Consuming HTTP at Scale

Node Summit, Jan 24, 2012

Hello, I'm

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Brought to you by

eBay's platform engineering

https://github.com/ql-io/ql.io
Open source (Apache 2)

API Billionaires Club, 2011 edition

13 billion API calls / day *(May 2011)*

10 billion API calls / month *(January 2011)*

Over 260 billion objects stored in S3 *(January 2011)*

1.6 billion API-delivered stories / month *(October 2010)*

5 billion API calls / day *(April 2010)*

5 billion API calls / day *(October 2009)*

8 billion API calls / month *(Q3 2009)*

3 billion API calls / month *(March 2009)*

[http://blog.programmableweb.com/2011/05/25/api-business-models-then-and-now/]

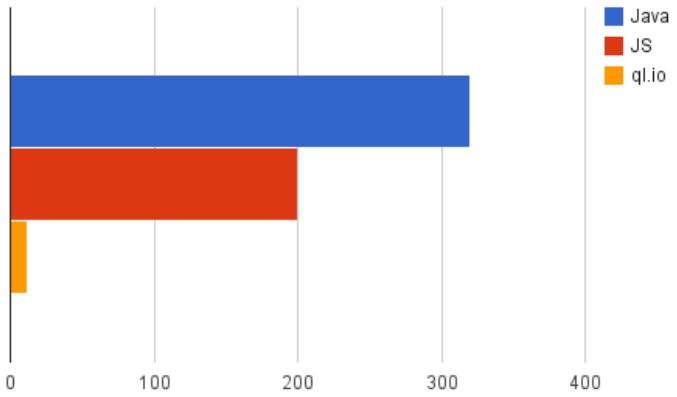
A **DSL** for HTTP

An HTTP **gateway**

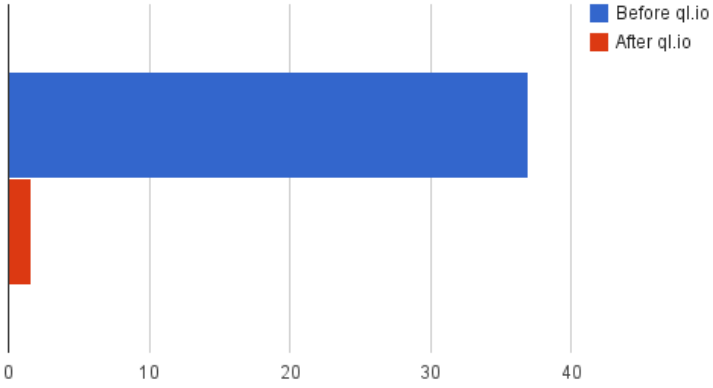
Built on **node.js**

Make HTTP APIs **easy** and **fast** to consume

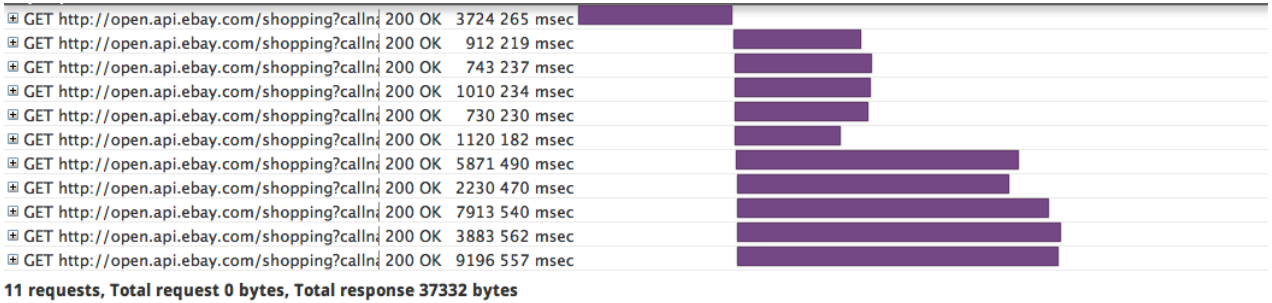
Lines of code for API calls



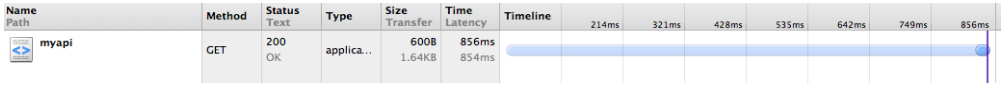
Data size (k)



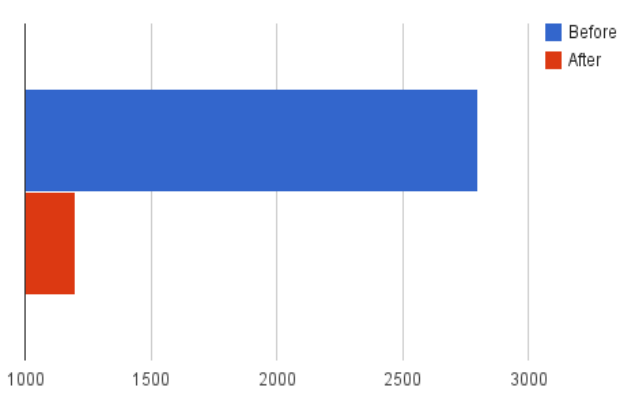
before



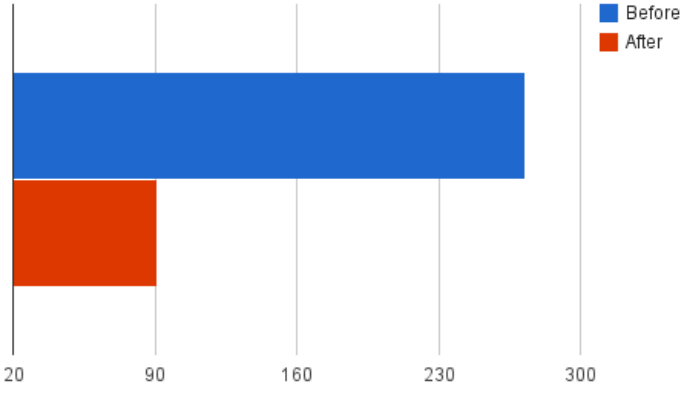
after



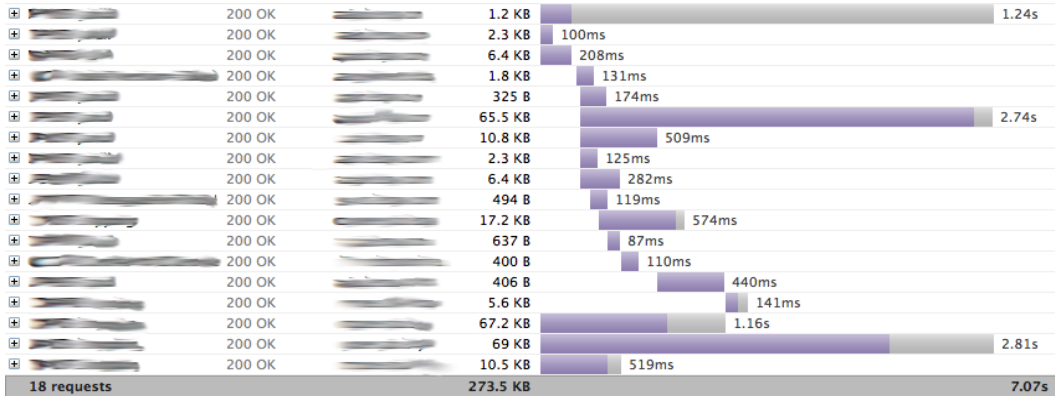
Lines of code for API calls



Data size (k)



