MILITARY STANDARD

INFORMATION TECHNOLOGY
DOD STANDARDIZED PROFILE

INTERNET ROUTING BETWEEN AUTONOMOUS SYSTEMS
BORDER GATEWAY PROTOCOL

AMSC N/A

AREA DCPS

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MIL-STD 2045-13501

Foreword

This military standard is approved for use by all Departments and Agencies of the Department of Defense (DOD).

Beneficial comments (recommendations, additions, deletions) and any pertinent data that may be of use in improving this MIL-STD should be addressed to the:

> Joint Interoperability and Engineering Organization (JIEO)
> ATTN: TBBD
> Fort Monmouth, New Jersey 07703-5613

by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this MIL-STD or by memorandum.

This MIL-STD 2045-13501 DOD Standardized Profile (DSP) is a functional standard produced by the Data Communications Protocol Standards (DCPS) Technical Management Panel (DTMP). DTMP functional standards are functional groupings of base standards. Referenced base standards may be commercial, DOD or de facto standards, although International Standards (produced by ISO, CCITT, and other bodies) are preferred when possible.

This Defense Standardized Profile (DSP) is a functional DOD Data Communications Protocol Standard (DCPS) produced by the DCPS Technical Management Panel (DTMP). The MIL-STD-2045 document series was established within the DCPS Standardization Area to allow for the enhancement of commercial standards or the development of standards that are unique to DOD.

The MIL-STD-2045-10000 series, MIL-STD-2045-10000 to MIL-STD-2045-19999 inclusive, will be used to describe how DOD will implement commercial, international, national, federal, or military standards within the functional profile concept to provide required network services. The Government Open Systems Interconnection Profiles (GOSIP) will serve as the base for developing the 10000 series with DOD enhancements, unique military standards, and interim standards being used only when necessary.

The MIL-STD-2045-20000 series, MIL-STD-2045-20000 to MIL-STD-2045-29999 inclusive, will be used to describe DOD enhancements and extensions to existing commercial, international, national, or federal standards.

The MIL-STD-2045-30000 series, MIL-STD-2045-30000 to MIL-STD-2045-39999 inclusive, will be used to describe protocols and services unique to DOD that will not be supported by commercial, international, national, or federal standards.

The MIL-STD-2045-40000 series, MIL-STD-2045-40000 to MIL-STD-2045-49999 inclusive, will be used to document interim standards. Interim standards document protocols and services needed by DOD until these protocols and services are described in either a GOSIP or a MIL-STD-2045-20000 or -30000 series standard.

The MIL-STD-2045-50000 series, MIL-STD-2045-50000 to MIL-STD-2045-59999 inclusive, will be used to describe how DOD will implement commercial, international, national, federal, or military standards within the functional profile concept to provide required network services. The Government Open Systems Interconnection Profiles (GOSIP) will serve as the base for developing the 50000 series with DOD enhancements, unique military standards, and interim standards being used only when necessary. The difference between MIL-STD-2045-10000 series and the MIL-STD-2045-50000 series is that the 50000 series are interim profiles

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Specific details and instructions for establishing a MIL-STD-2045 document, as well as profile development guidelines, are documented in MIL-HDBK-829. DTMP Working Groups shall be responsible for DSP development and informal Service or Agency coordination; the DTMP Plenary shall be responsible for final review and approval.

This document is part of a set of interim DOD data communications protocol profiles based on the Internet protocol suite and is intended to support the interoperability of DOD communication networks, including connectivity with the Defense Data Network (DDN).

This MIL-STD-2045-13501 contains one normative and one informative annex:

Annex A (normative)	DSPICS REQUIREMENTS LIST (DPRL).
Annex B (informative)	CONCLUDING MATERIAL

For DOD acquisition purposes, where such differences exist, this DSP shall be the controlling document.

The Preparing Activity for this standard is the Data Communication Protocol Standards Technical Management Panel (DTMP). The custodians for the document are identified in the Defense Standardization Program, "Standardization Directory (SD-1)" and are classified in the Federal Supply Classification (FSC) system under Data communication Protocol standards (DCPS). Additional information can be obtained from:

Joint Interoperability and Engineering Organization (JIEO)
ATTN: DTMP Chairman
Fort Monmouth, New Jersey 07703-5613

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Introduction

This DOD Standardized Profile (DSP) is defined within the context of functional standardization, in accordance with the principles specified by MIL-HDBK-829. The context of functional standardization is one part of the overall field of Information Technology (IT) standardization activities - covering base standards, profiles, and registration mechanisms. A profile defines a combination of base standards that collectively perform a specific well-defined IT function. Profiles standardize the selection of options and other variations in the base standards to promote system interoperability and to provide a basis for the development of uniform, internationally recognized system tests.

