite data service focused on public safety applications. Services include:
 - Bandwidth in the Ku band
 - Indoor and outdoor satellite equipment
 - Teleport, gateway and NOC services

* IFB = Invitation for Bid





CALNET 3 Changes

Category 14: Broadband Internet; IFB – E

■ Category 14.1: Satellite based high speed internet

- Access that is always on
- Faster than traditional dialup access, and
- Little or no SLA's

■ Category 14.2: Terrestrial based high speed internet

- Access that is always on
- Faster than traditional dialup access
- Includes DSL and fiber
- Little or no SLA's





CALNET Program

Category 12: Basic Voice; IFB – D





CALNET 3 Unified Communications Offerings

- **CALNET 3, Category 1.2: MPLS, Converged VoIP**
 - Software Clients
 - Call Control
 - Video Conferencing
 - Customer Collaboration
 - Voice Mail
 - Collaboration Endpoints
 - Teleconferencing

- **CALNET 3, Category 2 . 0: Web Conferencing**
 - Document, Application and Screen Share
 - Integrated Video
 - Personal Rooms
 - Integrated Audio

*Note: This is not an all-inclusive list; handout available



CALNET Information

■ CALNET Website

<http://www.OTech.ca.gov/stnd/calnet3/>

- Frequently Asked Questions
- Catalogs
- Bulletins
- User Instructions

■ Vendor websites

- Listed on the CALNET site

■ Customer Service Line

- 916-657-9150



Questions and Answers