SYSTEMS NETWORK ARCHITECTURE

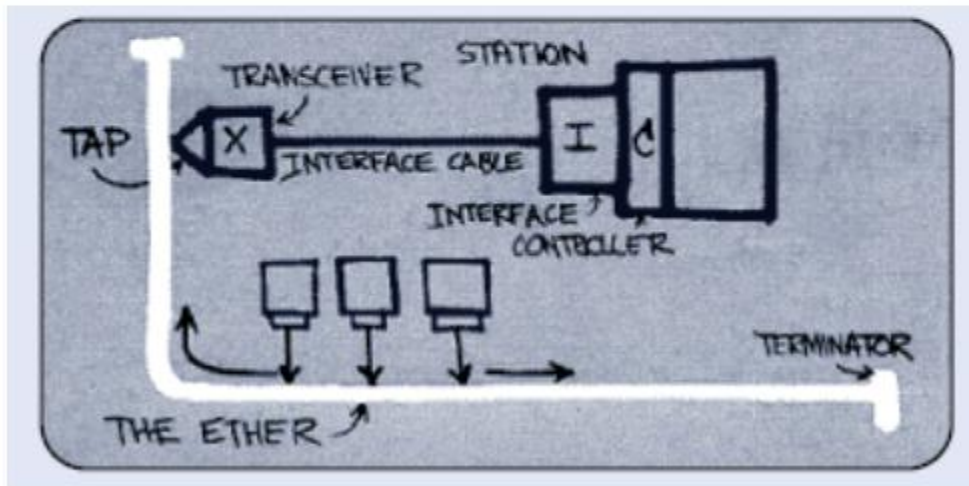| OSI Layer	Digital Network Architecture (DNA)
7 6	Network applications Network management
5	Session
4	End-to-end communication
3	Routing
2 1	Ethernet Token Ring FDDI . . .

XEROX

Birth of Ethernet

➡ **May 22, 1973: Ethernet memo**

⇨ Bob Metcalfe (Xerox Palo Alto Research Center)

⇨ Carrier Sense Multiple Access with Collision Detection and expo backoff

⇨ 3 mbps speed

US Patent 4.063.220
"Multipoint Data Communication
System with Collision Detection"
end 1977

XEROX Alto vs. Apple Lisa

TCP/IP	OSI	SNA
	Application	Transaction Services
telnet,ftp,SMTP,SNMP	Presentation	NAU Services Mgr, Func. Mgmt, Data Serv.
	Session	Data Flow Control
TCP,UDP	Transport	Transmission Control
IP, ARP, RARP, ICMP	Network	Path Control
Data Link	Data Link	Data Link Control
Physical	Physical	Physical Control

