

U.S. DEPARTMENT OF AGRICULTURE
WASHINGTON, D.C. 20250

DEPARTMENTAL REGULATION	Number: DR 3300-006
SUBJECT: Network Class of Service and Quality of Service	DATE: June 1, 2016
	OPI: Office of the Chief Information Officer, Enterprise Network Services

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1. PURPOSE

- a. This Departmental Regulation (DR) establishes the United States Department of Agriculture (USDA) policy for the implementation of Class of Service (CoS) and Quality of Service (QoS) on the Departmental enterprise network.
- b. This policy complies with the industry standards for CoS and QoS as defined and established by the Internet Engineering Task Force (IETF) in the following Request for Comments (RFC) documents: [RFC 2474](#), *Definition of the Differentiated Services Field (DS Field) in the IPv4 and IPv6 Headers*; [RFC 2475](#), *An Architecture for Differentiated Services*; [RFC 2597](#), *Assured Forwarding PHB Group*; [RFC 3168](#), *The Addition of Explicit Congestion Notification (ECN) to IP*; [RFC 3246](#), *An Expedited Forwarding*

PHB (Per-Hop Behavior); and [RFC 3260](#), New Terminology and Clarifications for Diffserv.

- c. Application of the CoS/QoS standards identified in the RFCs will provide USDA with a set of unified and cohesive methodologies for delivering greater network bandwidth optimization, reserving a minimum amount of bandwidth for critical agency applications, and prioritizing network service for current and future applications.

2. SPECIAL INSTRUCTIONS/CANCELLATIONS

- a. This DR is in effect at the date of signature and will remain in effect until superseded. If any provision of this DR is superseded by an official USDA memorandum or otherwise invalidated by external laws, directives, or standards, such invalidity does not affect other provisions of this DR. In the event of reorganization of offices or mission areas, USDA must ensure that each of the roles and responsibilities described in this DR are specifically assigned to a new or existing organization or team.
- b. The terms CoS and QoS are defined differently by various industry vendors. For the purposes of this DR, CoS and QoS are defined as the following:
 - (1) CoS refers to a grouping used by a Multi-Protocol Label Switching (MPLS) network to identify how traffic passes through that network; and
 - (2) QoS refers to how software configurations are implemented in a traditional network via switches and routers. QoS represents an effort to guarantee delivery of a given capability at the level expected by the user community independent of the underlying network. Each network service (e.g., data, voice, and video) has different QoS expectations.

3. SCOPE

This DR applies to all USDA agencies and staff offices, contractors, data centers, cloud service providers, cooperative partners, employees, and other personnel working with any USDA network.

4. BACKGROUND

- a. The USDA enterprise network is an integrated and collaborative environment, incorporating multiple requirements from a variety of functionality-based, engineered solutions for the various USDA staff offices and agencies.
- b. USDA senior leadership envisions a unified communications technology backbone that supports a broad range of integrated services across the enterprise network and offers

customers streamlined, intelligent communications options for accessing enterprise-managed and standalone services.

- c. As USDA networks converge, many disparate users will share the same network resources. Organizations that transition to a converged network realize savings in information technology (IT) operational costs, improved performance through the reduction of network security boundaries across trusted networks, and increased efficiencies of available bandwidth across those networks. As more USDA agencies and staff offices begin leveraging converged services across a single trusted network, it is essential that high-priority traffic be identified and marked to ensure efficient prioritization and use of bandwidth as a resource. USDA intends to make full use of the CoS and QoS industry standards across the Unified Telecommunications Network (UTN) to accomplish this goal.

5. POLICY

As CoS and QoS are implemented on any network circuit in USDA, the implementation must comply with the current [USDA Quality of Service \(QoS\)/Class of Service \(CoS\) Standard](#), which is maintained and published by the Office of the Chief Information Officer (OCIO), Enterprise Network Services (ENS) (eAuthentication access required). If an agency or staff office chooses to implement CoS and QoS and deviate from the current USDA QoS/CoS standard, the agency or staff office must submit a waiver request to the ENS Director for review and approval prior to implementation. Additional information about waiver requests can be found in section 8.

6. ROLES AND RESPONSIBILITIES

- a. The USDA Chief Information Officer (CIO) shall:
 - (1) Ensure that agencies and staff offices comply with this DR; and
 - (2) Sponsor, establish, and maintain a USDA UTN Technical Review Board (TRB).
- b. The ENS Director shall:
 - (1) Publish and maintain a Departmental network standard for CoS and QoS;
 - (2) Complete a QoS design for USDA;
 - (3) Implement and operationally maintain the QoS design across the UTN backbone;
 - (4) Manage configuration, classification, identification and marking, policy, reporting, and accounting functions to control and administer end-to-end traffic across the USDA enterprise network;

- (5) Review service level agreements (SLAs) and determine if credits or financial adjustments are applicable;
 - (6) Review and render a decision for agency and staff office policy waiver requests; and
 - (7) Maintain an electronic file of approved waivers.
- c. The USDA UTN TRB shall:
- (1) Review, approve, and update the USDA QoS/CoS standard, as needed;
 - (2) Develop and recommend a CoS and QoS standard to meet the demand of current and future capabilities, services, and applications on the USDA enterprise network; and
 - (3) Review and provide resources to assist agency and staff office implementation of CoS and QoS.
- d. Agency and Staff Office CIOs and Directors shall:
- (1) Ensure agency and staff office telecommunications personnel comply with this directive;
 - (2) Ensure agency and staff office internal directives conform to this DR's stated requirements;
 - (3) Ensure that data packets are identified, marked, and/or tagged correctly according to the USDA QoS/CoS standard;
 - (4) Coordinate shared network circuit capacity planning and software configuration with OCIO-ENS and other agencies and staff offices;
 - (5) Manage configuration, classification, identification and marking, policy, reporting, and accounting functions to control and administer end-to-end traffic across the agency or staff office network;
 - (6) Review SLAs and determine if credits or financial adjustments are applicable; and
 - (7) Obtain waivers and approvals from the ENS Director when agency and staff office requirements cannot be met through mandated policies.

