module ieee802-ethernet-interface {

 yang-version 1.1;

 namespace

 "urn:ieee:std:802.3:yang:ieee802-ethernet-interface";

 prefix eth-if;

 import ietf-yang-types {

 prefix yang;

 reference "IETF RFC 6991";

 }

 import ietf-interfaces {

 prefix if;

 reference "IETF RFC 7223";

 }

 import iana-if-type {

 prefix ianaift;

 reference "IETF RFC 7224";

 }

 organization

 "IEEE Std 802.3 Ethernet Working Group

 Web URL: http://www.ieee802.org/3/";

 contact

 "Web URL: http://www.ieee802.org/3/cf/";

 description

 "This module contains YANG definitions for configuring IEEE Std

 802.3 Ethernet Interfaces.

 In this YANG module, 'Ethernet interface' can be interpreted

 as referring to 'IEEE Std 802.3 compliant Ethernet

 interfaces'.";

 reference "IEEE Std 802.3-2018, unless dated explicitly";

 typedef eth-if-speed-type {

 type decimal64 {

 fraction-digits 3;

 }

 units "Gb/s";

 description

 "Used to represent the configured, negotiated, or actual speed

 of an Ethernet interface in Gigabits per second (Gb/s),

 accurate to 3 decimal places (i.e., accurate to 1 Mb/s).";

 }

 typedef duplex-type {

 type enumeration {

 enum full {

 description

 "Full duplex.";

 }

 enum half {

 description

 "Half duplex.";

 }

 enum unknown {

 description

 "Link is currently disconnected or initializing.";

 }

 }

 default full;

 description

 "The current duplex mode of operation of an Ethernet

 interface.";

 reference "IEEE Std 802.3, 30.3.1.1.32, aDuplexStatus";

 }

 typedef pause-fc-direction-type {

 type enumeration {

 enum "disabled" {

 description

 "Flow-control disabled in both ingress and egress

 directions, i.e., PAUSE frames are not transmitted and

 PAUSE frames received in the ingress direction are

 discarded without processing.";

 }

 enum "ingress-only" {

 description

 "PAUSE frame based flow control is enabled in the ingress

 direction only, i.e., PAUSE frames may be transmitted to

 reduce the ingress traffic flow, but PAUSE frames received

 in the ingress direction are discarded without reducing

 the egress traffic rate.";

 }

 enum "egress-only" {

 description

 "PAUSE frame based flow control is enabled in the egress

 direction only, i.e., PAUSE frames are not transmitted,

 but PAUSE frames received in the ingress direction are

 processed to reduce the egress traffic rate.";

 }

 enum "bi-directional" {

 description

 "PAUSE frame based flow control is enabled in both ingress

 and egress directions, i.e., PAUSE frames may be

 transmitted to reduce the ingress traffic flow, and PAUSE

 frames received on ingress are processed to reduce the

 egress traffic rate.";

 }

 enum "undefined" {

 description

 "Link is currently disconnected or initializing.";

 }

 }

 description

 "Enumerates the possible PAUSE frame based flow

 control settings that can be used in explicit configuration,

 or when reporting the operational state.";

 reference

 "IEEE Std 802.3.1, dot3PauseAdminMode and dot3PauseOperMode";

 }

 feature ethernet-pfc {

 description

 "This device supports Ethernet priority flow-control.";

 }

 feature ethernet-pause {

 description

 "This device supports Ethernet PAUSE.";

 }

 augment "/if:interfaces/if:interface" {

 when "derived-from-or-self(if:type, 'ianaift:ethernetCsmacd')" {

 description

 "Applies to all P2P Ethernet interfaces";

 }

 description

 "Augment interface model with IEEE Std 802.3 Ethernet interface

 specific configuration nodes.";

 container ethernet {

 description

 "Contains all Ethernet interface related configuration.";

 container auto-negotiation {

 description

 "Contains auto-negotiation transmission parameters.

 This leaf allows the advertised duplex value in the

 negotiation to be restricted.

 If not specified then the default behavior is to

 negotiate all available values for the particular type of

 Ethernet PHY associated with the interface.

 If auto-negotiation is enabled, and PAUSE frame based flow

 control has not been explicitly configured, then the

 default PAUSE frame based flow control capabilities that

 are negotiated allows for bi-directional or egress-only

 PAUSE frame based flow control to be negotiated (depending

 on the peer device capabilities/configuration).