Network Accessible Unit

Path Control Network
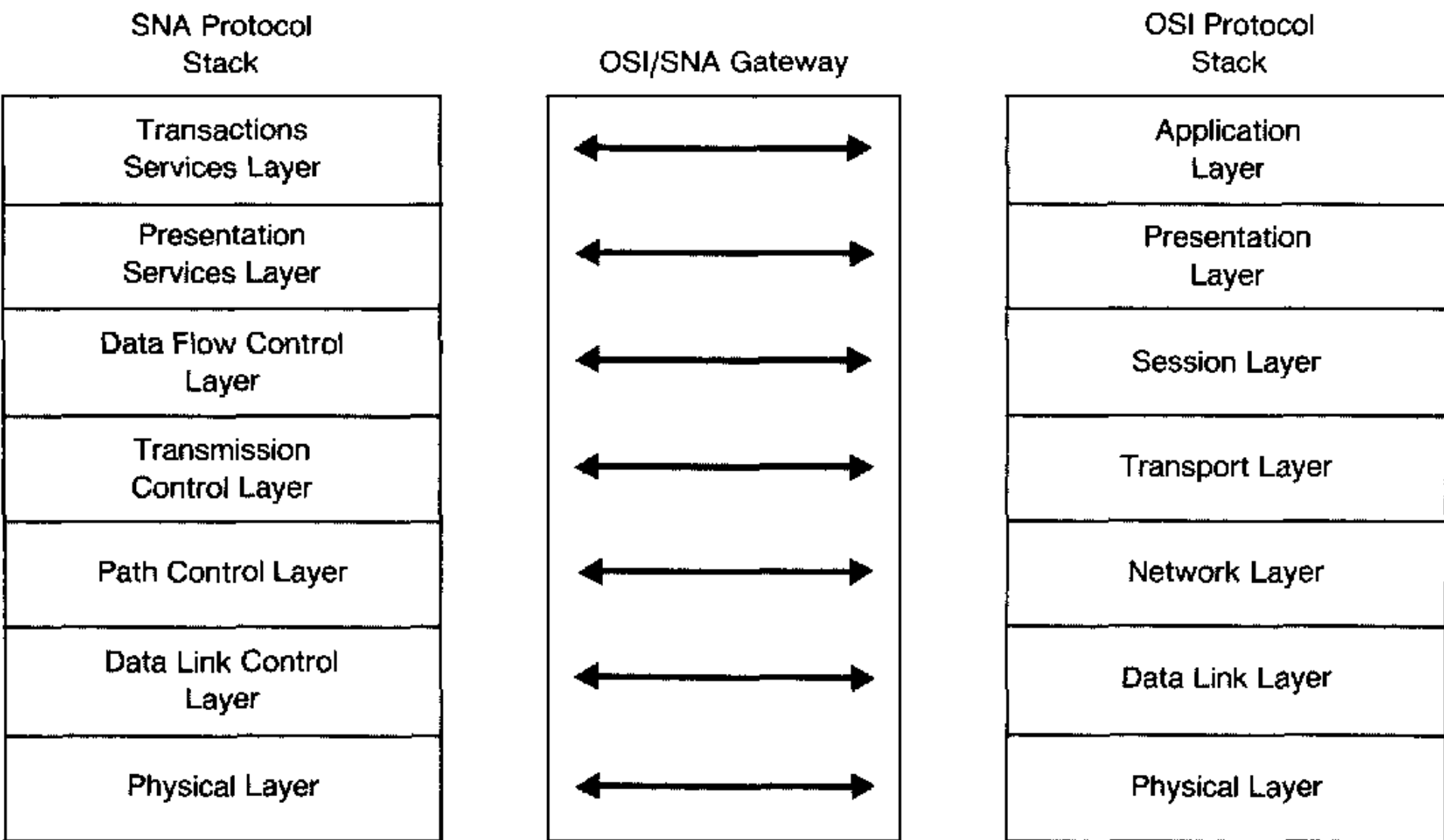
FIGURE 3. Direct-Integration SNA/OSI

OSI Model	SNA
Application	Transaction Services
	Presentation Services
Presentation	
Session	
	Data Flow Control
Transport	
	Transmission Control
Network	
	Path Control
Data Link	
	Data Link Control
Physical	Physical

◆ OSI 7 Layer Reference Model

IETF

- ◆ Internet Engineering Task Force
- ◆ http://www.ietf.org/
- ◆ RFC
- ◆ Draft

🏠 > Participate > Meetings

IETF 120 Vancouver
20 Jul 2024 - 26 Jul 2024
IETF 120 starts Saturday 20 July and runs through Friday afternoon, 26 July.

The IETF Hackathon and IETF Codesprint take place on the weekend. Events to help new participants get the most out of IETF meetings begin on Sunday afternoon. Participants should plan their travel accordingly. An introduction to IETF meetings provides an overview of how to prepare for and get the most out of sessions all week.

