



OpenLCB Technical Note	
Glossary	
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## 1 Introduction

This glossary provides working definitions and commentary on definitions for OpenLCB. It is not normative in any way.

We provide a separate section of “Key Terms” for initial reading.

## 2 Key Terms

Event

OpenLCB allows nodes to notify each other when specific "events" occur on the layout. These in turn can cause nodes to take particular actions. Events are not necessarily attached to a producer ('Button 2 pressed') or attached to a consumer ('Turn off light 4'), but rather to an overall state change ('Set for nighttime operation'). This is called a "Producer/Consumer model".

Node

A “node” is the basic unit of addressability in OpenLCB. It can be a single board, or a process in a larger computer, or any other independent actor on the OpenLCB network.

Every OpenLCB interaction originates in a node. Every board that connects to OpenLCB is at least one node. For example, a simple turnout controller board is one node, while a PC with multiple programs running may contain several nodes.

Message

The basic unit of OpenLCB communication. OpenLCB nodes exchange messages to control communications and to move information. It may take several messages to move a single datagram, or to start a stream, for example.

Protocol

An OpenLCB protocol defines how messages are exchanged to do some particular thing. There are low level protocols for things like sending datagrams, exchanging events, and doing link start-up. Higher-level protocols then define how configuration information is exchanged, or a nodes memory can be read, or a message can be put on a display.

## 3 General Glossary

Addressed

30 An “addressed” message is meant for only a single node. Contrast “global”.

#### Alias

Short form of a Node ID number which can be mapped back and forth to the full number. Often used as "NID Alias", "DID Alias" or "SID Alias", which are then written NIDa, DIDa and SIDa.

#### Board

35 Not really something that occurs in OpenLCB itself, we need to talk about how the common term "board" maps onto OpenLCB. E.g. A node (board) may connect to several things (devices) on the layout.

#### Bridge

40 Connects two OpenLCB segments with minimal changes to the content of the messages. For example, a bridge between two CAN segments would allow more nodes to be attach to the combined segments as if they were one; a bridge between a CAN segment and Ethernet segment would transform message format, but transfer every message.

#### CDI

45 “Configuration Definition Information”, the information provided by a node so that other nodes can understand what the configuration information in the first node includes, and how it's organized.

#### Datagram

50 The datagram protocol is a way for a OpenLCB node to efficiently send a short, definite-length message to another specific node. In that, it lies in between the event exchange protocol, which efficiently sends very short event IDs to all interested nodes, and the streaming protocol, which sends long messages between specific nodes, at some cost in efficiency. Sending a datagram takes multiple messages.

#### Datagram Indicator

The first byte of data transferred by a datagram is used to indicate the protocol being transported.

55 Device

Not really something that occurs in OpenLCB itself, we need to talk about how the common term "device" maps onto OpenLCB. E.g. A node (board) may connect to several things (devices) on the layout..

#### Destination Node ID (DID)

60 Node ID of the node to which a specific message is addressed.

#### Event ID (EID)

The number that identifies a specific event. OpenLCB event IDs must be globally unique.

Events are not associated with any particular node. It may be convenient to use e.g. Node ID as a way of numbering them uniquely, but Node IDs and Event IDs are not related.

## 65 Gateway

Connects two segments of the OpenLCB while translating to a different wire protocol. For example, a gateway can change NodeIDs on one side of the Router into aliases on the other side. The use of unique identifiers in OpenLCB is meant to reduce the need for gateways. They generally only appear to connect the wider network to a CAN link.

## 70 Global

A “global” message is meant for all OpenLCB nodes that are interested in it. Contrast “Addressed”.

## Installation

75 An OpenLCB installation is the complete set of OpenLCB hardware, nodes, etc, that can be reached from any one of them.

## Message Type Indicator

Every OpenLCB message contains a Message Type Indicator field that identifies the type of that particular message. Also used to refer to a particular value for that field.

## MTI

80 Message Type Indicator - identifies a common message type.

## Node ID (NID)

Number identifying a specific node. OpenLCB node IDs must be globally unique, so they form a one-to-one mapping to the nodes themselves.

## Producer/Consumer Model

85 A way of thinking about communications on a layout network. Events (unique messages on the layout network) are “produced” by some node(s), and “consumed” by other node(s). An event indicates something happened, but the corresponding messages isn't necessarily a status report or a command for something to change; it's just an announcement of the event. That event can be produced by many different sources (e.g. the “use passing siding” event could be produced by a push button at either end of the siding, or on a dispatcher panel), and can be consumed by several  
90 sources (it can turn on lamps on a panel, set turnouts in multiple places, etc).

## Producer-Consumer Event Report (PCER)

OpenLCB message type sent by producers of a particular Event that it has occurred, so that the corresponding consumers of that Event are notified.

## 95 Repeater

Connects two segments of the same type at the physical level, without transformation of message format.

**Router**

100 OpenLCB routers forward traffic from one link to another without reformatting. This can be as simple as receiving on one link and forwarding on N, or it could involve tracking e.g. event usage and only forwarding needed messages.

**Source Node ID (SID)**

The Node ID of the node which originated a specific message.

**Segment**

105 Subset of an overall OpenLCB installation which is reached via path or gateway. A segment typically uses a specific wire protocol.

**Simple Node**

110 A “simple node” is typically an individual board with a small processor on it which is acting as a leaf node in an OpenLCB network. A simple node doesn't initiate complex communications with other nodes, but may be the target of e.g. configuration operations.

**Stream**

Streams are a method of moving a large number of bytes between two nodes. The streaming protocol defines a way to do this in OpenLCB.

**Virtual Node**

115 One of one or more nodes co-resident within a single board or computer. Often a board is a single node, but it's possible for a board or computer to behave on the OpenLCB as if it contained multiple nodes. Those are then referred to as virtual nodes.

**Wire protocol**

120 Version of the OpenLCB common messages, interactions, etc adapted to a particular transport mechanism. Examples are the wire protocols for CAN bus segments and TCP/IP links.

## 4 CAN Glossary

**CAN**

Controller Area Network, an ISO-standardized communication network type. The CAN specification includes aspects of the physical- and link-layer definitions for OpenLCB.

125 **Frame**

A Frame is packet as it is defined on the CAN bus. It consists of a 11 or 29 bit CAN header and zero through 8 bytes of data. An OpenLCB message may become one or more frames when transmitted over CAN. Some frames, called Control Frames, are used for link-layer control and do not correspond to any particular OpenLCB message.

130 **Segment**

A single CAN segment is the set of CAN nodes that share CAN arbitration.

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