before



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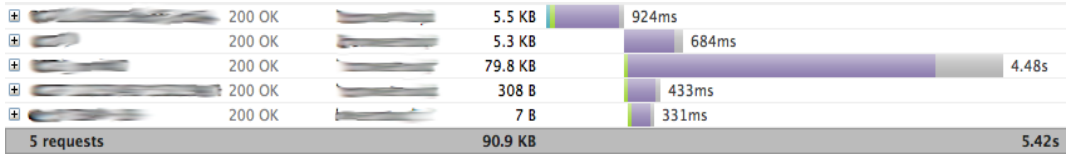


Home Come?

```
// HTTP and network coding is already easy
//
var http = require('http');
var client = http.request({
    method : 'GET',
    host : 'my host',
    path : 'my path'}, function(res) {
      res.on('data', function(chunk) { ... };
      res.on('end', function() { ... });
});
client.end();
```

Real code (randomized)

```
RbozAS1 XCJY1 6sh0eatZObMNgXQdiK3
1
    SRbs52PA2GOJtwkHKKj     no0SHN5AMVA6
    Vlws1iZz            BR7Ai0mag

    lPMsyj                  q58wYIhJrVQATA7
    eZOw66J                 QWdqDBkkS
    m416Mcu                 RiJAkVF

    qaSdpH zZ8Ka74telRxCiIyUtUeBKMtW9lOErKgihnprzP WAL
    7
        071n1cDPyQH Z crP
        IW2xiJEd O uHuee9ZEwmQw
    C

    u67M nM7Zv
    Y
        xNoCaN BgFqLJAyOxhsfMV 7 scmgK31eaLIAnwqSkUNdFSxFMOZGKAxPkA0l6F

        sp bExI0mtpNnLRPBOUerdn2oy9DSHL
            71V7eYA6clHRoIm Q 7RbmIel7VPgzCrJ 8 vb9tmHLrILN9A4

        TR R70W6tS7LiKQxqlxKAGB5ybAp2iev
            oe1SvY0KEgbCwn7 f bUxl8dD0aCHge7L M OEIfNzuYITexK7t



        I9HS4JrrBnNDI 5tmkYHffVOQaat 6 0Zr L5x0Z5bnZPG62YAZN ZW1dLvmeXXszh1yrQ T
            OubeETVx2 uKNZ7f AiqT JR4SSgBbjN0iozYyhCJmxr611nrVQeUm WF7goUa7z x
                IZiWBcLiwbc wf gBfds
                    A5Xpb2Z8QBd8mRc2rccGoKGu9yQ82xZbBlxdt5JSbrhdyvrCIpMtDnQUvRjehBlX4
            4
        ZZN
        w446Fy28diUB8oINkky 2 t7IzQPQmi
        h2veXhG0T2MdXdhbdGXoAy8gCbEE0S i 7DI0cgEc50F1dgXT
        Yr9Riu50CBeSdFZAR9YSCiINd
    b


    eObHpS9nvssQ109 hr1aOti1UPD6     9HqTdlGc       t PNrWU
```

```
    n7cejlhPnA8twkd GcGCytRu6GvLAUdK RUAQroSY1V5E   z AMJXQ

    CXhU XYwLpgg5L5jouqasGptY8pv08 2AGqsZMh
    9
        1y aBe957rY eT 3Kwv06UGNf24JFiurIBp3
        o
di          FS6xxEkMC3m nngXoCiiztuBztOOAFqwFpnjSpQfmJ7dX7aj 6SSJT4X7eF1eorO6pEtXd0gFBm3ZclEnQJvFRsyKQUB s7woVXNXskPorVKsvOHp73B
            B6s7yzYHByj 4 AfT4x
            rA6yIonUOBbnl0Yj12hSuVmC6D0lsgLs8lMX
            Aqgy5QJ
        C

        IS
        5C VJEVgZrMTqmvlAv7MUv9W0jU32E3ENSb oT zcXbH7q K7gtGy SV 9tT yic9

        yha3K3wC V etd UAnoHrpM9QpGtep Kr8ukNQKGb5Ekmz
        fc834upTO4D1 w UoO zf9adPqN1UKYs6w oWd3LUgdTmA1FG0nkwb

        jLVvy9 ADq4cV 2 FTcO3bTO5Gc7eYpF

        ze1u44xGIfo GPIQjsUM m BOPuwE1PfLH0AJaFg2QQrRJjwgrO5
        xs VyTkuaERPQMtNgmyBAaae5d DH Gzwt8cD55mTxfzXqnsxlhsxBTCijBC0
        L
            lHaZzN 8HRET1rtKZ w ul7iVILl4dvHyhoBRz5Kg2YXLMile2AioD7JbXFivgc9bPFV
            RjwSwG WEpidyH x aEhzB3fIVbJiCqeEQlKv8u5L6BR

            oa 7i 0dBdY sE B jrn6mtkfJCM Da wI7 UP8FP gKdf 3bP tMBGUZCr kGFZ x1Vk3R 8OXkr6H35 idDxiqI 0s 3
            jHE akYrHr1l D F1
            T4 h dD12Qi42sw9m8h2AOiCW 6c hTK9S
            W
                1fqN5qeg 4 l8LplornkV7cGoJaqE2WBZrCZCEh6GwNoye4Fs0
            u

            Dp gMuKyn J3t aU1Pp BnUIammuGinDfHv7 FY1 5hDmqnMg wauM5 pk su1 Oi PLO kmh8pD u4arJ0Vakwh5xz 7C4T7728 b6KGK
            rz 1dU RKTC 8fLbJP Rm F9 SBD PCCMipl HN Ds qu91S 1Jy ikQm0Gp C7 iq8N 3l uT WyPr yawEhaSPNRma G1GpjhRd
            be k0Uzf 4lX KSDCvOof
            F9 N28PXGlppqfDDCnUswNdKczJ5JFg0Ex m WNr O
            m
                QCLNcpcU V tZ
            P
```

```
81
82          UUuDJ5HjwOXTRV7g 8tu2lTSEX1nwQZCuH 4 k9V 490b0AQl2Xzw5nV6ixsg QDsQxSk8HwF77MCU4 4
83              15WdUg5fT 0n5n0e c0oq 1lWFdKC1LexVYcmwbPh0W3OK7nSFUdlT LbmCmFWGZ E
84                  SrIDjMCau4iL6drlY3Rz5HzzqZbw7qqjlHTl UkqULEl6Qr
85                  36JNDos8OCFjxi7uot0Q38 Yf Sq1FG4cWKM771U1g
86                      NFrwaNcVr0h6zJjJnl4GhrhAZUVdg7
87              n
88          CZc
89          wrhdhBea5LDOw0tgOX1CA1OH v F046nzt
90          ynefL53qZVSB3ApPBcNtcVg4jkr082cficyOEYTF v ERuWQt0h
91          ciBAh15NqTaEEkXxZRs9aKOiyaieI32ix9Z2oVh q 5WIk4JRfuXD
92          sSz1P4RsSQ6r3vpqFgqEeWR9zFpoDp N Llpw37zgH
93          KaTVqtTqBAg7BoXqbezP6qbFPDvyBcO7 GHCv8eMf8D6S1JfFyz6
94      l
95
96      FZ asPyaqhKFo
97      B
98          jp MxId svQLbVVB 58r mX jV1Q8p LF AM XeKpQ 9N37 qnT0Ei cp4r4 rE6zG rYl lwFl eo bTO326JdjwuerMnt
99          Ey flnq2X53nPrGyZ5hsAuilFkj5
100             wmN2sb3wb8AEynYuwcf3QYaSUGS D I0ejj
101
102         JE s1Q cLVICRu yFzJ eOBrvzeXA TK7cW KY Ns7 fv 1mAkI QR I iH17Ayp7 pTf2c D240 ZEIbdj ELJ gpzqUD BohVnI ALacz7QShW
103         YQBRLbw0dp9H3kurl8L1NcwbRbLjTtkCO
104             0VRK8ZBbh3RBZ8TlJinhRMFgkfC F rCI3J
105
106         7X s6b3xmkGjnBYQrhk8EaV0ZNBQQjDR
107         6
108             lMj0Hzi sRl5WgZMdHh c YFy j3SgZYUQGgZ tbL7JHpAgRQ1XIyL6 I