Key details

Meeting Registration ⌄
Register   Registration Fee Waivers

Terms and conditions   Participant List

Participation Information ⌄
Agenda   Preparing for the meeting

Important dates and deadlines

Information for new participants

Meeting Communication ⌄
Reporting Problems | Meeting Mailing Lists

Reporting Potential Harassment

Venue Information ⌄
Venue and Hotels | Childcare | Floor plans

Participant wiki (local information)

Meeting network and technology

Additional Events ⌄
Code Sprint | Hackathon | Social Event

Public Side Meetings | Request Additional Meeting

Meetings

IETF 119 Brisbane

IETF 120 Vancouver

IETF 121 Dublin

Upcoming meetings

Past Meetings

Interim Meetings

Preparing for an IETF Meeting

New Participants

Visas and Letters of Invitation

Onsite Childcare

Meeting Planning

Meeting network and technology

Meeting venue information
Venue

Hyatt Regency Vancouver
Vancouver, Canada

IETF RFC

◆ RFCs have since become official documents of Internet specifications, communications protocols, procedures, and events

◆ RFC768: UDP, August 1980
◆ RFC791: IPv4, September 1981
◆ RFC793: TCP, September 1981
◆ RFC2460 IPv6, December 1998

RFC Index

Num	Information
9552	**Distribution of Link-State and Traffic Engineering Information Using BGP** K. Talaulikar [December 2023] (HTML, TEXT, PDF, XML) (Obsoletes RFC7752, RFC9029) (Status: PROPOSED STANDARD) (Stream: IETF, Area: rtg, WG: idr) (DOI: 10.17487/RFC9552)
9547	**Report from the IAB Workshop on Environmental Impact of Internet Applications and Systems, 2022** J. Arkko, C. S. Perkins, S. Krishnan [February 2024] (HTML, TEXT, PDF, XML) (Status: INFORMATIONAL) (Stream: IAB) (DOI: 10.17487/RFC9547)
9546	**Operations, Administration, and Maintenance (OAM) for Deterministic Networking (DetNet) with the MPLS Data Plane** G. Mirsky, M. Chen, B. Varga [February 2024] (HTML, TEXT, PDF, XML) (Status: PROPOSED STANDARD) (Stream: IETF, Area: rtg, WG: detnet) (DOI: 10.17487/RFC9546)
9545	**Path Segment Identifier in MPLS-Based Segment Routing Networks** W. Cheng, H. Li, C. Li, R. Gandhi, R. Zigler [February 2024] (HTML, TEXT, PDF, XML) (Status: PROPOSED STANDARD) (Stream: IETF, Area: rtg, WG: spring) (DOI: 10.17487/RFC9545)
9540	**Discovery of Oblivious Services via Service Binding Records** T. Pauly, T. Reddy.K [February 2024] (HTML, TEXT, PDF, XML) (Status: PROPOSED STANDARD) (Stream: IETF, Area: sec, WG: ohai) (DOI: 10.17487/RFC9540)
9539	**Unilateral Opportunistic Deployment of Encrypted Recursive-to-Authoritative DNS** D. K. Gillmor, J. Salazar, P. Hoffman [February 2024] (HTML, TEXT, PDF, XML) (Status: EXPERIMENTAL) (Stream: IETF, Area: int, WG: dprive) (DOI: 10.17487/RFC9539)
9538	**Content Delivery Network Interconnection (CDNI) Delegation Using the Automated Certificate Management Environment** F. Fieau, E. Stephan, S. Mishra [February 2024] (HTML, TEXT, PDF, XML) (Status: PROPOSED STANDARD) (Stream: IETF, Area: art, WG: cdni) (DOI: 10.17487/RFC9538)
9535	**JSONPath: Query Expressions for JSON** S. Gössner, G. Normington, C. Bormann [February 2024] (HTML, TEXT, PDF, XML) (Status: PROPOSED STANDARD) (Stream: IETF, Area: art, WG: jsonpath) (DOI: 10.17487/RFC9535)
9534	**Simple Two-Way Active Measurement Protocol Extensions for Performance Measurement on a Link Aggregation Group** Z. Li, T. Zhou, J. Guo, G. Mirsky, R. Gandhi [January 2024] (HTML, TEXT, PDF, XML) (Status: PROPOSED STANDARD) (Stream: IETF, Area: tsv, WG: ippm) (DOI: 10.17487/RFC9534)
9533	**One-Way and Two-Way Active Measurement Protocol Extensions for Performance Measurement on a Link Aggregation Group** Z. Li, T. Zhou, J. Guo, G. Mirsky, R. Gandhi [January 2024] (HTML, TEXT, PDF, XML) (Status: PROPOSED STANDARD) (Stream: IETF, Area: tsv, WG: ippm) (DOI: 10.17487/RFC9533)
9532	**HTTP Proxy-Status Parameter for Next-Hop Aliases** T. Pauly [January 2024] (HTML, TEXT, PDF, XML) (Status: PROPOSED STANDARD) (Stream: IETF, Area: art, WG: httpbis) (DOI: 10.17487/RFC9532)
9530	**Digest Fields** R. Polli, L. Pardue [February 2024] (HTML, TEXT, PDF, XML) (Obsoletes RFC3230) (Status: PROPOSED STANDARD) (Stream: IETF, Area: art, WG: httpbis) (DOI: 10.17487/RFC9530)

