

# SDSU CS 596: Client Server Programming

## Gopher Protocol

[\[To Lecture Notes Index\]](#)

San Diego State University -- *This page last updated February 20, 1995*

---

### Contents of Gopher Protocol Lecture

1. [References](#)
2. [Gopher](#)
3. [Gopher+](#)

References The Internet Gopher Protocol by Anklesaria, McCahill, Linder, Johnson, Torry, Alberti, RFC 1436, March 1993

Gopher+ Upward Compatible Enhancements to the Internet Gopher Protocol Anklesaria, Lindner, McCahill, Torry, Johnson, Alberti, July 1993

---

## Gopher

Motivation: Provide easy anonymous access to information

Port: 70

Stateless

### Interaction

Client: open connection

Server: accept connection

Client: <selector><CRLF>

Server: <Stuff1><CRLF>

<Stuff2><CRLF>

<StuffN><CRLF>

.<CRLF>

close connection

---

### Using Empty Selector String

Client:

open connection

Server:

accept connection

Client:

<><CRLF>

Tells server to send list of what it has

Server responds with DirEntity (item list)

DirEntity Format

```
<Type><DisplayString><TAB>
<Selector><TAB>
<Host><TAB>
<PortNumber>
[<TAB><Stuff>]
<CRLF>
```

DirEntity Example

```
0About this gopher server<TAB>
0/About this gopher server<TAB>
Saturn.SDSU.Edu<TAB>
70
```

```
0About this gopher server 0/About this gopher server Saturn.SDSU.Edu 70
```

---

### Example of Using Empty Selector

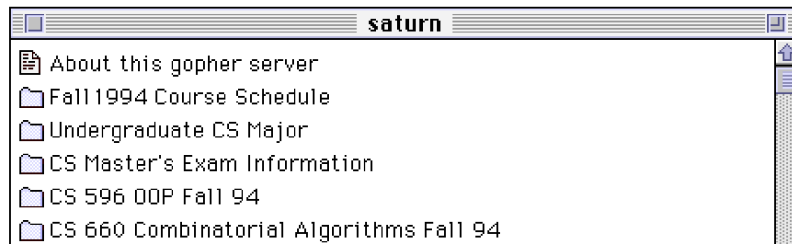
Telnet: open connection on saturn port 70

Server: accept connection

Telnet: <CRLF>

Server:

```
0About this gopher server      0/About this gopher      Saturn.SDSU.Edu 70
1Fall1994 Course Schedule     viewcourse CS           gopher.sdsu.edu 91
1Undergraduate CS Major      1/major                 Saturn.SDSU.Edu 70
1CS Master's Exam Info       1/mastersExam          Saturn.SDSU.Edu 70
1CS 596 OOP Fall 94          1/CS596 OOP            Saturn.SDSU.Edu 70
1CS 660 Comb Alg Fall 94     1/CS660                 Saturn.SDSU.Edu 70
.
```



---

### Values for <Type>

0 Item is a file

1 Item is a directory

2 Item is a CSO phone-book server

3 Error

4 Item is a BinHexed Macintosh file.

5 Item is DOS binary archive of some sort.

Client must read until the TCP connection closes.

6 Item is a UNIX uuencoded file.

7 Item is an Index-Search server.

8 Item points to a text-based telnet session.

9 Item is a binary file!

Client must read until the TCP connection closes.

+ Item is a redundant server

T Item points to a text-based tn3270 session.

g Item is a GIF format graphics file.

I Item is some kind of image file.

Client decides how to display.

Characters '0' through 'Z' are reserved.

---

### Using Selector String

Telnet: open connection on saturn port 70

Server: accept connection

Telnet: 1/major<CRLF>

Server:

0Undergraduate Advisors	0/major/advising	Saturn.SDSU.Edu 70
0Required courses for a CS major	0/major/required	Saturn.SDSU.Edu 70
0Elective courses for a CS major	0/major/electives	Saturn.SDSU.Edu 70
0CS499 as an elective	0/major/499	Saturn.SDSU.Edu 70
1Articulation agreements	1/major/artic	Saturn.SDSU.Edu 70
.		

---

### Fun with Selectors

Telnet: open connection on gopher.sdsu.edu port 91

Server: accept connection

Telnet: <CRLF>

Server:

<Type><DisplayString> <Selector> <Host>

<Type><DisplayString>	<Selector>	<Host>
0About this Gopher	about	gopher.sdsu.edu 91
0Help	help	gopher.sdsu.edu 91
7Class title search	class	gopher.sdsu.edu 91
7Instructor search	instr	gopher.sdsu.edu 91
7Sound alike instructor search	xinstr	gopher.sdsu.edu 91
7Schedule number search	sched	gopher.sdsu.edu 91
7Search entire schedule	all	gopher.sdsu.edu 91
7Search open classes by title	avail	gopher.sdsu.edu 91
.		

