

hostinfo egg

Look up host, protocol, and service information
Extension for Chicken Scheme
Version 1.0

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1 About this egg

1.1 Version history

1.0 Initial release

1.2 Requirements

This egg requires the following extensions:

```
vector-lib
```

1.3 Usage

Load this egg like so:

```
(require-extension hostinfo)
```

2 Documentation

This extension performs host, protocol and service information lookups via underlying calls to *gethostbyname(3)*, *getprotobyname(3)*, and *getservbyname(3)*. Depending on your system, this may consult DNS, NIS, */etc/hosts*, */etc/services*, */etc/protocols*, and so on.

A simple interface is provided for the most common queries. Also provided is a more comprehensive interface using records, which contain all data available in a lookup.

IP addresses are represented by 4 (IPv4) or 16 (IPv6) byte `u8vector`s. The interface requires, and returns, addresses in this format; functions are provided to convert between the string and `u8vector` representations. However, the "do what I want" procedures (e.g. `host-information`) will do the conversion for you.

2.1 Short and sweet

Quickly perform the most common lookups. Convenient and efficient for one-off use, but perform a new lookup each time. They return `#f` on failure.

`hostname->ip` [procedure]
 (`hostname->ip` HOSTNAME)

Look up string HOSTNAME and return IP address as `u8vector`.

`ip->hostname` [procedure]
 (`ip->hostname` IPADDR)

Look up `u8vector` IPADDR and return hostname as string.

`protocol-name->number` [procedure]
 (`protocol-name->number` PROTOCOL-NAME)

Look up string PROTOCOL-NAME and return protocol number.

`protocol-number->name` [procedure]
 (`protocol-number->name` PROTOCOL-NUMBER)

Look up PROTOCOL-NUMBER and return protocol name as string.

`service-port->name` [procedure]
 (`service-port->name` SERVICE-PORT [PROTO])

Look up SERVICE-PORT number and return service name as string. Optional PROTO argument, which must be a string, constrains lookup to that protocol.

`service-name->port` [procedure]
 (`service-name->port` SERVICE-NAME [PROTO])

Look up string SERVICE-NAME and return the canonical port for that service. Optional PROTO argument as above.

2.2 Records

Some lookups return a host, protocol, or service record. These records print nicely on the screen, for convenient interactive use.

`hostinfo-address` [procedure]

(`hostinfo-address h`)

Retrieves the `address` field of the `hostinfo` record `h`. Accessors are similar for other records and their fields.

`hostinfo` [record]

`name` Hostname

`addresses`

A vector of one or more `u8vector` IP addresses

`aliases` A vector of any alternate hostnames

`address` The first IP address (`u8vector`) in `addresses`

`type` `'AF_INET` (IPv4) or `'AF_INET6` (IPv6)

`length` IP address length in bytes

`protoinfo` [record]

`name` Protocol name

`number` Protocol number

`aliases` Vector of alternate names for this protocol

`servinfo` [record]

`name` Service name

`number` Service number

`aliases` Vector of alternate names for this service

`protocol` Name of protocol this service uses

2.3 Record lookup

`hostname->hostinfo` [procedure]

`ip->hostinfo` [procedure]

`service-name->servinfo` [procedure]

`service-port->servinfo` [procedure]

`protocol-name->protoinfo` [procedure]

`protocol-number->protoinfo` [procedure]

(`hostname->hostinfo NAME`)

(`ip->hostinfo IPADDR`)

(`service-name->servinfo NAME`)

(`service-port->servinfo NUM`)

(`protocol-name->protoinfo NAME`)

(`protocol-number->protoinfo NUM`)

These lookups correspond to those described in *Short and sweet*, but return a full record. The entire record is filled in a single system call.

2.4 One-stop shops

These decipher your argument, call the appropriate lookup, and return an information record.

`host-information` [procedure]
 (`host-information` HOST)

Look up and return a `hostinfo` record, or `#f`. HOST is a string hostname, a string numeric IP address, or a `u8vector` IP address.

`protocol-information` [procedure]
 (`protocol-information` PROTO)

Look up and return a `protoinfo` record, or `#f`. PROTO is a protocol number or string name.

`service-information` [procedure]
 (`service-information` SERVICE [PROTO])

Look up and return a `servinfo` record, or `#f`. SERVICE is a service number or string name. PROTO is an optional protocol number or string name, which will constrain lookups to that particular protocol.

NOTE: if the protocol number is illegal, an error is thrown, since this was probably unintentional.

2.5 Utility functions

`string->ip` [procedure]
 (`string->ip` IP-STRING)

Convert an IPv4 or IPv6 address string in canonical format to a `u8vector`, which can be considered an "IP address object". Returns `#f` on failure.

`ip->string` [procedure]
 (`ip->string` IPADDR)

Convert a 4 (IPv4) or 16 (IPv6) element `u8vector` to a string in canonical format. Throws an error if the `u8vector` is not 4 or 16 bytes long. This call should only fail on system error, in which case it will return `#f` (perhaps not the best behaviour).

3 Bugs

IPv6 lookup is not yet supported. However, IPv6<->string conversion works fine.

System errors return failure (**#f**) and so are indistinguishable from failed lookups. They should probably signal an error or an exception.

4 Examples

```
(host-information "www.call-with-current-continuation.org")
(host-information '#u8(194 97 107 133))
(host-information "194.97.107.133")
  ; => #,(hostinfo name: "www003.lifemedien.de"
  ;       addresses: #(#u8(194 97 107 133))
  ;       aliases: #("www.call-with-current-continuation.org"))
(ip->hostname '#u8(194 97 107 133)) ; "www003.lifemedien.de"
(string->ip "0708::0901")          ; #u8(7 8 0 0 0 0 0 0 0 0 0 0 0 0 9 1)
(ip->string '#u8(127 0 0 1))        ; "127.0.0.1"
(hostinfo-aliases
  (hostname->hostinfo
    (ip->hostname
      (hostname->ip
        (hostinfo-name
          (host-information "www.call-with-current-continuation.org"))))))
  ; => #("www.call-with-current-continuation.org")

(protocol-information 17)
  ; => #,(protoinfo name: "udp" number: 17 aliases: #("UDP"))
(protoinfo-name (protocol-information 2)) ; => "igmp"
(protoinfo-aliases (protocol-name->protoinfo
  (protocol-number->name
    (protoinfo-number
      (protocol-information "ospf"))))) ; => #("OSPFIGP")
(protocol-name->number "OSPFIGP")      ; 89 (you can look up aliases, too)

(servinfo-protocol (service-name->servinfo
  (service-port->name
    (servinfo-port (service-information "ssh")))))
  ; => "udp" (yes, really)
(service-information "ssh" "tcp")
  ; => #,(servinfo name: "ssh" port: 22 aliases: #() protocol: "tcp")
(service-information "ssh" "tco") ; => #f
(service-information 512 "tcp")
  ; #,(servinfo name: "exec" port: 512 aliases: #() protocol: "tcp")
(service-information 512 "udp")
  ; #,(servinfo name: "comsat" port: 512 aliases: #("biff") protocol: "udp")
(service-information 512 17)      ; same as previous
(service-information 512 170000)
  ; Error: (service-information) illegal protocol number: 170000
```

5 License

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