Status:	Proposed Standard
Obsoletes:	7752, 9029
More info:	Errata exist | Datatracker | IPR | Info page

Stream:	Internet Engineering Task Force (IETF)
RFC:	9552
Obsoletes:	7752, 9029
Category:	Standards Track
Published:	December 2023
ISSN:	2070-1721
Author:	K. Talaulikar, Ed.
	Cisco Systems

RFC 9552
Distribution of Link-State and Traffic Engineering Information Using BGP

Abstract

In many environments, a component external to a network is called upon to perform computations based on the network topology and the current state of the connections within the network, including Traffic Engineering (TE) information. This is information typically distributed by IGP routing protocols within the network.

This document describes a mechanism by which link-state and TE information can be collected from networks and shared with external components using the BGP routing protocol. This is achieved using a BGP Network Layer Reachability Information (NLRI) encoding format. The mechanism applies to physical and virtual (e.g., tunnel) IGP links. The mechanism described is subject to policy control.

Applications of this technique include Application-Layer Traffic Optimization (ALTO) servers and Path Computation Elements (PCEs).

This document obsoletes RFC 7752 by completely replacing that document. It makes some small changes and clarifications to the previous specification. This document also obsoletes RFC 9029 by incorporating the updates that it made to RFC 7752.

Status of This Memo

Num	Information
0001	**Host Software** S. Crocker [April 1969] (TXT, HTML) (Status: UNKNOWN) (Stream: Legacy) (DOI: 10.17487/RFC0001)
0002	**Host software** B. Duvall [April 1969] (TXT, PDF, HTML) (Status: UNKNOWN) (Stream: Legacy) (DOI: 10.17487/RFC0002)
0003	**Documentation conventions** S.D. Crocker [April 1969] (TXT, HTML) (Obsoleted-By RFC0010) (Status: UNKNOWN) (Stream: Legacy) (DOI: 10.17487/RFC0003)
0004	**Network timetable** E.B. Shapiro [March 1969] (TXT, HTML) (Status: UNKNOWN) (Stream: Legacy) (DOI: 10.17487/RFC0004)
0005	**Decode Encode Language (DEL)** J. Rulifson [June 1969] (TXT, HTML) (Status: UNKNOWN) (Stream: Legacy) (DOI: 10.17487/RFC0005)
0006	**Conversation with Bob Kahn** S.D. Crocker [April 1969] (TXT, HTML) (Status: UNKNOWN) (Stream: Legacy) (DOI: 10.17487/RFC0006)
0007	**Host-IMP interface** G. Deloche [May 1969] (TXT, HTML) (Status: UNKNOWN) (Stream: Legacy) (DOI: 10.17487/RFC0007)
0008	**ARPA Network Functional Specifications** G. Deloche [May 1969] (PDF, HTML) (Status: UNKNOWN) (Stream: Legacy) (DOI: 10.17487/RFC0008)
0009	**Host Software** G. Deloche [May 1969] (PDF, HTML) (Status: UNKNOWN) (Stream: Legacy) (DOI: 10.17487/RFC0009)
0010	**Documentation conventions** S.D. Crocker [July 1969] (TXT, HTML) (Obsoletes RFC0003) (Obsoleted-By RFC0016) (Updated-By RFC0024, RFC0027, RFC0030) (Status: UNKNOWN) (Stream: Legacy) (DOI: 10.17487/RFC0010)
0011	**Implementation of the Host - Host Software Procedures in GORDO** G. Deloche [August 1969] (TXT, PDF, HTML) (Obsoleted-By RFC0033) (Status: UNKNOWN) (Stream: Legacy) (DOI: 10.17487/RFC0011)
0012	**IMP-Host interface flow diagrams** M. Wingfield [August 1969] (TXT, PS, PDF, HTML) (Status: UNKNOWN) (Stream: Legacy) (DOI: 10.17487/RFC0012)
0018	**IMP-IMP and HOST-HOST Control Links** V. Cerf [September 1969] (TXT, HTML) (Status: UNKNOWN) (Stream: Legacy) (DOI: 10.17487/RFC0018)
0019	**Two protocol suggestions to reduce congestion at swap bound nodes** J.E. Kreznar [October 1969] (TXT, HTML) (Status: UNKNOWN) (Stream: Legacy) (DOI: 10.17487/RFC0019)
0020	**ASCII format for network interchange** V.G. Cerf [October 1969] (TXT, PDF, HTML) (Also STD0080) (Status: INTERNET STANDARD) (Stream: Legacy) (DOI: 10.17487/RFC0020)
0021	**Network meeting** V.G. Cerf [October 1969] (TXT, HTML) (Status: UNKNOWN) (Stream: Legacy) (DOI: 10.17487/RFC0021)
0022	**Host-host control message formats** V.G. Cerf [October 1969] (TXT, HTML) (Status: UNKNOWN) (Stream: Legacy) (DOI: 10.17487/RFC0022)

RFC 1: Host Software S. Crocker [April 1969] (TXT, HTML) (Status: UNKNOWN) (Stream: Legacy) (DOI: 10.17487/RFC0001)