---

## Gopher+

Extend Gopher protocol to support:

Pictures

Sounds

Movies

Allow server to

send error messages

improve data transmission

Support Item attribute information

Gopher+ DirEntity Format

<Type><DisplayString><TAB>

<Selector><TAB>

<Host><TAB>

<PortNumber><TAB>

+

<CRLF>

DirEntity Example

0About this gopher server<TAB>

0/About this gopher server<TAB>

Saturn.SDSU.Edu<TAB>

70

+

0About this gopher server 0/About this gopher server Saturn.SDSU.Edu 70 +

---

### Gopher+ Selector String

Client: open connection

Server: accept connection

Client: <selector><TAB>+<CRLF>

### Possible Server Responses

- +<NumberOfBytes><CRLF><data> close connection
- +-1<CRLF><data><CRLF>.<CRLF> close connection
- +-2<CRLF><data> close connection
- --1<CRLF><error message><CRLF>.<CRLF>

### Server Error Messages

- 1 Item Not available
- 2 Try again later
- 3 Item has been moved, use XXX

---

## Gopher+ Selector String Example

Telnet: open connection on saturn port 70

Server: accept connection

Telnet: 1/major<TAB>+<CRLF>

Server:

+-1

```
0Undergraduate Advisors      0/major/advising      Saturn.SDSU.Edu 70      +
0Required courses for a CS major 0/major/required      Saturn.SDSU.Edu 70      +
0Elective courses for a CS major 0/major/electives     Saturn.SDSU.Edu 70      +
0CS499 as an elective          0/major/499           Saturn.SDSU.Edu 70      +
1Articulation agreements       1/major/artic         Saturn.SDSU.Edu 70      +
.
```

---

## Attribute Information

Client: open connection

Server: accept connection

Client: <selector><TAB>!<CRLF>

Server: returns the attribute information for the item indicated in the selector

### Attribute Format

+<AttributeName>:<data>

### Required Attributes

+INFO: <selector>

+ADMIN:

Admin: [comment] <administrator e-mail address>  
Mod-Date: [comment] <YYYYMMDDhhmmss>  
[Optional stuff]  
+VIEWS: [gopher descriptor]  
Content-Type[ viewLanguage]: [<size>]

Content-Type Text/plain application/postscript

image/gif etc

Content-Type En\_US De\_DE,

---

### Attribute Information Example

Telnet: open connection on saturn port 70

Server: accept connection

Telnet: 1/major<TAB>!<CRLF>

Server:

+ -1

+INFO: 1Undergraduate CS Major 1/major Saturn.SDSU.Edu 70 +

+ADMIN:

Admin: Computer Science <whitney@saturn.sdsu.edu>

Mod-Date: Fri Sep 16 09:44:18 1994 <19940916094418>

Access: read

+VIEWS:

application/gopher-menu En\_US: <.5k>

application/gopher+-menu En\_US: <.5k>

+PROTOCOLS:

gopher

gopher+

gopher+/meta

.

---

### Attributes for all items in a Directory

Client: open connection

Server: accept connection

Client: <selector><TAB>\$<CRLF>

### Specifying the Attributes of Interest

Client: open connection

Server: accept connection

Client: <selector><TAB>\$+VIEWS+ABSTRACT<CRLF>

---

### "Interactive Query Items"

DirEntity format for query

<Type><DisplayString><TAB>

<Selector><TAB>

<Host><TAB>

<PortNumber><TAB>

?

<CRLF>

DirEntity Example

0Registration

0/facstaff/Rosters/Reg admissions.sdsu.edu 70 ?

ASK attribute contains questions for client to show user

+ASK:

Note: Electronic Roster Registration

Note:

Ask: Last Name:

Note:

Ask: First Name:

Note:

Ask: Fac/Staff ID# (SS#):

Note:

Ask: Phone Number:

Note:

Ask: E-mail Address:

Note:

Ask: Department(s):

Note:

Choose: Type: Faculty Staff

---

### Some Query Options

AskL

presents the user with a question, and ideally should allow the user to enter several lines of response.

AskF"

requests the user for a new local filename

AskP

presents the user with a question, and bullets out the response typed in by the user

Select

presents the user with a set of options from which the use can select one or many

Choose

presents the user with a set of options from which the use can select one

---

### How Queries work

User selects item in Client that has ? extension

Client gets ask attribute for item from server

Server disconnects

Client displays questions to user, gets answers

Client relays answers to server!!!!

---

### Full Gopher+ Client Request

<selector><TAB>

+ [representation]

[<TAB><dataFlag>]<CRLF>

[dataBlock]

OCTET = \$00 -> \$ff

UNASCII = OCTET - [TAB, CRLF, NUL ]

representation = 'Text' | 'List' | 'Postscript' | 'MacWriteII' |

'RTF' | {UNASCII}



dataFlag = 0 means no data block

= 1 means has data block

Success = '+' | '-'

Transfer ::= DigitSeq | '-1' | '-2'

DataHead ::= Success Transfer CRLF

DataBlock ::= DataHead {OCTET}