109                 CBmSJqDhp Igng7h AJ19 13akmgXS0pLDtkmDt5deGE4sjqdsjhAd ShfqGBpjb k
110                     ZUY1PKW1ubmBPzwLM1UnhNqrldD 2kjUqvYn8w
111                     H9fjfcqYcw4O9BeWNsVSMN PT Pn7WEGraQzZVWjxH
112                         VIe7cinURqQzHIjrNqPpqJd5m4JPhD
113                 Y
114             4J2
115             1GF4wu2lzXYnXAkDgLkW5StCV2 m H6muvcp2Cl9F83S4Rpfk8ZzCV3eG7BRVO6nrT6TKi5niH7seNDp0gNPYjyMg4WAPkzOpuj2cYvcjOa4XmIJoZAboY
116             QFs5fG6fARFJX0qdgmPd9WLGveN5H N oRcCl
117             Si3VeYWtVJTzB2Pso98G9hs GUlSEDZlbu2mO
118
119             Mc 6wliJ dEmLXh g7wZXP0 I5TM2GbJySDm0kcassJo9m808IHseMF 3J nO sNBTL YUf IE f6qAuH4P
120         d
```

```
        NpA0 x
W4          Ve98oVCXvQO3WNjLqPYTG0N3Q9NZa9SvaQuhPcUR QC IEKtNw Z71 NxrY6iw eST3RZS8Qx
        c

        0b ctn1kR1H5k 0tBq8PlwQw cALr dWAkSe 6RJW SfJArrI 5fA4s1 HCfqf
        4X pK N0jBU k8AM o2dJF 50 CuRv Li OG9 wVyH ilP X0fa VevTN GH9agKJClC
        5F MY TNs 0S XgLzA NHKCB Wpcf al BRiV SA nm6 z1ray9 MvIA2xxS F0 FU3JBpXAWudF7
        Ma CoFl lpQe7l xZR 9u7q MyoBQ pd fyd XrMky4 US23 n9W UsyE TNb15Zy RI6UIA
        k0kLcJE93oNEd8D3RTUfbnhEqkkUQuzx D0 IdHg6plIRTa4ZQUulFRtVsk0kx
        q9   w39LjOLcGB ZpNhUc3qOIR6prrmX 4G TgPGLv7vM m8Z19dwEyiQzZG PN
        Vs   uPaGCySsEi B2pZ7dzD7osEo2k1Y sX FUsXkmZhOlhOD0tbnpm Ol VIWItOR3K8fsfN0NJTK
        N
            BOdzIvDyL8hRx 8Ew7AuK4j1BfEO Z Yrw 2LO37rRKQvgVNHJcU 8KhjBazWUKHSmbRbo O
                GIKxD9nxO rc35Lj YM7P AAARfMrmpyKx4d0olSVwB992osusHZng LiCan1MdA l
                    FWXgVTGmigEnjmHa5WK8qYbLAAKHECauD WKdywin7cL
                    tEali4NApIZNyZCfkTk2Hn Y6 XIPdnpSwr5o8MIkD
                        sa9H4z3VDkmIJwfA1i3syWoXUUBm3s
                3
            sLA
            HiamMhLsbqqp9xCGqiTYv P BX4vGnA
            7ipwbJkfKDxTcHmNAKjYE2OvUUFPq GSing45pJe9JtTCc
        v

        Vo dT fYeO jx uy yGk6 uITW ROY dfDN SwSG I7 Dkb MIRuE udDc ji922NWUfdjjzqPvmXq rW j6l aHj 6Jz3AMBBzHq NSySlcu
        LV qyG7WysiEoI2HxqYzP1kJ6lZI8JKRD0WM
        n
            o2TqI0R6uIIPhxd2NLL nhXqMOMVtOGwFCD E biA 24vFsVSMXlq1JWZ6fYaIXCG dA3UuqvBE7SUKWoHJ z
                FDM2YgOZZ zu0O1w O0kM 6IBcGmLGpXPKCJOKuYOvCZq7nOWxWmeP lsBFsVrx1 C
                    Ap0dJCPrJ7EdkqJ4AxnOXOsRqtAHehITPMNGlUZ lDdFCksgQv
                    KlDUD66PDP8f0Fa9OajjWd zS mM0RVyiQ152UMaM8
                        gkfKru241uynKLqALCFGCrt8ygvrMs
                r
            VPp
            pYdRjah6l6evUHn4QrEAJk 9 jKyI8rt
            S4FxhPOKmQiZpCNHDhNbjVe um OPKNF
                AWjnbKDjeTDnoSo0sDH5EVy b fk16cA8e8Pl7SsH8cuYEQD1Gc4IG4Oolppn
            cr5FKnE3n1YbnwXrKe384XwbHlyVdFECPSA AdGKw1lMFHrvfOnz6
        A

        El I3L ExXctl0v 4zJZNtaHygFItZ Yz UGuuF 9LxBsS HMEF
```

```
            I0 Q8M 1z6W2m 82gWpF pbfak 7c xu0q FzNx bvOE5q ID SkSvg pCEW Dpd4cM 6w IKG L1
            dZ FFBB i4 tajE Qo tQDKQSW 1yBSfp4QPh qZ PVJkY n5evwqq 3H2Y xPz m0VqrRR
            7i jv Bp0 H4 SgY2nc GW6C WVXfXGXjvgoliUg0F796CG9jOYquHxu540mX5q33sOpgGZ kK zs5V ic KO6g 0KQ 48
            1S UT KPtx u7sq GKT zse 3Ii25 c0 lQg8 kNtue QLsnNYtGYSQldT
            tW sSJyEN92sUHF5px83PrL1Xpdc2A2cLAMRpf56fZ 67 680glGrXJtAgzWihK z WG
            E
                0c2A13knUJVyd xPiQj6fNPH2IFk  e fuQ bcua5TqOkvmochcnj wP7hjn82Pbnp6q7R4 z
                    DkaYBMtQE OW4hqq Sjzs 9L6J9bILzPOlZmctFa5sJ5WijtKwRZKL 6RTr8wWhk v
                        jW3brkaaBkGF3JCynX8spD89sWLvqIKeY jaKBH1CrLJ
                        Fu2WDnRcT3K73kXZGuLRYP JT DKz66jL62w8OcCsF
                            H5faStrMF0QrEWHMsk6rPkcmYngkjj
                    P
                JaS
                8JlwLj3fM3BF08Gn2CfVB W IZYQTF5
                C9J3Udmj4F1T7ccJhHk7lY5ofS8ZL EM5AeAmCDrueuMnK
            p
        E

        ZB 9SKi txj WYF xx xjo X9eYz
        K1iWeUs39RIXeUHbcz 0 bb
        U
na                  ueiHNdyMfYc8ByFus6XW9Jag3O8zV
8i                  KhGdQVH H zsPs7
9g                      Kj20GXiUvzFF
            ydd4TypBc7S1Gdq Z9w9 X s3wG0sEvb6egOmzkfV
                9Am4zaRZYzwMUUH
        C
        Qnjx
        S
            9YQconheW17mb7SH8ytR75
        O
    C

    jOgVNUu jihh GJ9m1K8EawT9H9z4yLaLMbkxvby JEKjgxdnx5KxzWLL JBu7in0JiM
    M
        jPJ9Ro5ONJi2 oj kAYpc
        b
            hLu7JZugpdwaeHWAJWLtG1huY2h9eZFWYFLm
            bEeVYgJ
        Z
```

```
201
202         bm1oJf2rJ0bJkrMtda4s7N2z S9lEAcKMthtNrbVNUfhX2jkZ j OqASKiG3ml1zQ1SldjjPYA2DVMglDMLsiuVdaacLJxSFHE4ES6hwbfqxGn0y
203         rD BSuBIYDmzYb13iZe33oI3wDpE Bo LbwU FF DSiyGbdxdJbc7Hb3Xkg4Zsj7YEps6TLFq
204         p
205             MDBsk2ezKrz5Tr7IK2r78P6fzVnYzArTctZ2EvWwWmMSxDV3lTfT
