Use Cases

The table below describes the Use Cases that were and are being considered for the S-9.6/OpenLCB NMRAnet design. NMRAnet refers to the S-9.6/OpenLCB proposal.

Entry Level User	A model railroader wants to learn about NMRAnet. He buys two inexpensive boards at h layout to two pushbuttons and a turnout motor, does a simple configuration, and is able to
	Alice wants to control her three track station. She has goes to her local store and buys one a power supply. When she gets home, she unpacks the nodes and connects each of the tur W1, and W2. Then she connects the nodes together with the cables. Following the directi the turnout-controllers and ensures the attached turnout changes position. Now she is ready to make the buttons control the turnouts. The buttons are labelled A-H. blue button on the E1 controller until the turnout is in the position she wants, and then the this position. She then goes back to the button node and pushes the gold button, button A, the turnout controller to respond to button A. She then sets E1 to the other position and tr she pushed blue repeatedly to position the turnout, then pressed gold, then pressed gold, with turnouts E2, W1, and W2 and C-H. However, she found that she still forgot to compatibly position the turnouts at both ends realized that she could improve her scheme. She reset the nodes to factory settings as dire turnouts select track 1. (In detail: on E1 set diverge and gold, on E2 set diverge and gold, diverge and gold, and finally on the button node pushed gold, A, and gold). She also mad Now she could control her station tracks with only three buttons, and there was never a cl changed it again so that A-C selected tracks 1-2 for entrance, and D-F selected them for e
Expanding A Small Layout	A user has four NMRAnet boards working on his layout. He buys one more input board t yard ladder from the other end of the layout. He's able to configure the new board and pu
	Alice decides that it would be nice to be able to control her station tracks from another lo label these M-T), and hooks it to the other nodes. She then copies the learning from the fi the original set of buttons she pushed A and gold, and then on the new buttons she pushed process with the other buttons).
Mid-size Layout Problem	A user has twelve NMRAnet boards operating. Something changes, and the system is no work, and others only work sometimes. The user attempts some debugging steps using fe to locate the problem, so buys/borrows diagnostic device(s).
	Mike is at a loss, although he kept good records things have gone south on his layout. He with the NMRAnet configuration software and a NMRAnet-USB adapter. He plugs them program asks him to select the layout name or choose new. He chooses new. The program each part of each node and see what other nodes receive its events. He can also see whose the nodes. He pushes some buttons and watches as the program animates the events trave nodes. He finds his mistake, and makes changes to his configuration and tests again. Prob
Large Layout Upgrade	A model railroad has 40 NMRAnet boards controlling a large layout. To upgrade a major new ones that offer new (non-NMRAnet) features. He captures the existing setup, replace

	equipment and is back in operation.
	Joe has been assigned the non-trivial task of upgrading the yard with the new boards the p NMRAnet configuration program to make a fixed record of the configuration of the twelv twice, he's paranoid. He then proceeds to disconnect the original twelve boards and replac he brings up the configuration program, and its informs him there are twelve new boards know" he mutters. He brings up another copy and retrieves his stored configuration. He n changed, but he can manage. He uses the old configuration to find nodes from which he c the screen he just grabs the node's consumer or producer entry and drags it to one or more producers. The nodes are linked and using the old events. "Sweet" he thinks. Now he sets these new nodes have – "Wow, it was worth it, these babies are hot".
Distant Control Panel	A model railroad has turnouts and signals controlled via NMRAnet. The owner wants to p separate building, and operate it via NMRAnet.
	Mike has been operating his layout from afar using a 'glass' control panel on his computer However, it doesn't have the same satisfaction as having a real control panel. He decides t NMRAnet nodes to interface it. The big day arrives and now he needs to configure it. He it into his networks. He boots up his configuration program, links to the bridge and sets it layout, the program announces there are lots of new nodes. Using drag-and-drop he links relatively easy, as he is just duplicating his old controls. In fact he can just drag one whol are duplicated. The whole process only took 5 minutes. Mike thinks "Now, let's get down
Large Layout Expands	A large model using CAN, but not any attached computers, grows enough that it needs to possible without reconfiguring all the existing nodes, event IDs, etc.
	Hugh realizes he has a problem – the NMRAnet-CAN bus running his layout is not big en He talks to the local guru, and the guru says – no problem, just cut your CAN into two pa bridge. Hugh is doubtful, it can't be that simple, won't he need to change node ids and cha reassures him – it is that simple – no need to change anything, the nodes will still see alll take shim at his word, picks up a bridge and, after five minutes deciding where to break th trains again.
Connect Multiple Programs	The user wants to run multiple programs from multiple vendors in his home computer tha NMRAnet and control/monitor it.
	Mike visits Hugh and brings some new NMRAnet software on his laptop. "This software showing the location and connections between your nodes. I just need to plug it into your
Remote Dispatcher	A model railroad has turnouts and signals controlled via NMRAnet. NMRAnet is used to panel could be either a physical panel or on a computer screen.
	See Distant Control Panel.
Modular Layouts	A modular club has fifty modules, each of which as a CAN NMRAnet with two or three r are separately built, with no central administration. They are brought to a central location together in some pre-planned orientation. The NMRAnets are connected in some fashion,

	both central and distributed locations.
	John is in charge of the meet. He tells the attendees to connect the modules together into limitations of length and drive capabilities of the nodes. He assigns segment leaders and segment in isolation by connecting a computer with configuration software. XML files de brought help in this, but the nodes themselves contain enough information to allow them block detection and signalling systems. If the number of modules was smaller, then John would have connected the segments tog had decided to connect the segments together using an Ethernet backbone, using Ethernet bandwidth requirements on each of the segments because the bridges will automatically actually required, rather than all packets. Together with his segment leaders, they quickly Attendees can observe and control the layout from disparate points on teh layout.
Remote Diagnostics	A club layout is operated via NMRAnet. There's something not quite right about the signa the operation of the signals. He makes a remote connection to the layout and checks the s his home computer.
	Bob receives a call from his friend Hugh at the clubhouse that there's some trouble on the town and back, but fortunately, his club has an Ethernet connection to the layout, and eve network (LAN) and to the wider internet through their router – he can just log in from ho program on his home computer and connects to teh layout. It appears that one of the signa cascade of failures downstream from the signal. He phones Hugh back and tells him to ch crawls under the layout and discovers a plug has pulled out – it must have been that work normal. Hugh thanks John. John replies “Its all in a day's work for a NMRAnet repairman
Aggregation of Modular Clubs	Dozens of clubs put together dozens of NMRAnet segments and hundreds of modules tha FREMO meet would be an example. Collision avoidance: EventIds, NodeIds that are alre already be unique. It must be possible to build automated tools for translating, disambigu connecting across the boundaries are needed so that e.g. signaling systems can work with must be possible to build automated tools for health monitoring across the layout.
	See Modular Layouts. In this case, thanks to prior planning, each club has provided an X connected to allow the integration of the signalling and other systems. Hugh and John use schematic diagram of the entire layout. They then drill down to each interface between la each segment together. They quite quickly repeat the exercise on each adjacent pair of seg of segments. Since every node has a unique ID and unique Events, they are not worried a events on any modules – reprogramming hundreds of nodes would not be inviting.