One of the most important roles for a DSP is to serve as the basis for the development of recognized tests. DSPs also guide implementors in developing systems that fit the needs of the US Department Of Defense (DOD). DSPs are produced not simply to 'legitimize' a particular choice of base standards and options, but to promote real system interoperability. The development and widespread acceptance of tests based on this and other DSPs is crucial to the successful realization of this goal.

The base standards of this DSP include Request For Comments (RFCs) designated as Official Internet Architecture Board (IAB) standards and other RFCs.

This MIL-STD-2045-13501, DOD Standardized Profiles - Internet Routing Between Autonomous Systems, is a Routing Profile for the Border Gateway Protocol (BGP). This document covers the provisions and use of the features and services which are specific to the Border Gateway Profile as defined in RFC 1267 (A Border Gateway Protocol 3, October 1991) and RFC 1268 (Application of the Border Gateway Protocol in the Internet, October 1991).

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Information Technology - DOD Standardized Profile (DSP) - Border Gateway Protocol

1 Scope

1.1 General

This DOD Standardized Profile (DSP) 2045-13501 applies to the Border Gateway Protocol 3 (BGP-3) Standard.

1.2 Position within the taxonomy

This profile is classified as MIL-STD 2045-13501 in accordance with MIL-HDBK 829.

1.3 Scenario

This DSP specifies the provisions of the Border Gateway Protocol 3 (BGP-3).

TRANSPORT LAYER	BGP-3 (RFC 1267)	BGP PROFILE MIL-STD-2045-13501
	IAB STD 7 (TCP)	MIL-STD-2045-14502-01
NETWORK LAYER	IAB STD 5 (IP)	

Figure 1. BGP Profile Scenario

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2   References

The following documents contain provisions which, through reference in this text, constitute provision of this part of MIL-STD 2045-13501. At the time of publication, the editions indicated were valid. All documents are subject to revision, and parties to agreements based on this part of MIL-STD 2045-13501 are warned against automatically applying any more recent editions of the documents listed below, since the nature of references made by MIL-STDs to such documents is that they may be specific to a particular edition.

2.1   Government Documents

2.1.1 Specifications, standards, and handbooks

The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

MIL-HDBK 829: July 1994   *Guidelines for Developing Data Communications Protocol Standards*

MIL-STD-2045-14502-01   *Information Technology - Defense Standardized Profiles - Internet Transport Profile for DOD Communications - Part 1: Transport and Internet Services.*

DOD activities may obtain copies of DOD directives through their own publication channels or from the DOD Single Stock Point, Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094. Other federal agencies and the public may purchase copies from the U.S. Department of Commerce, National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.

Copies of Federal Information Processing Standards (FIPS) are available to Department of Defense activities from the Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120-5099. Others must request copies of FIPS from the National Technical Information Services, 5285 Port Royal, Springfield, VA 22161-2171.2

2.1.2 Other Government documents, drawings, and publications

The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

None

2.2   Non-Government publications

The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted are those listed in the issue of the DODISS cited in the solicitation.

2.2.1 Profiles

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None

(Application for copies of these documents should be addressed to the American National Standards Institute, 11 West 42nd Street, NY, NY 10036.)

2.2.2 Base Standards

RFC 1267   (A Border Gateway Protocol 3 (BGP-3), October 1991).

RFC 1268   (Application of the Border Gateway Protocol in the Internet, October 1991).

2.2.3   Other Non-Government documents, drawings, and publications

The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted are those listed in the issue of the DODISS cited in the solicitation.

IAB STD 7   (RFC 793 : September 1981, Transmission Control Protocol - DARPA Internet Program Protocol Specification).

RFC 1104   (Models of Policy Based Routing, June 1989).

RFCs are in the public domain, and are freely available on the Internet.

2.3   Order of precedence

In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3   Definitions

Internet Architecture Board (IAB) Standards (STD): The IAB has established this as an official standard protocol for the Internet. These protocols are assigned STD numbers.

Request For Comments (RFCs): RFC are the working notes of the "Network Working Group", that is the Internet research and development community.

Note: All standards are published as RFCs, but not all RFCs specify standards.