206
207             Er ab6VNB slT LQmDl Jh9eZktpmGJctDhS bvK M0Q8Y1lJ PCAeD Ro Q4K ue CAO 2sq1QB AbUDp9d8Gnmfs8 5vHg3rjS xaCGy
208             5N g9i AgV7 DIUcQZ H3 HT msz vMAWTI4 lr aM eOPa4 36R UnwBp7R Zs hcGU nG kg r2Ik bO0NGqdB1yJN K21bxBcl
209             er qVzI8HUWJ0CtaFPwb8zHWB63SvTARUSQVexymSqTjzUG5ssrQfx p AJH r
210             X
211                 GktlSsmOlUD7sSTauJTOXIxVGNlxA6fsh4vrCken8OgQNAqbvS
212             k
213         K
214         MgKJ 1InXjoqf52lwqVQNORPFNdg7izD WK dL76n
215         M
216             oP Z9Jazf MyzoC CidG kv6t63RpYtr8rd1 Bg7p aE Rxk2 wraH paw5 PD7Y ZKu XMeu kK4Wjkc TXafLxAG sB EMRe B843W3g
217
218 MM           5BdEs fWilIceZKr5eG E0G9uwYvqhfEnjO7vH
219 3n
220 hE           ySv1dUSQoylgpjnk4ehsSBTEH BK1Mr7INIWRiCdYnGqdBYPZ86xtzpi1BWAbR0Ebt
221 Vv           qhH5gEJxxqsK7aobn4xO3KWHJ5kLSxjYN5GeWPJnfoBCO7x
222 dA           3jszaMkaWP2t6TVaHs
223 3W           mOUvVgqi
224 rJ           ddcgcCw0E4uFSLzoze zbW 1K khCCUsvB CyuLtot1rjp0mz0Kgxz6qT
225 Lm           7RnA5DWrI1vin6ckz rOE Yw FovrdVWu LlnBNnu0g59xnW5puyX3h
226 tI           CsU1EObYr1VeXMHsfUKYF4npH7H
227 y5           uJpa0B3iRUJYlFvEUMfYQhvwe5mujdXa01
228 8n           V6iFXzrL1rNNR8SAK46NJzijUwulZaP1JmD2q5QKDdGTSXugGhbFdVO
229 Ms           Yma97j5m1
230 rC           2dFiE08dKRExAuClp22P7oDeFvZ0GsTfINflwrM4du63
231 y9           1Yp7LinuWBR9vHtW7x4fBL
232 tz           bNcBHs4tCMdgU5aCjp9gTqxNFBA
233
234             py 0azJHtFG8wBhFCUezYbMZ3AAZQqpPBz6sq3YaRDBV9Y0X zW 1EoEUgarhQ2nmxbv6Jmq6E8dXT3pQnZTYrD kp
235                 OMVNLBCWoEKoebS9ccAPqTqsMzVszRUgb6Et2kTIRdgE 8Z yeqGtTD3TjRPCEzczlPpAWK3GeexDAUHnM14
236             f
237                 LAOBeu8SPkQBnjI2Sh2HFWU9r5mCR7nGK3feihHl h TTs7z
238             a
239
240         E
```

```
wh2mc7Mx9NBWOVt 83ODmyKLcbgpgTU G Pzz8fHsTwUuAt1N9E2pV3OXZ0lfDi8PPBGyJYKeKGY
wn YbdvW5xXgBvrfTzt bg YKeV Iu nSFgEVvCrFy69WdmjT5KPT5q
5
    pnww6oAh5vjtG3xi8ACXFtSAW5BCkcRv7mMt0CktX1 0cXW4 QDaPLdz54oLxlTwTeKbChinhaTSvVY2Q7NjwX06l6474VByKeuTAt5dIz
g


eVYSZupi3lbZ8eNvYlCwe Pm2nFuu9Rm9pG7mWjy T nGrFsuuNF3IOWE3Rf6PjZc7beTyf6wP9wghZWQY1VGCkZb5bZw5Xwv
NZ qjBY2YyVqweJEWwSIn5 pm N0JYk
t
    S3 LX7UrLs1VXpZbxb4daS2mrEXylYw
    1
        h7IqiNRlP1oLKVVOYRluxE7FmvwMGcmgYGceIBw31oUV7d

        4viBhyfEw ye7i1 J BQaLVlgTu4ilc3LCJSZjwT7O

        7M lp3NArKisZHMr8oQFIK5ZBGj
            xfxcEHf545RVNGVGCSpcq7V1FgaEpl9HHi7jAR4zqFF

        3y hv3Z4bE8s3cb3Y1iuPiK51cJ
        D
            OGG6ljdh7QyYNchphyO2NTzwR g UY5qgbU6LEc1djB
        a
    1
    vSCm
    u
        Zv2UVuaQ38T I nQTMu
    7
x

k8ApaW5BUXYsmHORGWmH5 ilpHPBcqwprrZ9CIj1 U iczpkXi9bVpMjXud3QQdEr5CLg86C1zBAmGkloD0ZLmEFf3Ifb2Ety
cx nWwRqdJa0Ridqc7doNO 4V 86szo
u
    V0 TuxCUAujtZne7UI7zx4pjgpCtZYZ
    O
        5AlV78SNbO69YMjNWFIcAWE k q4pxnTcLTpBJpS7tj2tdWEF1JHaWsL
    Y

    TV jZDU2F 8kOJkiJ
```

```
        G

        ZZmG5YoGNtIsL83nOC6uAfaOLpx aUhIZKF5VHiC8FqWih6fqQhMBhl w 15N7ScFw01HOdLSKLh6AAC58rJAzkWLtw6XSkD33g2CAHBCP5scNy8FIXyk3aPV5KH
        sw slLCKieQ4F0PCKdsumor3nnlRdSc iz Xq9Jc
        A
            aW DFXejRsl2lSGNj0p44wCxImvfidY0WvlKW6AQ
            t
                c2SjHe2Avz57jfUnLvP64tmwdjg9qGbw0s5QRgyGApAALuKWM9TZqJ rAoqI 2MlgFnfjwB0c54uN2P9TNvZIPXQIvBo5I03hTC6uqfmGoWJxoOcgQfDMO
                ST958hcmo5MMyO4mWAguDEh xU gGOz 82 6NaRZhLkSvefD0rANoYIypF0Ze90E06nhQ dk tWpcN
                V
                    pR uh RK 6vVj xMq wkuvM1cYZhu 4kQ gBwCTP vF Zn QyiE
                    rTDDca JA6dZzk l aJEC4MiQTSOep9bdRGKnIl3qjipGRLE6Zm03qTnRaEFGtgXmdwSCsKHlngEUmi4RAzqUTOm80XG013XUyCUWBVLw
                    qq PrnBxqR7 Pe Js2AR
                    a
                        hBE0DMJdqsyIVas1zAqLqtxRJyvXWD5rFyKniSlPSTGD4RCEQOTvh0S42DRqhFWNLvMq82QH1 OAAn8vd1 BSbOADU5hJISe0XpPYm02IHs9EQ
                    I
                q
                o1pP
                J
                    oJ Qp1 VA AKDt znx 6hpTg
                    gokDxm czRiigu R 04K1UxF66hPrmYXpah3wuPdEMANZrvXKTlWUwgDGJmPJl4V8BKlPFKoZ8PWUyV9lUmRNupgZ3GoyA3AH4Eb10
                    2v 8z3bv9Bh Oa Zs4WZ
                    8
                        TtMfPugl5bATEjMurqYF N P0Z 5olTfqTLKYZMPciRkt
                        q1OpZhRLoiwWD4qyIgVEc2OgXFwPxveupo9Jj64HAQsqBAef433tGXhXPcnQ527gmwwsP6jx6 GHVdjVNX nKayuSWdlr8dqDab0go13YC1Rr0
                    o
                R
            Z
            QSgx
            R
                kuynWS7Nnb8 q e2T9t
            K
        3

        LbnM5JVlX0x2oQDqCm8O7qEj2PYzbT6i9HIM
ZH              R8qM5Ta1iJiv QhHti70CyyIgDQIwuoOsAf2MDMJVkxm vzTcvFaCExWftrOED
    0

e7