 If auto-negotiation is enabled, and PAUSE frame based flow

 control has been explicitly configured, then the

 configuration settings restrict the values that may be

 should be noted that the protocol

 does not allow only egress PAUSE frame based flow control

 to be negotiated without also allowing bi-directional

 PAUSE frame based flow control.";

 reference "IEEE Std 802.3, Clause 28 and Annexes 28A-D";

 leaf enable {

 type boolean;

 default true;

 description

 "Controls whether auto-negotiation is enabled or

 disabled.

 For interface types that support auto-negotiation then

 it defaults to being enabled.";

 }

 leaf negotiation-status {

 when "../enable = 'true'";

 type enumeration {

 enum in-progress {

 description

 "The auto-negotiation protocol is running and

 negotiation is currently in-progress";

 }

 enum complete {

 description

 "The auto-negotation protocol has completed

 successfully";

 }

 enum failed {

 description

 "The auto-negotiation protocol has failed.";

 }

 enum unknown {

 description

 "The auto-negotiation status is not currently known,

 this could be because it is still negotiating or the

 protocol cannot run (e.g., if no medium is

 present).";

 }

 }

 config false;

 description

 "The status of the auto-negotiation protocol.";

 reference "IEEE 802.3, 30.6.1.1.4, aAutoNegAutoConfig";

 }

 }

 leaf duplex {

 type duplex-type;

 description

 "Operational duplex mode of the Ethernet interface.

 The default value is implementation-dependent.";

 reference "IEEE Std 802.3, 30.3.1.1.32 aDuplexStatus";

 }

 leaf speed {

 type eth-if-speed-type;

 units "Gb/s";

 description

 "Operational speed of the Ethernet interface.

 The default value is implementation-dependent.";

 }

 container flow-control {

 description

 "Holds the different types of Ethernet PAUSE frame based

 flow control that can be enabled.";

 container pause {

 if-feature "ethernet-pause";

 description

 "IEEE Std 802.3 PAUSE frame based PAUSE frame based flow

 Control.";

 reference "IEEE Std 802.3, Annex 31B";

 leaf direction {

 type pause-fc-direction-type;

 description

 "Indicates which direction PAUSE frame based flow

 control is enabled in, or whether it is disabled. The

 default flow-control settings are vendor specific.

 If auto-negotiation is enabled, then PAUSE based

 flow-control is negotiated by default.

 The default value is implementation-dependent.";

 }

 container statistics {

 config false;

 description

 "Contains the number of PAUSE frames received or

 Transmitted.";

 leaf in-pkts-pause {

 type yang:counter64;

 units frames;

 description

 "A count of PAUSE MAC Control frames transmitted on

 this Ethernet interface.

 Discontinuities in the values of counters in

 this container can occur at re-initialization of the

 management system, and at other times as indicated

 by the value of the 'discontinuity-time' leaf

 defined in the ietf-interfaces YANG module

 (RFC 7223).";

 reference

 "IEEE Std 802.3, 30.3.4.3 aPAUSEMACCtrlFramesReceived";

 }

 leaf out-pkts-pause {

 type yang:counter64;

 units frames;

 description

 "A count of PAUSE MAC Control frames transmitted on

 this Ethernet interface.

 Discontinuities in the values of counters in

 this container can occur at re-initialization of the

 management system, and at other times as indicated

 by the value of the 'discontinuity-time' leaf

 defined in the ietf-interfaces YANG module

 (RFC 7223).";

 reference

 "IEEE Std 802.3, 30.3.4.2

 aPAUSEMACCtrlFramesTransmitted";

 }

 }

 }

 container pfc {

 if-feature "ethernet-pfc";

 description

 "IEEE Std 802.3 Priority-based PAUSE frame based flow

 Control.";

 reference "IEEE Std 802.3, Annex 31D";

 leaf enable {

 type boolean;

 description

 "True indicates that IEEE Std 802.3 priority-based

 PAUSE frame based flow control is enabled, false

 indicates that IEEE Std 802.3 priority-based PAUSE

 frame based flow control is disabled.

 For interfaces that have auto-negotiation, then

 priority-based PAUSE frame based flow control is

 negotiated by default.