4   Abbreviations

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ATCCIS Army Tactical Command and Control Information System
BGP   Border Gateway Protocol
DCPS   Data Communications Protocol Standards
DTMP   DCPS Technical Management Panel
IAB   Internet Architecture Board
IP   Internet Protocol
MCEB   Military Communications-Electronics Board
RFC   Request For Comments
STD   Standard
TCP   Transmission Control Protocol

5   Requirements

5.1   General Requirements

A conforming implementation of this profile shall be unconditionally compliant and therefore, shall satisfy all the "MUST" and all the "SHOULD" requirements of the reference base standards and shall not implement any capability that has been identified by the base standards as "SHOULD NOT".

5.1.1   BGP Topological Model

There are no additional requirements as specified in RFC 1268, section 2.

5.1.2   Topology Considerations

There are no additional requirements as specified in RFC 1268, section 3.1.

5.1.3   BGP Neighbor Relationships

There are no additional requirements as specified in RFC 1268, section 3.3.

5.2   Conformance Requirements

Implementations claiming conformance to this DSP 2045-13501 shall support the following as stated.

5.2.1   Message Formats

There are no additional requirements to the message formats as specified in RFC 1267, section 4.

5.2.1.1   Message Header Format

There are no additional requirements to the message header format as specified in RFC 1267, section 4.1.

5.2.1.2   OPEN Message Format

There are no additional requirements to the OPEN message format as specified in RFC 1267, section 4.2.

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5.2.1.3 UPDATE Message Format

There are no additional requirements to the UPDATE message format as specified in RFC 1267, section 4.3.

5.2.1.4 KEEPALIVE Message Format

There are no additional requirements to the KEEPALIVE message format as specified in RFC 1267, section 4.4

5.2.1.5 NOTIFICATION Message Format

There are no additional requirements to the NOTIFICATION message format as specified in RFC 1267, section 4.5

5.2.2 Path Attributes

There are no additional requirements to the Path Attributes as specified in RFC 1267, section 5.

5.2.3 BGP Error Handling

There are no additional requirements to the BGP Error Handling as specified in RFC 1267, section 6.

5.2.3.1 Message Header error handling

There are no additional requirements to the Message Header error handling as specified in RFC 1267, section 6.1.

5.2.3.2 OPEN message error handling

There are no additional requirements to the OPEN message error handling as specified in RFC 1267, section 6.2.

5.2.3.3 UPDATE message error handling

There are no additional requirements to the UPDATE message error handling as specified in RFC 1267, section 6.3.

5.2.3.4 NOTIFICATION message error handling

There are no additional requirements to the NOTIFICATION message error handling as specified in RFC 1267, section 6.4

5.2.3.5 Hold Timer Expired error handling

There are no additional requirements to the HOLD Timer as specified in RFC 1267, section 6.5.

5.2.3.6 Finite State Machine error handling

There are no additional requirements to the Finite State Machine error handling as specified in RFC 1267, section 6.6

5.2.3.7 Cease

There are no additional requirements to the Cease as specified in RFC 1267, section 6.7.

5.2.3.8 Connection collision detection

There are no additional requirements to the Connection collision detection as specified in RFC 1267, section 6.8.

5.2.4 BGP Version Negotiation

There are no additional requirements to the BGP Version Negotiation as specified in RFC 1267, section 7.

5.2.5 BGP Finite State Machine

There are no additional requirements to the BGP Finite State Machine as specified in RFC 1267, section 8 and Appendix 1.

5.2.6 UPDATE message handling

There are no additional requirements to the UPDATE message handling as specified in RFC 1267, section 9.

5.2.7 Detection of Inter-AS Policy Contradictions

There are no additional requirements as specified in RFC 1267, section 10.

5.2.8 TCP options

There are no additional requirements as specified in RFC 1267, Appendix 4.

5.2.9 Implementation Recommendations

Implementations recommendations can be used as specified in RFC 1267, Appendix 5.

5.2.10 Policy Making with BGP

There are no additional requirements as specified in RFC 1268, section 4.

5.2.11 Path Selection with BGP

There are no additional requirements as specified in RFC 1268, section 5.

5.2.12 Required set of supported routing policies

There are no additional requirements as specified in RFC 1268, section 6.

5.2.13 Interaction of BGP and an IGP

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There are no additional requirements as specified in RFC 1268, Appendix A.

5.2.14 Interface Conformance

Implementations claiming conformance to this DSP 2045-13501 shall support the following interfaces.

5.2.14.1 TCP Conformance

There are no additional requirements for the Transmission Control Protocol as specified in the MIL-STD-2045-14502-01.

5.2.14.2 UDP Conformance

None

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ANNEX A (normative)

DSPICS REQUIREMENTS LIST (DPRL)

A.1   Introduction

This document provides the DOD Standardized Profile Implementation Conformance Statements (DSPICS) Requirements List (DPRL) for implementations of the DOD Standardized Profile (DSP) 2045-13501. The DSPICS for an implementation is generated by completing the DPRL in accordance with the following instructions.