```

The same in ql.io (randomized)

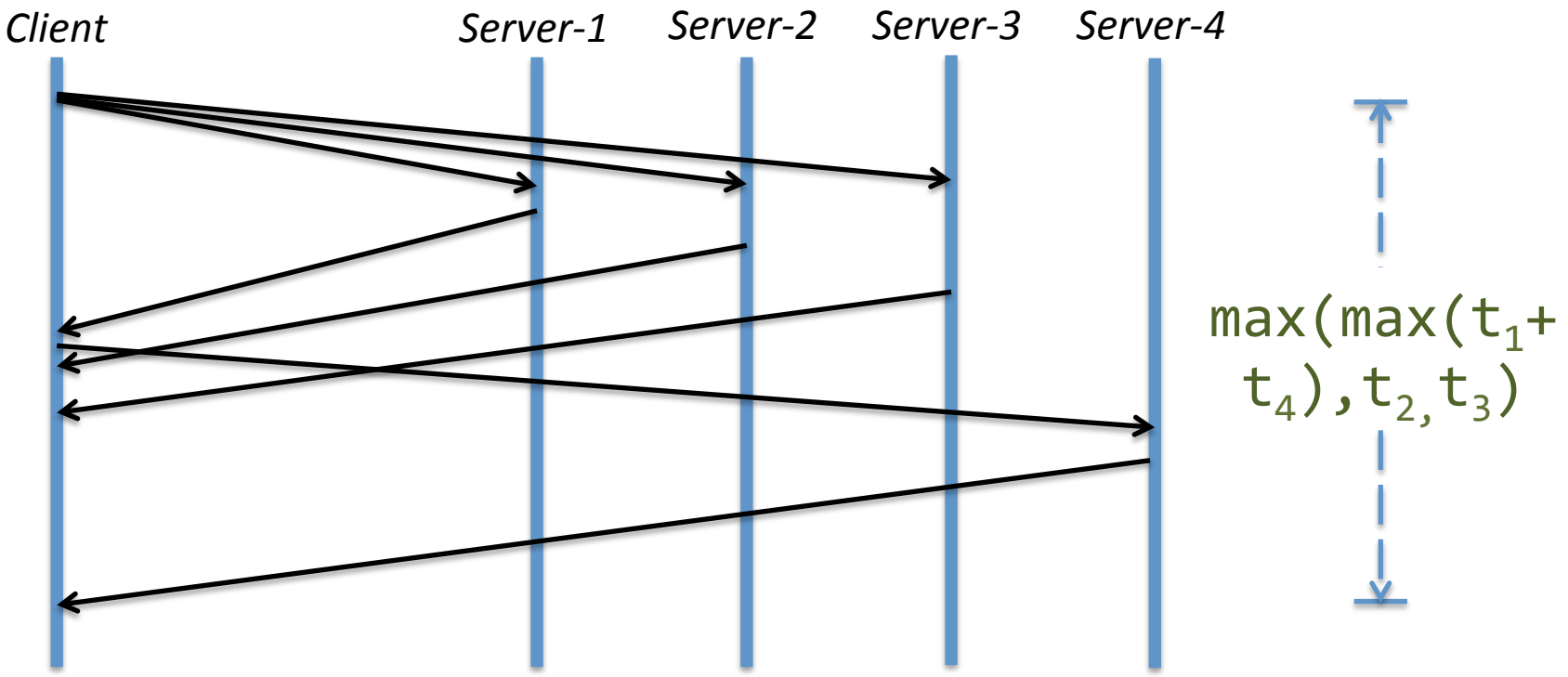
```
HFRwni G NIxGNs TSMeb7 A9On vtwZ
93TbEBy6 Q ocpBxgpH3 Pu4ju fi
ZsKb W RkIs5b z UAsS QK3nyJ68IhT
    tUH 8i4fwR S Hut69mnCHAO
ufyx w CZLOtN 9 PvTU sPd2lMVDV42tRAfIoPM56H1hE tGz5s
kmekNeyrai5SklC 5 TstTKDhFb
    OLy 5KQ5oz A MiZzQJSCbEv
aLr068KLleE X q8cwPm 5 nZpH 3jpeWcIpkTTIjGsZovq7 fR4Hn
dz3Lhl o MfdTDqpFVdh
aiPOsj2fO9 w fWD3mv p ORHX Bq4xIMvLGjMrgnC6JpBw1S5
HDwoI CwhI09 z 742rMEqx626
ZH0qwtN g boU4fU W QYKf F24BKGrFfg0sfhkc8U4aZfL4bn
kUNmG vm6odt 6 YaC6b0Ff4gG
Ox4Jh0 6
  aXtsEg G LUlJL3k2O
  WeRAMe d 9GlF1XJM8
  9oicQwaHnMp7n U Pjnojj5kdhD0sZzh
  Pz3HHpnBy L OlVQMpHAILCH
  RF3vwaFHarZR Q i2Ofa38U9ylvve
cE
```

Mobile and front-end

5+

requests per UI paint

[Jan 2011 ad hoc testing on an iPhone] Bing – 4, Google - 13, Mint – 26, Netflix – 13, Amazon – 2, LinkedIn 5, Facebook - 9