◆ https://www.rfc-editor.org/rfc/rfc1.txt

```
Network Working Group                              Steve Crocker
Request for Comments: 1                                     UCLA
                                                    7 April 1969


                    Title:   Host Software
                    Author:   Steve Crocker
                     Installation:   UCLA
                    Date:    7 April 1969
           Network Working Group Request for Comment:    1


CONTENTS

INTRODUCTION

   I. A Summary of the IMP Software

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       IMP Transmission and Error Checking

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  II. Some Requirements Upon the Host-to-Host Software

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       Deep Use

       Error Checking

 III. The Host Software

       Establishment of a Connection
```

```
Network Working Group                                    Vint Cerf
Request for Comments: 13                                  UCLA
                                                    20 August 1969
```

```
Referring to NWG/RFC: 11, it appears that file transmissions over
auxiliary connections will require some mechanism to specify "END-OF-
FILE."  It is proposed that a length 0 (zero) message be used for this
purpose.  Figure 1 shows the format:
```
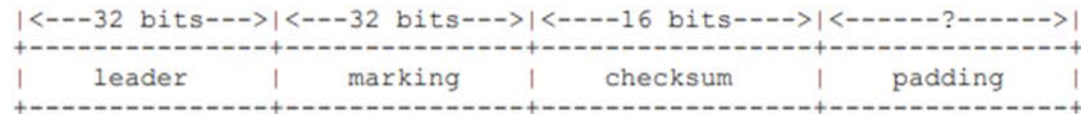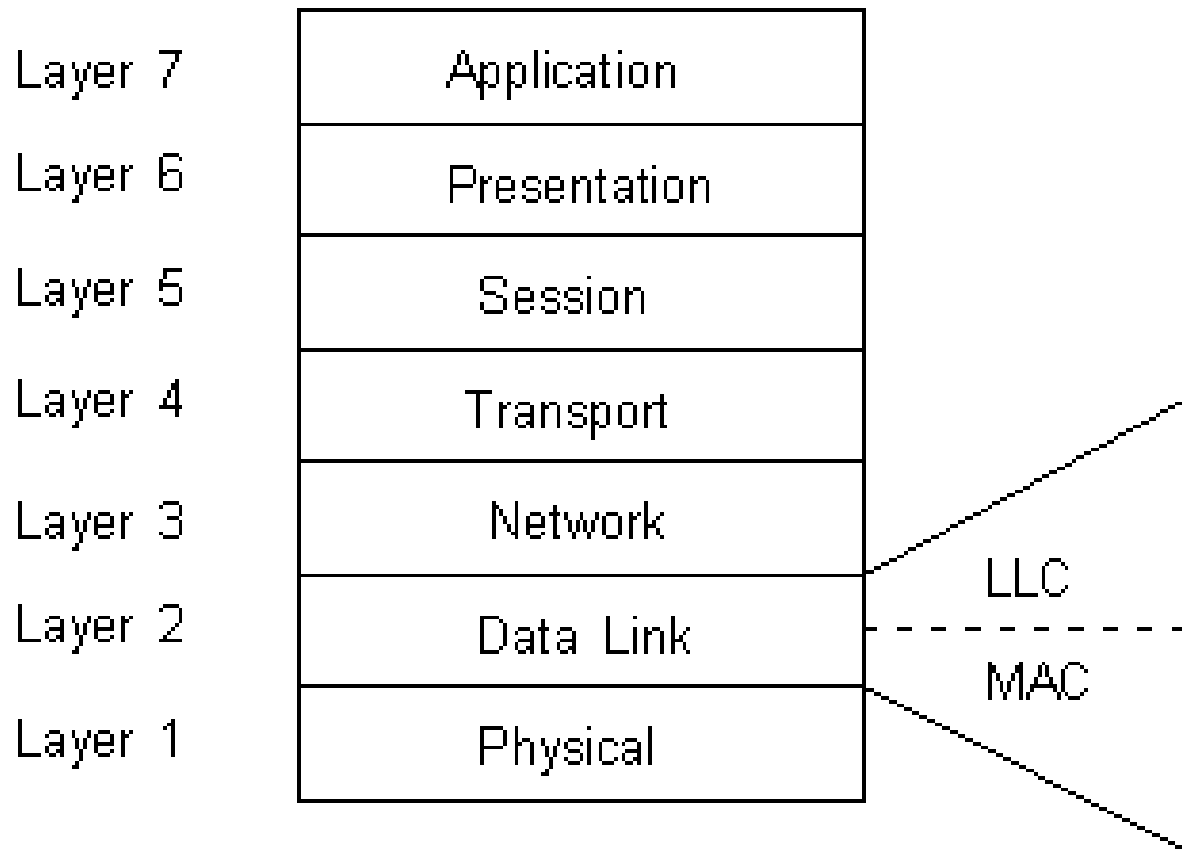
```
|<---32 bits--->|<---32 bits--->|<----16 bits---->|<-------?------>|
+---------------+---------------+-----------------+---------------+
|    leader     |    marking    |    checksum     |    padding    |
+---------------+---------------+-----------------+---------------+
```

```
                           Figure 1

                Zero Text Length EOF Message
```

```
        [ This RFC was put into machine readable form for entry ]
        [ into the online RFC archives by Michael Brunnbauer 1/97 ]
```

OSI Model

Layer 7	Application
Layer 6	Presentation
Layer 5	Session
Layer 4	Transport
Layer 3	Network
Layer 2	Data Link
Layer 1	Physical

LLC

MAC

TCP/IP Stack

Standards/Specs   **Protocol Stack**

RFC 768, 793 etc.