An implementation shall satisfy the mandatory conformance requirements of the base standards referenced in this profile.

An implementation's completed DPRL is called the DSPICS. The DSPICS states which capabilities and options of the protocol have been implemented. The following can use the DSPICS:

(a) the protocol implementor, as a checklist to reduce the risk of failure to conform to the standard through oversight.

(b) the supplier and acquirer or potential acquirer of the implementation, as a detailed indication of the capabilities of the implementation, stated relative to the common basis for understanding provided by the standard DSPICS proforma.

(c) the user or potential user of the implementation, as a basis for initially checking the possibility of inter-working with another implementation (note that, while inter-working can never be guaranteed, failure to internetwork can often be predicted from incompatible DSPICSs).

(d) a protocol tester, as the basis for selecting appropriate tests against which to assess the claim for conformance of the implementation.

A.1.1 Notation

The following notations and symbols from MIL-HDBK 829, which references ISO/IEC TR 10000-1 and -2, are used in the DPRL to indicate the status of features:

Status Symbols

m	- mandatory
m.<n>	- support of every item of the group labeled by the same numeral <n> required, but only one is active at a time
o	- optional
o.<n>	- optional, but support of at least one of the group of options labeled by the same numeral <n> is required
c	- conditional
-	- non-applicable (i.e. logically impossible in the scope of the profile)
x	- excluded or prohibited
i	- out of scope of profile (left as an implementation choice)

In addition, the symbol "•" is used to indicate an option whose status is not constrained by the profile (status in the

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base standard). The o.<n> notation is used to show a set of selectable options (i.e., one or more of the set must be implemented) with the same identifier <n>.

Two character combinations may be used for dynamic conformance requirements. In this case, the first character refers to the static (implementation) status, and the second refers to the dynamic (use); thus "mo" means "mandatory to be implemented, optional to be used."

Notations for Conditional Status

The following predicate notations are used:

<predicate>::   This notation introduces a group of items, all of which are conditional on <predicate>.

<predicate>:   This notation introduces a single item which is conditional on <predicate>.

In each case, the predicate may identify a profile feature, or a boolean combination of predicates. ("^" is the symbol for logical negation.)

<index>:   This predicate symbol means that the status following it applies only when the DPICS states that the features identified by the index are supported. In the simplest case, <index> is the identifying tag of a single DPICS items. The symbol <index> also may be a Boolean expression composed of several indices.

<index>::   When this group predicate is true, the associated clause should be completed.

Notations used in the Protocol Feature Column

<r>   Symbol used to denote the receiving system.
<t>   Symbol used to denote the transmitting system.

Support Column Symbols

The support of every item as claimed by the implementor is stated by circling the appropriate answer (Yes, No, or N/A) in the support column:

Yes   Supported by the implementation.
No   Not supported by the implementation.
N/A   Not applicable.

Base standard requirements are shown using the equivalent notations in upper case (e.g., M, O, X).

A.1.2 Footnotes

Footnotes to the proforma are indicated by superscript numerals. The footnote appears on the page of the first occurrence of the numeral. Subsequent occurrences of a numeral refer to the footnote of the first occurrence.

A.1.3 Instructions for Completing the DPRL

A DSP implementor shows the extent of compliance to a DSP by completing the DPRL; that is, compliance to all mandatory requirements and the options that are not supported are shown. The resulting completed DPRL is called a DSPICS. Where this profile refines the features of the base standards, the requirements expressed in this DPRL shall be applied (as indicated in DPRL items with no "Profile Support" column) to constrain the allowable

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responses in the base standard DPICS proforma. When this profile makes additional requirements, the "Profile Support" column for such DPRLs shall be completed. In this column, each response shall be selected either from the indicated set of responses, or it shall comprise one or more parameter values as requested. If a conditional requirement is inapplicable, use the Not Applicable (NA) choice. If a mandatory requirement is not satisfied, exception information must be supplied by entering a reference Xi, where i is a unique identifier, to an accompanying rationale for the noncompliance. When the profile requirement is expressed as a two-character combination (as defined in A.1.1 above), the response shall address each element of the requirement; e.g., for the requirement "mo," the possible compliant responses are "yy" or "yn."

A.2   Standards Referenced

This profile specifies the provision of the Border Gateway Protocol 3 (BGP-3) as specified in RFC 1267 (A Border Gateway Protocol 3, October 1991) and RFC 1268 (Application of the Border Gateway Protocol in the Internet, October 1991).