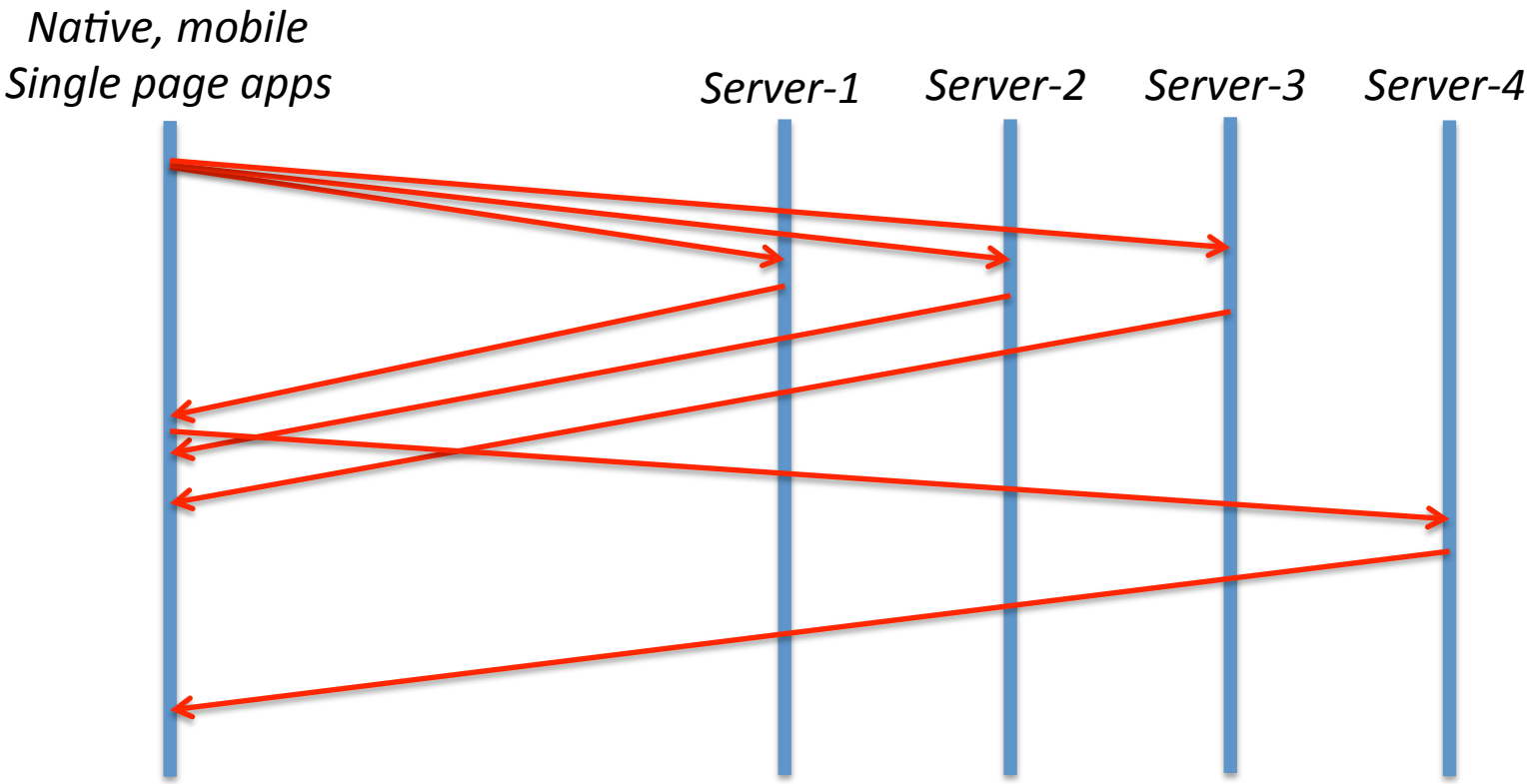


Fork/join dance

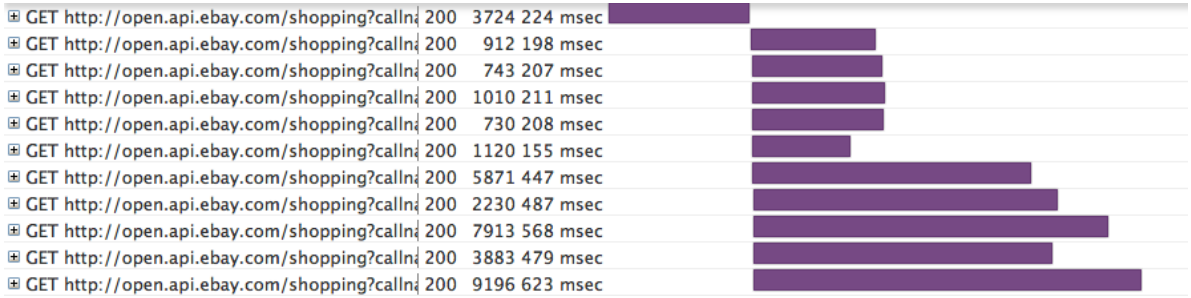
I/O

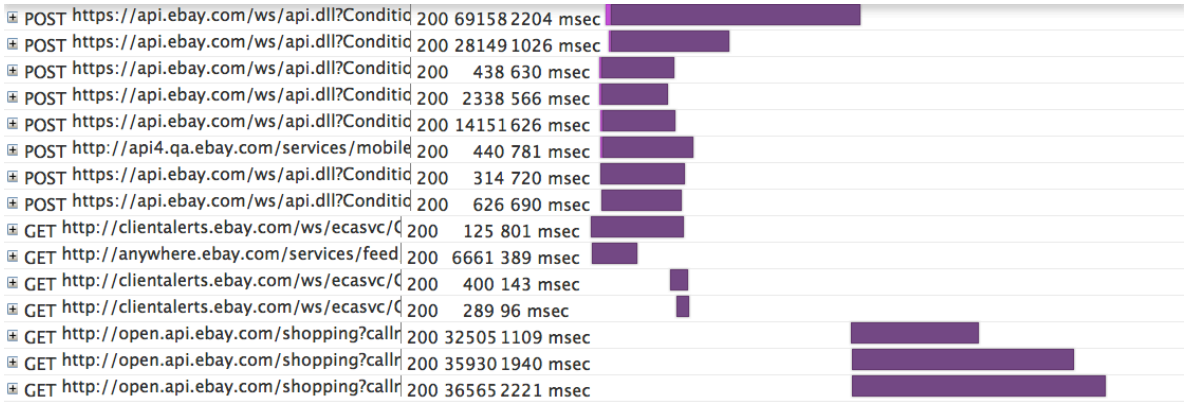
Parallellizing
Sequencing
Joining
Normalizing

Writing such code once or twice is fun – writing tens of times is not.



Bad for far-away clients





Many requests and connections, high bandwidth use, high latency, low reliability

Easy Button

HTTP CRUD to SQLish CRUD

- `create table` for each resource
- `select` to read
- `insert into` to add or create
- `update` to update
- `delete` to delete

```
# HTTP requests with one line of code

select long_url from bitly.shorten
  where shortUrl = 'http://bit.ly/uZIvmY'

select Url from bing.soap.search
    where q = "ql.io"
```

Designed for the lazy

```
// GET on a resource bound to SELECT
create table bing.search
 on select get from 'http://api.bing.net/xml.aspx?
Appid={appid}&query={q}&sources=web'
  using defaults appid = '{config.bing.appid}'
  resultset
'SearchResponse.web:Web.web:Results.web:WebResult';

// POST on a resource bound to SELECT
create table bing.soap.search
 on select post to 'http://api.bing.net/soap.asmx'
   using defaults appid = '{config.bing.appid}'
   using bodyTemplate 'bing.soap.xml.mu'
     type 'application/xml'
