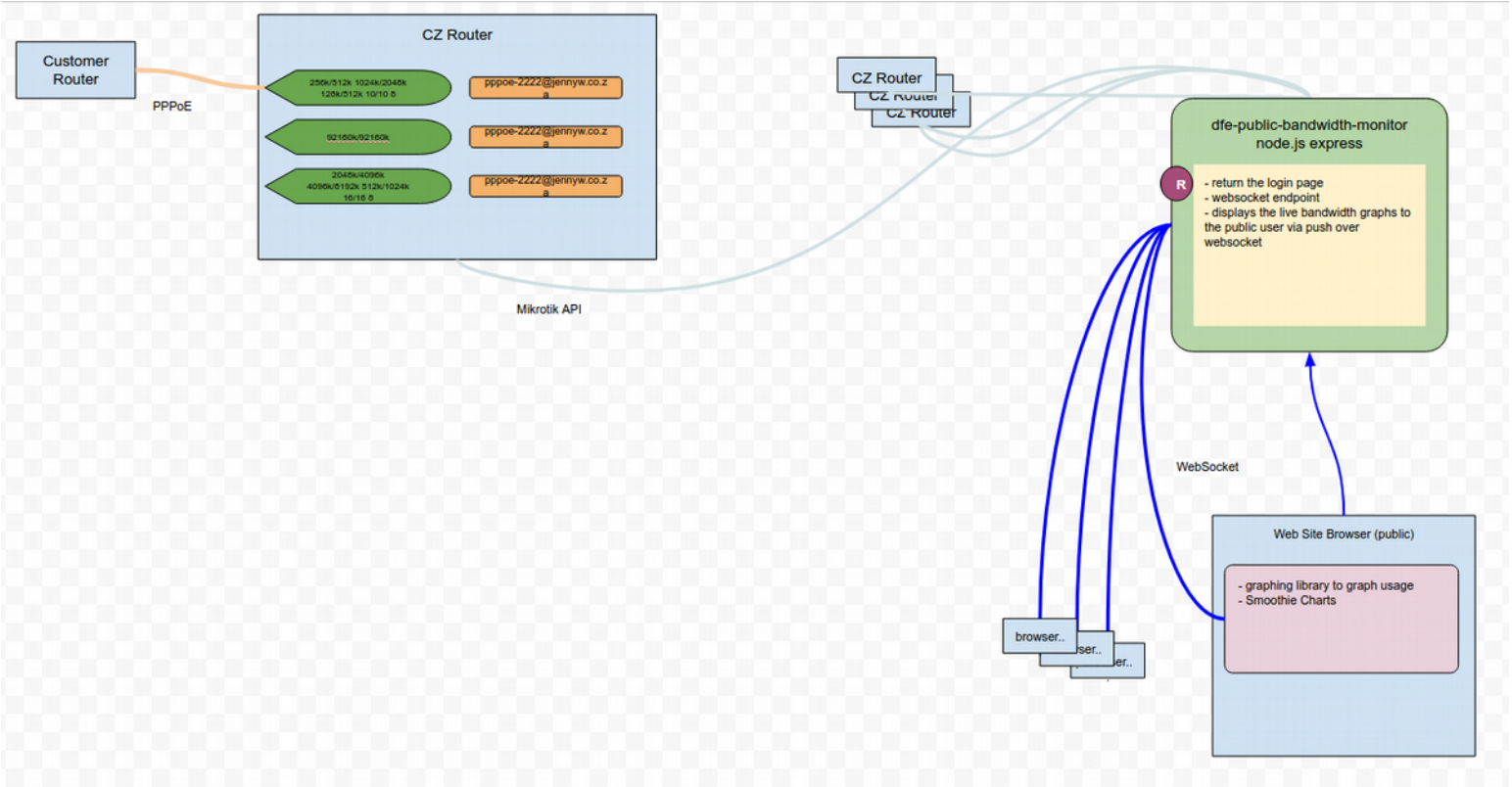
Live Bandwidth Monitoring using the Mikrotik API

Context

- Users don’t know what is running in the network
- Support center load increased with the rise of video
- Customers don’t have power / tools to understand their bandwidth
- Speedtest services have a major flaw, only useful on single device networks