A.3   DSPICS Requirements List

A.3.1 General Information

A.3.1.1   IMPLEMENTATION IDENTIFICATION

Supplier	
Contact point for queries about the profile	
Implementation Name(s) and Version(s)	
Date of statement	
Other Information: Machine Name, Operating Systems, System Name	

A.3.2 MESSAGE SIZE

Item	Protocol Feature	Base Standard		Profile		Supported
		Reference	Status	Clause	Status	
1	Message Size	1267, 4	M	5.2.1	m	Yes
1.1	Maximum Message Size 4096 octets		M		m	Yes
1.2	Smallest Message Size 19 octets (BGP Header Only)		M		m	Yes

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A.3.3 MESSAGE HEADER FORMAT (FIXED-SIZE)

Item	Protocol Feature	Base Standard		Profile		Supported
		Reference	Status	Clause	Status	
1	Message Header Format (Fixed-Size)	1267, 4.1	M	5.2.1.1	m	Yes
1.1	Marker (16 octets)		M		m	Yes
1.1.1	Marker be all ones if type of message is open		M		m	Yes
1.1.2	Marker be all ones if Authentication Code in Open message is Zero		M		m	Yes
1.1.3	Marker able to detect loss of synchronization between pairs of BGP peers		M		m	Yes
1.1.4	Marker able to authenticate incoming BGP messages		M		m	Yes
1.2	Length (2 octets)		M		m	Yes
1.2.1	Minimum Value of the field 19 octets		M		m	Yes
1.2.2	Maximum Value of the field 4096 octets		M		m	Yes
1.3	Type (Code) (1 octet)		M		m	Yes
1.3.1	OPEN (1)		M		m	Yes
1.3.2	UPDATE (2)		M		m	Yes
1.3.3	NOTIFICATION (3)		M		m	Yes
1.3.4	KEEPALIVE (4)		M		m	Yes

A.3.4 SUPPORTED MESSAGE TYPES

Item	Protocol Feature	Base Standard		Profile		Supported
		Reference	Status	Clause	Status	
1	OPEN Message Format	1267, 4.2	M	5.2.1.2	m	Yes
2	UPDATE Message Format	1267, 4.3	M	5.2.1.3	m	Yes
3	KEEPALIVE Message Format	1267, 4.4	M	5.2.1.4	m	Yes
	NOTIFICATION Message Format	1267, 4.5	M	5.2.1.5	m	Yes

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A.3.4.1 OPEN MESSAGE PARAMETERS

Item	Protocol Feature	Base Standard		Profile		Supported
		Reference	Status	Clause	Status	
1	Fixed-size BGP header	1267, 4.1	M	5.2.1.1	m	Yes
2	Version	1267, 4.2	M	5.2.1.2	m	Yes
3	My Autonomous System		M		m	Yes
4	Hold Time		M		m	Yes
5	BGP Identifier		M		m	Yes
6	Authentication Code		M		m	Yes
6.1	Authentication Mechanism		M		m	Yes
6.1.1	Authentication Code Zero		M		m	Yes
6.1.2	Authentication Data Empty		M		m	Yes
6.1.3	Marker Fields of all Messages be all ones		M		m	Yes
7	Authentication Data		M		m	Yes
8	Minimum Message Length 29 octets (Including Message Header)		M		m	Yes

A.3.4.2 UPDATE MESSAGE PARAMETERS

Item	Protocol Feature	Base Standard		Profile		Supported
		Reference	Status	Clause	Status	
1	Fixed-size BGP Header	1267, 4.1	M	5.2.1.1	m	Yes
2	Total Path Attribute Length	1267, 4.3	M	5.2.1.3	m	Yes
3	Path Attributes	1267, 4.3,5	M	5.2.1.3, 5.2.2	m	Yes
3.1	Attribute type	1267, 4.3	M		m	Yes
3.1.1	Attribute Flags	1267, 4.3	M		m	Yes
3.1.1.1	Support Higher-Order bit (bit 0)		O		o	Yes No
3.1.1.1.1	Bit 0 set to 1 for optional attribute		M:3.1.1.1		m:3.1.1.1	Yes no
3.1.1.1.2	Bit 0 set to 0 for well-known attribute		M:3.1.1.1		m:3.1.1.1	Yes No
3.1.1.2	Bit 1 set to 1 for transitive attribute		M		M	Yes