RFC 791 etc.

Ethernet: RFC 826, 894, 895,
          1029, 1972...
Wireless 802.11*: IEEE 802.11*
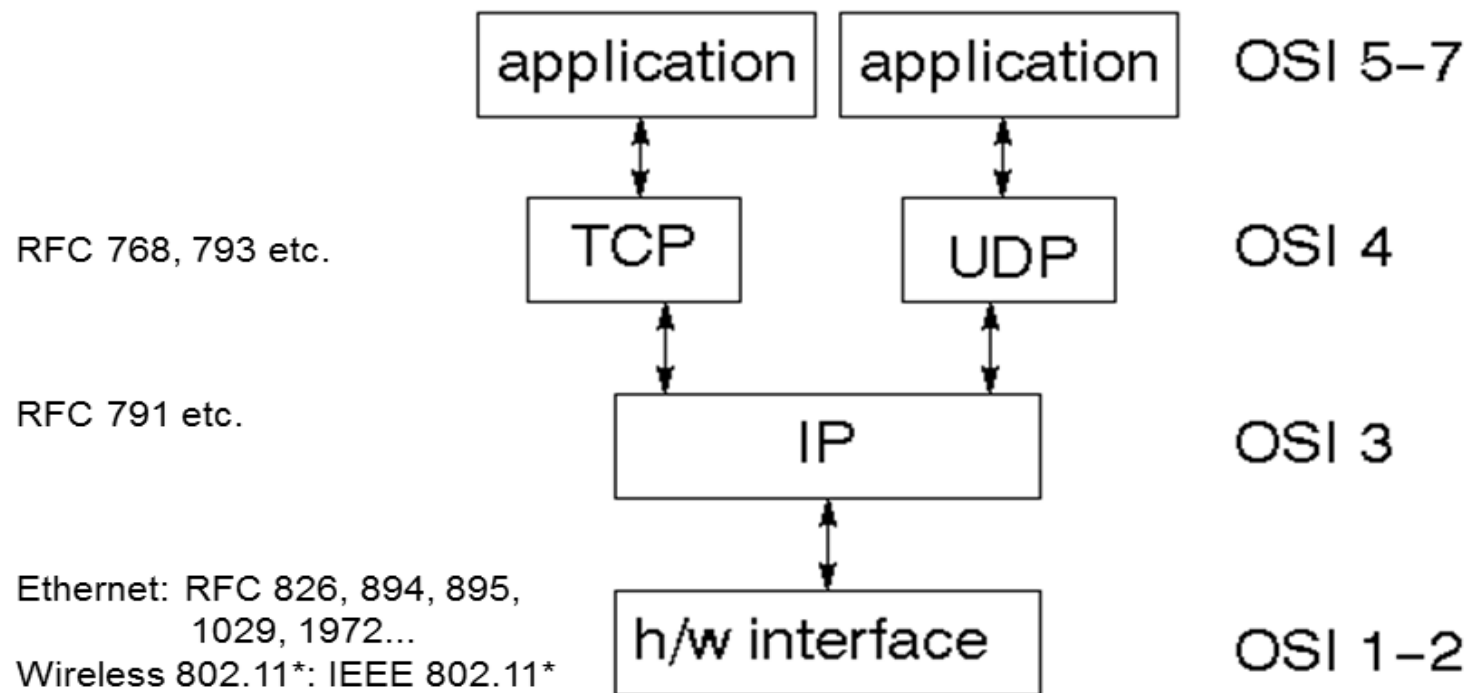
TCP/IP Reference Model—The Internet Architecture