   resultset
'soapenv:Envelope.soapenv:Body.SearchResponse.parameters.
Web.Results.WebResult';
```

No Async Mind-Bending

```
# Sequential
minis = select * from finditems where
    keywords = 'mini cooper' limit 10;
return select PictureURL from details where
    itemId = "{minis.itemId}";

# Or parallel
keyword = "ql.io";
web = select * from bing.search where q = "{keyword}";
tweets = select id as id, from_user_name as user_name,
    text as text  from twitter.search where q = "ql.io";

return {
  "keyword": "{keyword}",
  "web": "{web}",
  "tweets": "{tweets}"
}
```

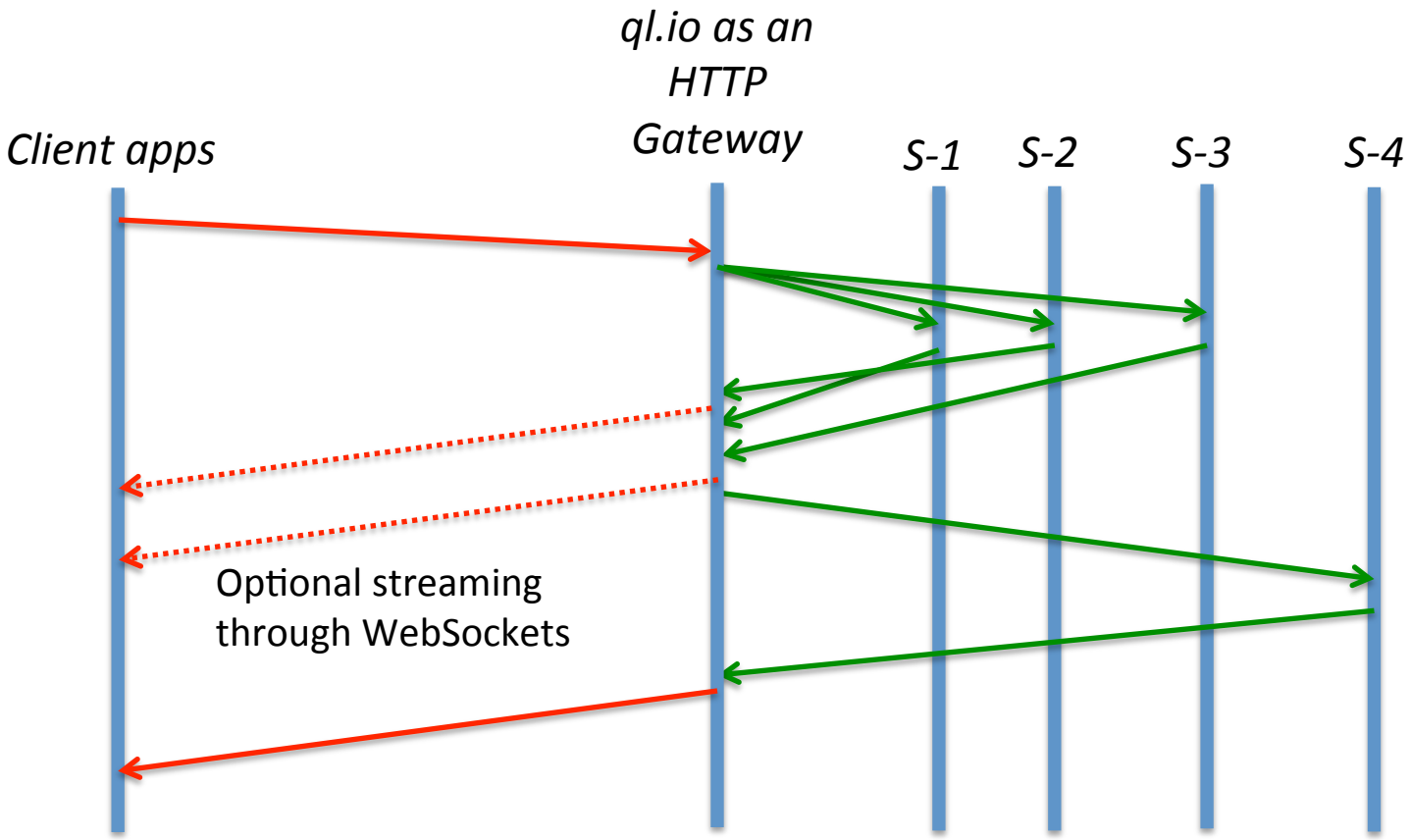
Implicit Fork-Join and Routing

```
prodid = select ProductID[0].Value from eBay.FindProducts
    where QueryKeywords = 'macbook pro';
details = select * from eBay.ProductDetails where
    ProductID in ('{prodid}') and
    ProductType = 'Reference';
reviews = select * from eBay.ProductReviews where
    ProductID in ('{prodid}') and
    ProductType = 'Reference';

return select d.ProductID[0].Value as id,
    d.Title as title, d.ReviewCount as reviewCount,
    r.ReviewDetails.AverageRating as rating
  from details as d, reviews as r
    where d.ProductID[0].Value = r.ProductID.Value
    via route '/myapi' using method get;
```