 If explicitly configured, when auto-negotiated is

 enabled, then the configuration will restrict the

 priority PAUSE frame based flow control settings that

 can be negotiated.

 The default value is implementation-dependent.";

 }

 container statistics {

 config false;

 description

 "This container collects all statistics for IEEE

 Std 802.3 Ethernet interfaces.";

 leaf in-pkts-pfc {

 type yang:counter64;

 units frames;

 description

 "A count of PFC MAC Control frames received on this

 Ethernet interface.

 Discontinuities in the values of counters in

 this container can occur at re-initialization of the

 management system, and at other times as indicated

 by the value of the 'discontinuity-time' leaf

 defined in the ietf-interfaces YANG module

 (RFC 7223).";

 reference "IEEE Std 802.3.1, dot3HCInPFCFrames";

 }

 leaf out-pkts-pfc {

 type yang:counter64;

 units frames;

 description

 "A count of PFC MAC Control frames transmitted on

 this interface.

 Discontinuities in the values of counters in

 this container can occur at re-initialization of the

 management system, and at other times as indicated

 by the value of the 'discontinuity-time' leaf

 defined in the ietf-interfaces YANG module

 (RFC 7223).";

 reference "IEEE Std 802.3.1, dot3HCInPFCFrames";

 }

 }

 }

 leaf force-flow-control {

 type boolean;

 default false;

 description

 "Explicitly forces the local PAUSE frame based flow

 control settings regardless of what has been negotiated.

 Since the auto-negotiation of flow-control settings

 does not allow all sane combinations to be negotiated

 (e.g., consider a device that is only capable of sending

 PAUSE frames connected to a peer device that is only

 capable of receiving and acting on PAUSE frames) and

 failing to agree on the flow-control settings does not

 cause the auto-negotiation to fail completely, then it is

 sometimes useful to be able to explicitly enable

 particular PAUSE frame based flow control settings on

 the local device regardless of what is being advertised

 or negotiated.

 The default value is implementation-dependent.";

 reference

 "IEEE Std 802.3, Table 28B-3";

 }

 }

 leaf max-frame-length {

 type uint16;

 units octets;

 config false;

 description

 "This indicates the MAC frame length (including FCS bytes)

 at which frames are dropped for being too long.";

 reference "IEEE Std 802.3, 30.3.1.1.37 aMaxFrameLength";

 }

 leaf mac-control-extension-control {

 type boolean;

 config false;

 description

 "A value that identifies the current EXTENSION MAC Control

 function, as specified in IEEE Std 802.3, Annex 31C.";

 reference

 "IEEE Std 802.3, 30.3.8.3 aEXTENSIONMACCtrlStatus

 IEEE Std 802.3.1, dot3ExtensionMacCtrlStatus ";

 }

 leaf frame-limit-slow-protocol {

 type uint64;

 units fps;

 default 10;

 config false;

 description

 "The maximum number of Slow Protocol frames of a given

 subtype that can be transmitted in a one second interval.

 The default value is 10.";

 reference

 "IEEE Std 802.3, 30.3.1.1.38 aSlowProtocolFrameLimit";

 }

 container capabilities {

 config false;

 description

 "Container all Ethernet interface specific capabilities.";

 leaf auto-negotiation {

 type boolean;

 default false;

 description

 "Indicates whether auto-negotiation may be configured on

 this interface.";

 }

 }

 container statistics {

 config false;

 description

 "Contains statistics specific to Ethernet interfaces.

 Discontinuities in the values of counters in the

 container can occur at re-initialization of the management

 system, and at other times as indicated by the value of

 the 'discontinuity-time' leaf defined in the

 ietf-interfaces YANG module (IETF RFC 7223).";

 container frame {

 description

 "Contains frame statistics specific to Ethernet

 Interfaces.

 All octet frame lengths include the 4 byte FCS.

 Error counters are only reported once. The count

 represented by an instance of this object is incremented

 when the frameCheckError status is returned by the MAC

 service to the LLC (or other MAC user). Received frames

 for which multiple error conditions pertain are,

 according to the conventions of IEEE Std 802.3 Layer

 Management, counted exclusively according to the error

 status presented to the LLC.

 A frame that is counted by an instance of this object is

 also counted by the corresponding instance of

 'in-errors' leaf defined in the ietf-interfaces YANG

 module (IETF RFC 7223).