Technical Solution Overview

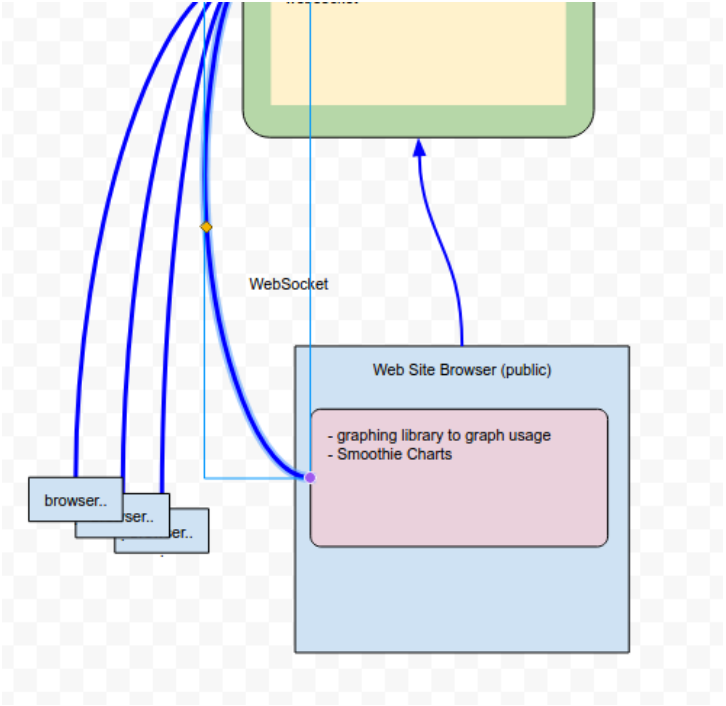


Technical Components Used

- Node.js mikronode-ng library
- Socket.io
- Smoothie.js Charts
- Mikrotik API
- Node.js web framework : express

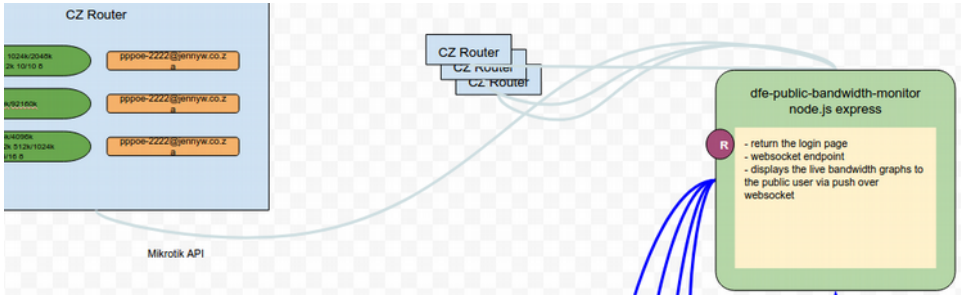
Basic Control Flow - Client Side

- User navigates to the web page with their pppoe username as a parameter
- Page loads the Smoothie.js graphing library
- Page loads the socket.io client library
- Page initiates a websocket connection to the Node.js server
- Page joins a socket.io room for the pppoe username



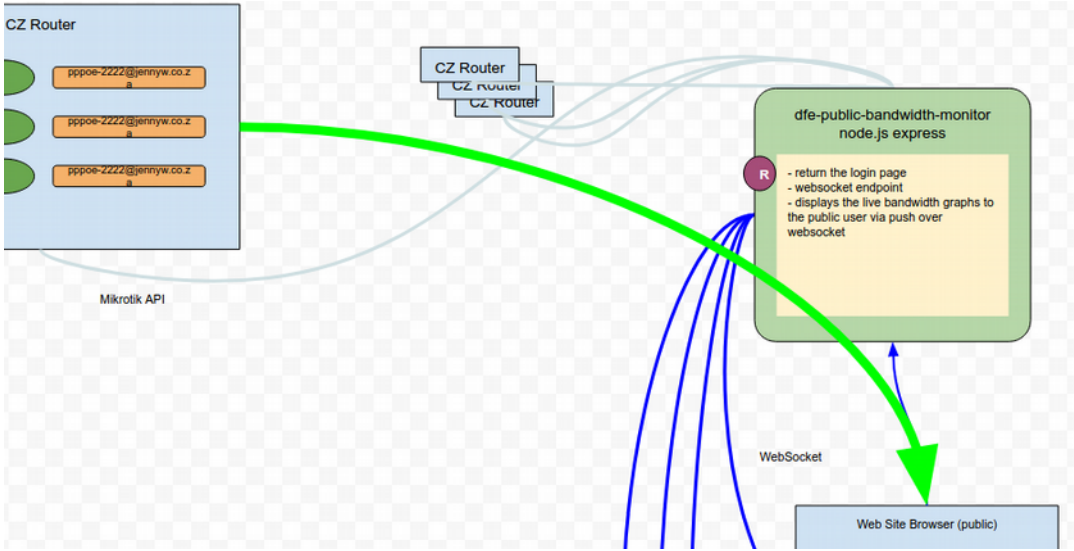
Basic Control Flow - Node.js

- Socket.io listens for a join room message from clients
- Process connects Mikrotik API on the customer router on which the pppoe interface resides
- Process issues a “/interface/monitor-traffic” with the pppoe interface as a parameter
- Process starts receiving events from Mikrotik API for bandwidth