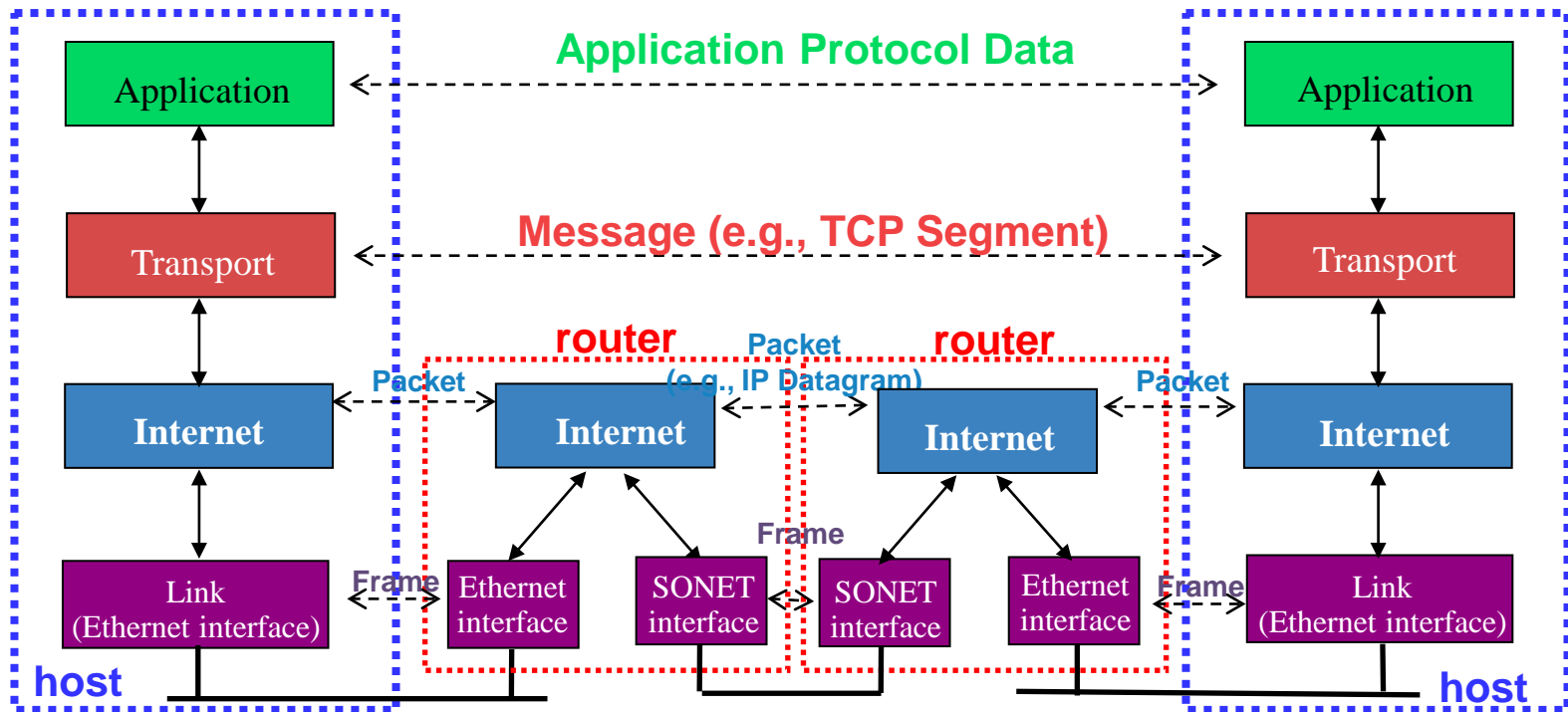
Review

- ◆ OSI
- ◆ IETF
- ◆ RFC
- ◆ TCP/IP
- ◆ DECnet
- ◆ IBM SNA

- ◆ IEEE 802.11
- ◆ Ethernet
- ◆ 4G, 5G
- ◆ ATM