 Discontinuities in the values of counters in the

 container can occur at re-initialization of the

 management system, and at other times as indicated by

 the value of the 'discontinuity-time' leaf defined in

 the ietf-interfaces YANG module (IETF RFC 7223).";

 leaf in-total-pkts {

 type yang:counter64;

 units frames;

 description

 "The total number of frames (including bad frames)

 received on the Ethernet interface.

 This counter is calculated by summing the following

 IEEE Std 802.3, Clause 30 counters:

 aFramesReceivedOK +

 aFrameCheckSequenceErrors +

 aAlignmentErrors +

 aFrameTooLongErrors +

 aFramesLostDueToIntMACRcvError

 Also see the 'description' statement associated with

 the parent 'statistics' container for additional

 common semantics related to this counter.";

 reference

 "IEEE Std 802.3, Clause 30 counters, as specified

 in the description above.";

 }

 leaf in-total-octets {

 type yang:counter64;

 units octets;

 description

 "The total number of octets of data (including those in

 bad frames) received on the Ethernet interface.

 Includes the 4 byte FCS.

 Also see the 'description' statement associated with

 the parent 'statistics' container for additional

 common semantics related to this counter.";

 reference

 "IETF RFC 2819, etherStatsOctets";

 }

 leaf in-pkts {

 type yang:counter64;

 units frames;

 description

 "A count of frames (including unicast, multicast and

 broadcast) that have been successfully received on the

 Ethernet interface.

 This count does not include frames received with

 frame-too-long, FCS, length or alignment errors, or

 frames lost due to internal MAC sublayer error.

 Also see the 'description' statement associated with

 the parent 'statistics' container for additional

 common semantics related to this counter.";

 reference

 "IEEE Std 802.3, 30.3.1.1.5 aFramesReceivedOK";

 }

 leaf in-multicast-pkts {

 type yang:counter64;

 units frames;

 description

 "A count of multicast frames that have been

 successfully received on the Ethernet interface.

 This counter represents a subset of the frames counted

 by in-pkts.

 This count does not include frames received with

 frame-too-long, FCS, length or alignment errors, or

 frames lost due to internal MAC sublayer error.

 Also see the 'description' statement associated with

 the parent 'statistics' container for additional

 common semantics related to this counter.";

 reference

 "IEEE Std 802.3, 30.3.1.1.21 aMulticastFramesReceivedOK";

 }

 leaf in-broadcast-pkts {

 type yang:counter64;

 units frames;

 description

 "A count of broadcast frames that have been

 successfully received on the Ethernet interface.

 This counter represents a subset of the frames counted

 by in-pkts.

 This count does not include frames received with

 frame-too-long, FCS, length or alignment errors, or

 frames lost due to internal MAC sublayer error.

 Also see the 'description' statement associated with

 the parent 'statistics' container for additional

 common semantics related to this counter.";

 reference

 "IEEE Std 802.3, 30.3.1.1.22 aBroadcastFramesReceivedOK";

 }

 leaf in-error-fcs-pkts {

 type yang:counter64;

 units frames;

 description

 "A count of receive frames that are of valid length,

 but do not pass the FCS check, regardless of whether

 or not the frames are an integral number of octets in

 length.

 This count effectively comprises

 aFrameCheckSequenceErrors and aAlignmentErrors added

 together.

 Also see the 'description' statement associated with

 the parent 'statistics' container for additional

 common semantics related to this counter.";

 reference

 "IEEE Std 802.3, 30.3.1.1.6 aFrameCheckSequenceErrors;

 IEEE Std 802.3, 30.3.1.1.7 aAlignmentErrors";

 }

 leaf in-error-undersize-pkts {

 type yang:counter64;

 units frames;

 description

 "A count of frames received on a particular Ethernet

 interface that are less than 64 bytes in length, and

 are discarded.

 This counter is incremented regardless of whether the

 frame passes the FCS check.

 Also see the 'description' statement associated with

 the parent 'statistics' container for additional

 common semantics related to this counter.";

 reference

 "IETF RFC 2819, etherStatsUndersizePkts and

 etherStatsFragments";

 }

 leaf in-error-oversize-pkts {

 type yang:counter64;

 units frames;

 description

 "A count of frames received on a particular Ethernet

 interface that exceed the maximum permitted frame

 size, that is specified in max-frame-length, and are

 discarded.