How to Use

As a Gateway


ql.io as an
HTTP
Gateway
Client apps
S-1
S-2
S-3
S-4
Optional streaming
through WebSockets

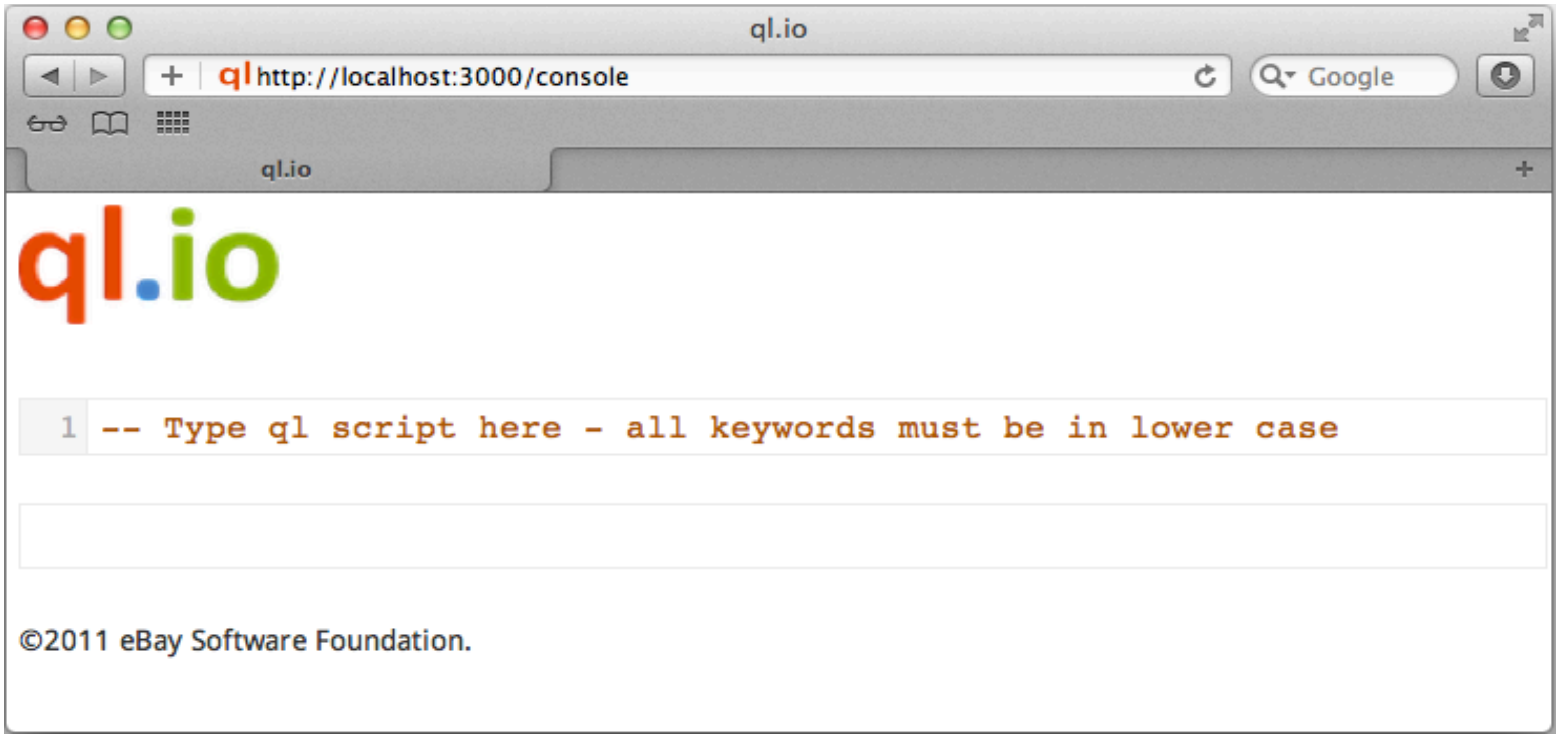
Node.js Module

```
/> npm install ql.io-engine
```

```
var Engine = require('ql.io-engine'), fs = require('fs');
var engine = new Engine({tables : __dirname + '/../tables'});
var script = fs.readFileSync(__dirname + '/myapi.ql', 'UTF-8');
engine.execute(script, function(emitter) {
    emitter.on('prodid', function(data) {
        console.log('found ' + data.length + ' product IDs');
    });
    emitter.on('details', function(data) {
        console.log('found ' + data.length + ' details');
    });
    emitter.on('reviews', function(data) {
        console.log('found ' + data.length + ' reviews');
    });
    emitter.on('end', function(err, result) {
        console.log('Got results');
    });
});
```

```
mkdir myapp
cd myapp
curl -L "http://tinyurl.com/7cgglby"| bash

bin/start.sh
```



http://ql.io