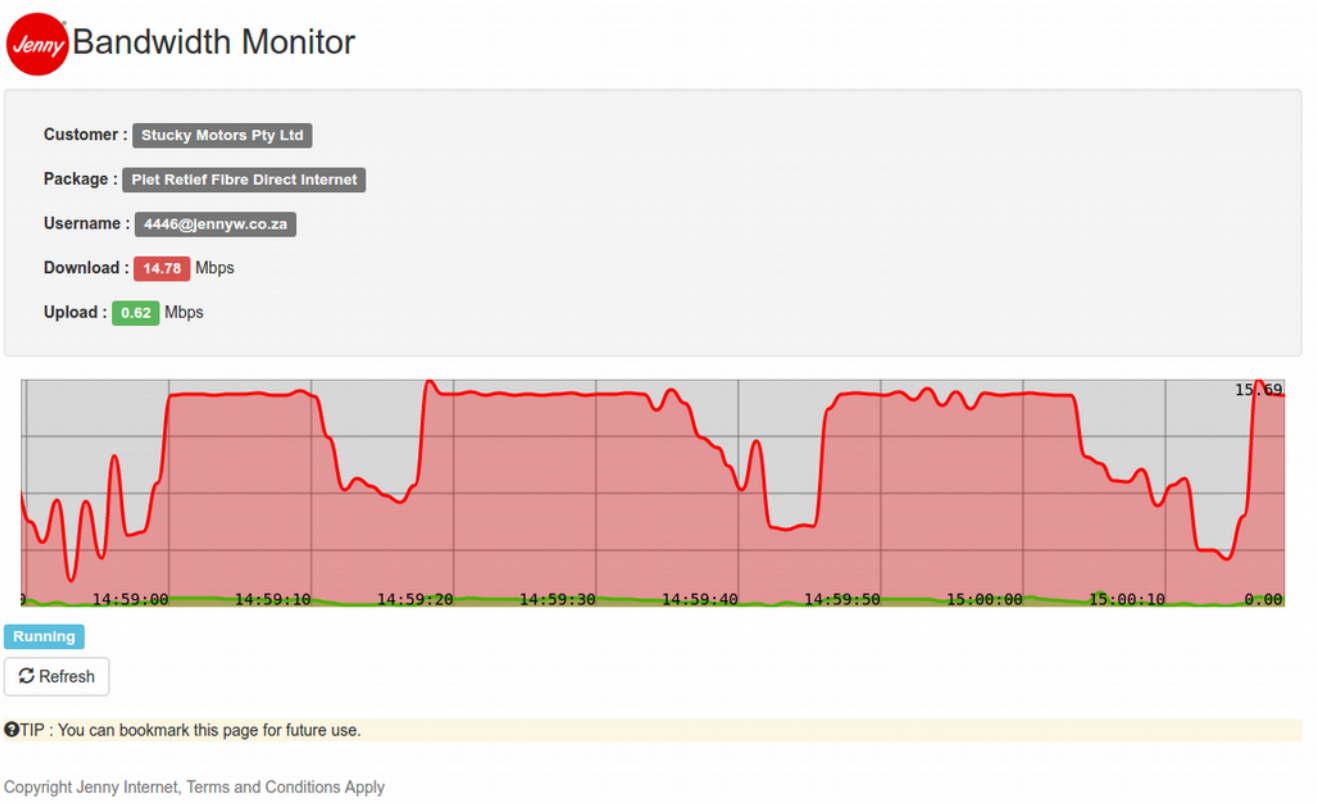


Basic Control Flow - Updates to the client

- For every event received from the Mikrotik, emit a message on the socket.io room for the pppoe user
- The client web page receives a websocket frame and uses this as input for the Smoothie charts javascript graphing library