 This counter is incremented regardless of whether the

 frame passes the FCS check.

 Also see the 'description' statement associated with

 the parent 'statistics' container for additional

 common semantics related to this counter.";

 reference "IEEE Std 802.3, 30.3.1.1.25 aFrameTooLongErrors";

 }

 leaf in-error-mac-internal-pkts {

 type yang:counter64;

 units frames;

 description

 "A count of frames for which reception on a particular

 Ethernet interface fails due to an internal MAC

 sublayer receive error.

 A frame is only counted by an instance of this object

 if it is not counted by the corresponding instance of

 either the in-error-fcs-pkts, in-error-undersize-pkts,

 or in-error-oversize-pkts. The precise meaning of the

 count represented by an instance of this object is

 implementation-specific.

 In particular, an instance of this object may

 represent a count of receive errors on a particular

 Ethernet interface that are not otherwise counted.

 Also see the 'description' statement associated with

 the parent 'statistics' container for additional

 common semantics related to this counter.";

 reference

 "IEEE Std 802.3, 30.3.1.1.15

 aFramesLostDueToIntMACRcvError";

 }

 leaf out-pkts {

 type yang:counter64;

 units frames;

 description

 "A count of frames (including unicast, multicast and

 broadcast) that have been successfully transmitted on

 the Ethernet interface.

 Also see the 'description' statement associated with

 the parent 'statistics' container for additional

 common semantics related to this counter.";

 reference

 "IEEE Std 802.3, 30.3.1.1.2 aFramesTransmittedOK";

 }

 leaf out-multicast-pkts {

 type yang:counter64;

 units frames;

 description

 "A count of multicast frames that have been

 successfully transmitted on the Ethernet interface.

 This counter represents a subset of the frames counted

 by out-pkts.

 Also see the 'description' statement associated with

 the parent 'statistics' container for additional

 common semantics related to this counter.";

 reference

 "IEEE Std 802.3, 30.3.1.1.18 aMulticastFramesXmittedOK";

 }

 leaf out-broadcast-pkts {

 type yang:counter64;

 units frames;

 description

 "A count of broadcast frames that have been

 successfully transmitted on the Ethernet interface.

 This counter represents a subset of the frames counted

 by out-pkts.

 Also see the 'description' statement associated with

 the parent 'statistics' container for additional

 common semantics related to this counter.";

 reference

 "IEEE Std 802.3, 30.3.1.1.19 aBroadcastFramesXmittedOK";

 }

 leaf out-error-mac-internal-pkts {

 type yang:counter64;

 units frames;

 description

 "A count of frames for which transmission on a

 particular Ethernet interface fails due to an internal

 MAC sublayer transmit error.

 The precise meaning of the count represented by an

 instance of this object is implementation-specific. In

 particular, an instance of this object may represent a

 count of transmission errors on a particular Ethernet

 interface that are not otherwise counted.

 Also see the 'description' statement associated with

 the parent 'statistics' container for additional

 common semantics related to this counter.";

 reference

 "IEEE Std 802.3, 30.3.1.1.12

 aFramesLostDueToIntMACXmitError";

 }

 }

 container phy {

 description

 "Ethernet statistics related to the PHY layer.

 Discontinuities in the values of counters in the

 container can occur at re-initialization of the

 management system, and at other times as indicated by

 the value of the 'discontinuity-time' leaf defined in

 the ietf-interfaces YANG module (IETF RFC 7223).";

 leaf in-error-symbol {

 type yang:counter64;

 units errors;

 description

 "A count of the number of symbol errors that have

 occurred.

 For the precise definition of when the symbol error

 counter is incremented, please see the 'description'

 text associated with aSymbolErrorDuringCarrier,

 specified in IEEE Std 802.3, 30.3.2.1.5.

 Also see the 'description' statement associated with

 the parent 'phy-statistics' container for additional

 common semantics related to this counter.";

 reference

 "IEEE Std 802.3, 30.3.2.1.5 aSymbolErrorDuringCarrier";

 }

 container lpi {

 description

 "Physical Ethernet statistics for the energy efficiency

 related low power idle indications.";

 leaf in-lpi-transitions {

 type yang:counter64;

 units transitions;

 description

 "A count of occurrences of the transition from

 DEASSERT to ASSERT of the LPI\_INDICATE

 parameter. The indication reflects the state of the

 PHY according to the requirements of the RS (see

 IEEE Std 802.3, 22.7, 35.4, and 46.4).