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Item	Protocol Feature	Base Standard		Profile		Supported
3.1.1.3	Bit 1 set to 0 for non-transitive attribute		M		m	Yes
3.1.1.4	Bit 2 set to 1 for partial information in the optional transitive attribute		M		m	Yes
3.1.1.5	Bit 2 set to 0 for complete information in the optional transitive attribute		M		m	Yes
3.1.1.6	Bit 3 set to 0 if the attribute length is one octet		M		m	Yes
3.1.1.7	Bit 3 set to 1 if the attribute length is two octets		M		m	Yes
3.1.1.8	The lower-order four bits set to zero (and ignore when received)		M		m	Yes
3.1.2	Attribute Type Code (Name)	1267, 4.3	M		m	Yes
3.1.2.1	1 (ORIGIN)	1267, 5	M		m	Yes
3.1.2.2	2 (AS_PATH)		M		m	Yes
3.1.2.3	3 (NEXT_HOP)		M		m	Yes
3.1.2.4	4 (UNREACHABLE)		MO		mo	Yes No
3.1.2.5	5 (INTER-AS METRIC)		O		o	Yes No
3.2	Attribute Length	1267, 4.3,5	M		m	Yes
3.2.1	1 (ORIGIN)	1267, 5	M		m	Yes
3.2.2	Variable (AS_PATH)		M		m	Yes
3.2.3	4 (NEXT_HOP)		M		m	Yes
3.2.4	0 (UNREACHABLE)		M		m	Yes
3.2.5	2 (INTER-AS METRIC)		M		m	Yes
3.3	Attribute Value	1267, 4.3	M		m	Yes
4	Network	1267, 4.3	M	5.2.1.3	m	Yes
5	Minimum message Length 37 octets (Including Message Header)	1267, 4.3	M		m	Yes

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A.3.4.3   KEEPALIVE MESSAGE PARAMETERS

Item	Protocol Feature	Base Standard		Profile		Supported
		Reference	Status	Clause	Status	
1	Fixed-size BGP Header (19 octets)	1267, 4.4	M	5.2.1.4	m	Yes

A.3.4.4   NOTIFICATION MESSAGE PARAMETERS

Item	Protocol Feature	Base Standard		Profile		Supported
		Reference	Status	Clause	Status	
1	Fixed-size BGP Header	1267, 4.1	M	5.2.1.1	m	Yes
2	Error Code	1267, 4.5	M	5.2.1.5	m	Yes
2.1	1 - Message Header Error	1267, 4.5,6.1	M	5.2.1.5, 5.2.3.1	m	Yes
2.2	2 - OPEN Message Error	1267, 4.5,6.2	M	5.2.3.2	m	Yes
2.3	3 - UPDATE Message Error	1267, 4.5,6.3	M	5.2.3.3	m	Yes
2.4	4 - Hold Timer Expired	1267, 4.5,6.5	M	5.2.3.5	m	Yes
2.5	5 - Finite state Machine Error	1267, 4.5,6.6	M	5.2.3.6	m	Yes
2.6	6 - Cease	1267, 4.5,6.7	M	5.2.3.7	m	Yes
3	Error Subcode	1267, 4.5	M	5.2.1.5	m	Yes
3.1	Message Header Error Subcodes	1267, 4.5,6.1	M	5.2.1.5, 5.2.3.1	m	Yes
3.1.1	1 - Connection Not Synchronized		M		m	Yes
3.1.2	2 - Bad Message Length		M		m	Yes
3.1.3	3 - Bad Message Type		M		m	Yes
3.2	OPEN Message Error subcodes	1267, 4.5,6.2	M	5.2.1.5, 5.2.3.2	m	Yes
3.2.1	1 - Unsupported Version Number		M		m	Yes
3.2.2	2 - Bad Peer AS		M		m	Yes
3.2.3	3 - Bad BGP Identifier		M		m	Yes

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Item	Protocol Feature	Base Standard		Profile		Supported
3.2.4	4 - Unsupported Authentication Code		M		m	Yes
3.2.5	5 - Authentication Failure		M		m	Yes
3.3	UPDATE Message Error Subcodes	1267, 4.5,6.3	M	5.2.1.5, 5.2.3.3	m	Yes
3.3.1	1 - Malformed Attribute List		M		m	Yes
3.3.2	2 - Unrecognized Well-known Attribute		M		m	Yes
3.3.3	3 - Missing Well-known Attribute		M		m	Yes
3.3.4	4 - Attribute Flags Error		M		m	Yes
3.3.5	5 - Attribute Length Error		M		m	Yes
3.3.6	6 - Invalid ORIGIN Attribute		M		m	Yes
3.3.7	7 - AS Routing Loop		M		m	Yes
3.3.8	8 - Invalid NEXT_HOP Attribute		M		m	Yes
3.3.9	9 - Optional Attribute Error		M		m	Yes
3.3.10	10 - Invalid Network Field		M		m	Yes
3.4	Zero (Unspecific) value used if no appropriate Error Subcode defined	1267, 4.5	M		m	Yes
3.5	Data	1267, 4.5	M		m	Yes
3.6	Minimum Message Length 21 octets (Including Message Header)	1267, 4.5	M		m	Yes
3.7	Notification Message Error Handling	1267, 6.4	I	5.2.3.4	i	No