Final Implementation



Bandwidth Monitor

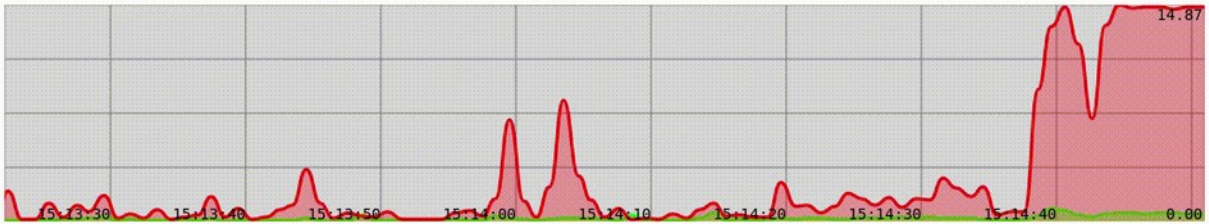
Customer : Stucky Motors Pty Ltd

Package : Piet Retief Fibre Direct Internet

Username : 4446@jennyw.co.za

Download : 14.57 Mbps

Upload : 0.58 Mbps

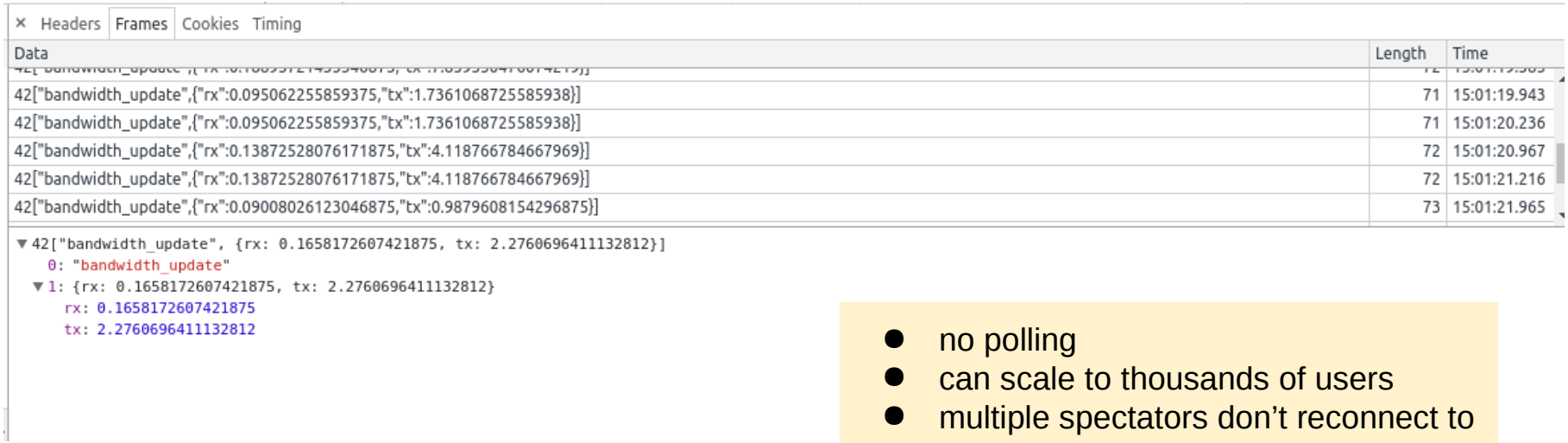


Running

Refresh

TIP : You can bookmark this page for future use.

Websocket frames on the browser



- no polling
- can scale to thousands of users
- multiple spectators don’t reconnect to the backend

Mikrotik API Commands Code

```
//connection to router has been established
channels.chan_pppoe = conn.openChannel();
channels.chan_pppoe.closeOnDone = true;

channels.chan_pppoe.write(['/interface/pppoe-server/getall'],function(c1){
c1.on('done',function(data){
      var pppoeusers = mikronode.parseItems(data);
      var minterfaces = [];
      _.each(pppoeusers,function(v){
            minterfaces.push(v.name);
      });
      minterfaces = _.uniq(minterfaces);
      var interface_str = '=interface=' + minterfaces.join(',');

      channels.chan_monitor.write(['/interface/monitor-traffic',interface_str], function(c) {
            c.addListener('read', function(data){
                  var parsed = mikronode.parseItems(data);
                  update_emitter(parsed); //function that sends update on the websocket room
            });
      }
}
```

Frontend Code

```
var smoothie = new SmoothieChart({minValue:0,millisPerPixel:80...//init smoothie);

smoothie.streamTo(document.getElementById("mycanvas"), 1000);

// Data
var line1 = new TimeSeries();
var line2 = new TimeSeries();

// Add to SmoothieChart
smoothie.addTimeSeries(line1,{ strokeStyle:'rgb(0, 255, 0)', fillStyle:'rgba(0, 255, 0, 0.4)',
lineWidth:3 });
smoothie.addTimeSeries(line2,{ strokeStyle:'rgb(255, 0, 0)', fillStyle:'rgba(255, 0, 0, 0.3)',
lineWidth:3 });

socket.on('bandwidth_update', function(obj){
     line1.append(new Date().getTime(),line1val);
     line2.append(new Date().getTime(),line2val);
     });
```

Resources

- SmoothieCharts : https://github.com/joewalnes/smoothie/
- Mikronode Library : https://github.com/f5eng/mikronode-ng
- Socket.io : https://socket.io/