7. COMPLIANCE

- a. Compliance with this DR shall be enforced in accordance with the USDA QoS/CoS standard.
- b. Agencies and staff offices are authorized to deviate from the CoS and QoS standard within their own network boundaries as long as they have an approved waiver from the ENS Director and meet the standard when interfacing with shared network segments.
- c. Interoperability between an agency or staff office network and the OCIO Wide Area Network (WAN) must ensure CoS and QoS communication is tagged bi-directionally at any network routing device.

8. POLICY EXCEPTIONS

- a. All USDA agencies and staff offices are required to conform to this policy. In the event that a specific policy requirement cannot be met as explicitly stated, agencies and staff offices may submit a policy waiver request in writing. The waiver request shall explain the reason for the request, identify compensating controls/actions that meet the intent of the policy, and identify how the compensating controls/actions provide a similar or greater level of defense or compliance than the policy requirement.
- b. Agency and staff office system owners and CIOs shall address all policy waiver request memoranda to the ENS Director and submit the waiver request to ens.policy@ocio.usda.gov for review and determination.
- c. Waivers to stipulations of this directive that have been granted approval by the ENS Director and that are associated with a National Institute of Standards and Technology (NIST) IT security control shall be recorded and tracked as a Plan of Action and Milestones (POA&M) item in the USDA Federal Information Security Management Act (FISMA) data management and reporting tool.
- d. Waivers will expire at the end of the fiscal year or six months from the date of approval, whichever is longer. Unless otherwise specified, agencies and staff offices shall review and renew approved policy waivers every fiscal year.
- e. The ENS Director will provide a reason for any waiver request that is denied. If a waiver request is denied, the agency or staff office is expected to comply with the existing policy.

9. INQUIRIES

Questions and comments concerning the requirements of this regulation should be directed to OCIO-ENS, Telecommunications Management and Governance (TMG) at ens.policy@ocio.usda.gov.

APPENDIX A

DEFINITIONS

- a. Class of Service (CoS). Refers to a grouping used by an MPLS network to identify how traffic passes through that network.
- b. Intelligence Communications. Refers to a network's ability to determine best path as well as traffic prioritization decisions for defined Internet Protocol (IP) services.
- c. Quality of Service (QoS). Refers to how mechanisms are implemented in a traditional network via switches and routers. QoS represents an effort to guarantee delivery of a given capability at the level expected by the user community independent of the underlying network. Each network service (e.g., data, voice, and video) has different QoS expectations.
- d. Telecommunications. Includes the transmission, emission, or reception of signals, writing, images, sounds, or intelligence of any nature, by wire, cable, satellite, fiber optics, laser, radio, or any other electronic, electric, electromagnetic, or acoustically coupled means. The term includes the telecommunications facilities and equipment necessary to provide telecommunications services. Telecommunications is a component of the information resources management system. ([DR 3300-020](#), *Telecommunications Mission Area Control Officer (TMACO) – Roles and Responsibilities*)

APPENDIX B

ACRONYMS AND ABBREVIATIONS

CIO	Chief Information Officer
CoS	Class of Service
DR	Departmental Regulation
DS	Differentiated Services
ECN	Explicit Congestion Notification
ENS	Enterprise Network Services
FISMA	Federal Information Security Management Act
IETF	Internet Engineering Task Force
IP	Internet Protocol
IT	Information Technology
MPLS	Multi-Protocol Label Switching
NIST	National Institute of Standards and Technology
OCIO	Office of the Chief Information Officer
POA&M	Plan of Action and Milestones
QoS	Quality of Service
PHB	Per-Hop Behavior
RFC	Request for Comments
SLA	Service Level Agreement
TMACO	Telecommunications Mission Area Control Officer
TMG	Telecommunications Management and Governance
TRB	Technical Review Board
USDA	United States Department of Agriculture
UTN	Unified Telecommunications Network
WAN	Wide Area Network

APPENDIX C

AUTHORITIES AND REFERENCES

[DR 3300-020](#), *Telecommunications Mission Area Control Officer (TMACO) - Roles and Responsibilities*, August 30, 2010

IETF, [RFC 2474](#), *Definition of the Differentiated Services Field (DS Field) in the IPv4 and IPv6 Headers*, December 1998

IETF, [RFC 2475](#), *An Architecture for Differentiated Services*, December 1998

IETF, [RFC 2597](#), *Assured Forwarding PHB Group*, June 1999

IETF, [RFC 3168](#), *The Addition of Explicit Congestion Notification (ECN) to IP*, September 2001

IETF, [RFC 3246](#), *An Expedited Forwarding PHB (Per-Hop Behavior)*, March 2002

IETF, [RFC 3260](#), *New Terminology and Clarifications for Diffserv*, April 2002

USDA, [USDA Quality of Service \(QoS\)/Class of Service \(CoS\) Standard](#), Version 1.0, January 10, 2012