A.3.5 SUPPORTED FUNCTIONS

Item	Protocol Feature	Base Standard		Profile		Supported
		Reference	Status	Clause	Status	
1	BGP Message exchange over TCP connection	1267, 2,4	M	5.2.14.1	m	Yes
2	BGP Error Handling	1267, 6	M	5.2.3	m	Yes
2.1	Connection Collision Detection	1268, 6.8	M	5.2.3.8	m	Yes
3	BGP Version Negotiation	1267, 7	M	5.2.4	m	Yes
4	UPDATE Message Handling	1267, 9	M	5.2.6	m	Yes

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Item	Protocol Feature	Base Standard		Profile		Supported
5	Accept path with unrecognized transitive optional attributes	1267, 5,9	M		m	Yes
6	Ignore unrecognized non-transitive optional attributes	1267, 5,9	M		m	Yes
7	Detection of Inter-AS Policy Contradictions	1267, 10	M	5.2.7	m	Yes
8	Multiple Networks Per Message	1267, Appx.5	O	5.2.9	o	Yes No
9	Processing Messages on a Stream Protocol		O		o	Yes No
10	Processing Update Messages		O		o	Yes No
11	Frequency of Route Selection		O		o	Yes No

A.3.6 TCP OPTIONS USED WITH BGP

Item	Protocol Feature	Base Standard		Profile		Supported
		Reference	Status	Clause	Status	
1	Set PUSH flag if local system TCP user interface supports TCP PUSH function	1267, Appx. 4	M	5.2.8	m	Yes
2	Local system TCP user interface supports setting precedence for TCP connection		O		o	Yes No
3	Opened transport connection with precedence set to Internetwork Control value		2:M		2:m	Yes

A.3.7 BGP TIMERS

Item	Protocol Feature	Base Standard		Profile		Supported
		Reference	Status	Clause	Status	
1	BGP Timers Default Values[1]	1267, Appx. 5	M	5.2.9	m	Yes
1.1	Default Value for ConnectRetry timer 120 seconds		M		m	Yes
1.2	Default Value for Holdtime timer 90 seconds		M		m	Yes
1.3	Default Value for KeepAlive timer 30 seconds		M		m	Yes
1.4	Timer Range	N/A	N/A	N/A	o	Yes No
1.4.1	ConnectRetry Range Maximum/Minimum Values				o	Yes No
1.4.2	Holdtime Range Maximum/Minimum Values				o	Yes No
1.4.3	KeepAlive Range Maximum/Minimum Values				o	Yes No
1.5	Configurability	1267, Appx. 5	M	5.2.9	m	Yes
1.5.1	ConnectRetry Range Incrementation	N/A	N/A	N/A	o	Yes No
1.5.2	Holdtime Range Incrementation				o	Yes No
1.5.3	KeepAlive Range Incrementation				o	Yes No

A.3.8 TOPOLOGY CONSIDERATIONS AND NEIGHBOR RELATIONSHIPS

Item	Protocol Feature	Base Standard		Profile		Supported
		Reference	Status	Clause	Status	
1	BGP used for stub and multihomed AS's	1268, 2,3.1	O	5.1.1, 5.1.2	o	Yes No
2	Consistent routing information among BGP speakers	1268, 3.3	M	5.1.3	m	Yes
3	Policy constraint applied to all BGP speakers within an AS be consistent	1268, 3.3	M		m	Yes

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[1] The suggested values for BGP timers are considered as default values. Items that address timers maximum/minimum values and range incrementation are not specified in the base standard.