 Also see the 'description' statement associated with

 the parent 'phy-statistics' container for additional

 common semantics related to this counter.";

 reference

 "IEEE Std 802.3, 30.3.2.1.11 aReceiveLPITransitions";

 }

 leaf in-lpi-time {

 type decimal64 {

 fraction-digits 6;

 }

 units seconds;

 description

 "A count reflecting the total amount of time (in

 seconds) that the LPI\_REQUEST parameter has the

 value ASSERT. The request is indicated to the PHY

 according to the requirements of the RS (see IEEE Std

 802.3, 22.7, 35.4, and 46.4).

 Also see the 'description' statement associated with

 the parent 'phy-statistics' container for additional

 common semantics related to this counter.";

 reference

 "IEEE Std 802.3, 30.3.2.1.9 aReceiveLPIMicroseconds";

 }

 leaf out-lpi-transitions {

 type yang:counter64;

 units transitions;

 description

 "A count of occurrences of the transition from state

 LPI\_DEASSERTED to state LPI\_ASSERTED of the LPI

 transmit state diagram is the RS. The state

 transition corresponds to the assertion of the

 LPI\_REQUEST parameter. The request is indicated to

 the PHY according to the requirements of the RS (see

 IEEE Std 802.3, 22.7, 35.4, 46.4.)

 Also see the 'description' statement associated with

 the parent 'phy-statistics' container for additional

 common semantics related to this counter.";

 reference

 "IEEE Std 802.3, 30.3.2.1.10 aTransmitLPITransitions";

 }

 leaf out-lpi-time {

 type decimal64 {

 fraction-digits 6;

 }

 units seconds;

 description

 "A count reflecting the total amount of time (in

 seconds) that the LPI\_INDICATION parameter has the

 value ASSERT. The request is indicated to the PHY

 according to the requirements of the RS (see IEEE

 802.3, 22.7, 35.4, and 46.4).

 Also see the 'description' statement associated with

 the parent 'phy-statistics' container for additional

 common semantics related to this counter.";

 reference

 "IEEE Std 802.3, 30.3.2.1.8 aTransmitLPIMicroseconds";

 }

 }

 }

 container mac-control {

 description

 "A group of statistics specific to MAC Control operation

 of selected Ethernet interfaces.

 Discontinuities in the values of counters in the

 container can occur at re-initialization of the

 management system, and at other times as indicated by

 the value of the 'discontinuity-time' leaf defined in

 the ietf-interfaces YANG module (IETF RFC 7223).";

 reference

 "IEEE Std 802.3.1, dot3ExtensionTable";

 leaf in-pkts-mac-control-unknown {

 type yang:counter64;

 units frames;

 description

 "A count of MAC Control frames with an unsupported

 opcode received on this Ethernet interface.

 Frames counted against this counter are also counted

 against in-discards defined in the ietf-interfaces

 YANG module (IETF RFC 7223).

 Also see the 'description' statement associated with

 the parent 'mac-control-statistics' container for

 additional semantics.";

 reference

 "IEEE Std 802.3, 30.3.3.5 aUnsupportedOpcodesReceived";

 }

 leaf in-pkts-mac-control-extension {

 type yang:counter64;

 units frames;

 description

 "The count of Extension MAC Control frames received on

 this Ethernet interface.

 Also see the 'description' statement associated with

 the parent 'mac-control-statistics' container for

 additional semantics.";

 reference

 "IEEE Std 802.3, 30.3.8.2

 aEXTENSIONMACCtrlFramesReceived";

 }

 leaf out-pkts-mac-control-extension {

 type yang:counter64;

 units frames;

 description

 "The count of Extension MAC Control frames transmitted

 on this Ethernet interface.

 Also see the 'description' statement associated with

 the parent 'mac-control-statistics' container for

 additional semantics.";

 reference

 "IEEE Std 802.3, 30.3.8.1

 aEXTENSIONMACCtrlFramesTransmitted";

 }

 }

 }

 }

 }

}