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4	An AS number used with BGP	1268, 3.3	M		m	Yes

A.3.9 POLICY MAKING WITH BGP

Item	Protocol Feature	Base Standard		Profile		Supported
		Reference	Status	Clause	Status	
1	Enforce policies based on various routing preferences and constraints	1268, 4	M	5.2.10	m	Yes
2	Policies are not directly encoded in the protocol	1268, 4	M		m	Yes
3	Policies are provided in the form of configuration information	1268, 4	M		m	Yes
4	Routing Policies that can be enforce	1268, 4	O		o	Yes No
4.1	Multihomed AS refuse to act as a transit AS for another AS's	1268, 4	O		o	Yes No
4.2	Multihomed AS become a transit AS for a restricted set of adjacent AS's	1268, 4	O		o	Yes No
4.3	AS favor or disfavor the use of certain AS's for carrying transit traffic from itself	1268, 4	O		o	Yes No
5	Control performance-related criteria	1268, 4	M		m	Yes
5.1	AS minimize the number of transit AS's		O		o	Yes No
5.2	Quality of transit AS		O		o	Yes No
5.3	Preference of internal routes over external routes		O		o	Yes No
6	Resolved equal cost paths in a consistent fashion	1268, 4	M		m	Yes

A.3.10 PATH SELECTION WITH BGP

Item	Protocol Feature	Base Standard		Profile		Supported
		Reference	Status	Clause	Status	
1	Criteria for assigning a degree of preference to a path	1268, 5	O	5.2.11	o	Yes No
1.1	AS count		O		o	Yes No
1.2	Policy consideration		M		m	Yes

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Item	Protocol Feature	Base Standard		Profile		Supported
1.3	Presence or absence of a certain AS or AS's in the path		O		o	Yes No
1.4	Path origin		O		o	Yes No
1.5	AS path subsets		M		m	Yes
1.6	Link dynamics		M		m	Yes
1.6.1	Stable paths preferred over unstable ones		M		m	Yes

A.3.11   REQUIRED SET OF SUPPORTED ROUTING POLICIES

Item	Protocol Feature	Base Standard		Profile		Supported
		Reference	Status	Clause	Status	
1	Allow an AS to control announcements of BGP-learned routes to adjacent AS's	1268, 6	M	5.2.12	m	Yes
2	Support such control with at least the granularity of a single network	1268, 6	M		m	Yes
3	Support such control with the granularity of an autonomous system	1268, 6	M		m	Yes
4	Allow an AS to prefer a particular path to destination (when more than one path is available)	1268, 6	M		m	Yes
5	Allow an AS to ignore routes with certain AS's in the AS_PATH path attribute	1268, 6	M		m	Yes
6	Route selection process ignore routes that have "weight" equal to "infinity"	1268, 6	M		m	Yes

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A.3.12 INTERACTION BETWEEN BGP AND AN IGP

Item	Protocol Feature	Base Standard		Profile		Supported
		Reference	Status	Clause	Status	
1	Methods for achieving stable interactions	1268, Appx. A		5.2.13		
1.1	Propagation of BGP information via the IGP		O		o	Yes No
1.2	Tagged Interior Gateway Protocol		O		o	Yes No
1.3	Encapsulation		O		o	Yes No
1.4	Other Cases		O		o	Yes No

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ANNEX B (informative)

CONCLUDING MATERIAL

B.1 Deviations from Base Standards/Referenced Profiles

This MIL-STD documents the Border Gateway Protocol in the ISO/IEC TR 10000, "Framework and Taxonomy of International Standardized Profiles" and MIL-HDBK-829 format. This DSP does not deviate from the protocol as written in the RFC base standards.

The classification of the requirements in RFC 1267/1268 have been changed in the DSPICS to the following:

RFC	MIL-STD
MUST	Mandatory
SHOULD	Mandatory
MAY	Optional
SHOULD NOT	Prohibited
MUST NOT	Prohibited

B.2 Subject Term (Key Word) Listing

BGP
DOD Standardized Profile (DSP)
Data Communications Protocol Standards (DCPS)
DCPS Technical Management Panel (DTMP)
DSPICS Proforma
PICS Proforma
Routing

B.3 Preparing Activity

Defense Information Systems Agency (DISA) - DC   Project: 0013, Subproject 07

B.4 Reviewing Activities

Army	SC
Air Force	02, 13, 17, 29, 90
DLA	DH
DMA	MP
DIA	DI
DOT	OST
OASD	IQ, DO, MA, IR
ODISC4	AC
STRICOM	PT
NAVY	EC, CH, ND, TD, OM
USMC	MC, CG

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B.5   Custodians

DISA: DC
Army: SC
Air Force: 90
Navy: OM
DIA: DI
NSA: NS
USMC: MC
DLA: DH
Other: Joint Staff/Architecture & Integration
             USSPACECOM

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3. DOCUMENT TITLE DOD Standardized Profile - Border Gateway Protocol-3 (BGP-3)

4. NATURE OF CHANGE *(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)*

5. REASON FOR RECOMMENDATION

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a. NAME *(Last, First, Middle Initial)*	b. ORGANIZATION	
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