DNS Advancing the Network
where we’ve been
where we’re headed

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Where We’ve Been

Early days
DNS globally adopted as a network protocol to distribute naming authority to every organization

Over time
Make it scale and do new things

Today
Need new paradigms for security, content distribution, machine to machine, etc.

DNS has always prized the ability to evolve; Do IPv6 and DNSSEC have useful “DNA” for Internet evolution?
Significant Shifts

IP address “explosion” adds to the volume of data

• Roughly 4 billion IPv4 addresses used

• IPv6 allows $3.4 \times 10^{38}$ more addresses

“Happy eyeballs” – Optimize the user experience, not network traffic

![IPv4 address utilization: 2000 vs. 2010](image)

Different objectives $=\quad$ Exponentially More DNS queries
Much Bigger Data

<table>
<thead>
<tr>
<th>Event</th>
<th># per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Twitter “tweets”</td>
<td>400 million</td>
</tr>
<tr>
<td>Facebook “likes”</td>
<td>2.7 billion</td>
</tr>
<tr>
<td>Google searches</td>
<td>3.3 billion</td>
</tr>
<tr>
<td>Nominum DNS queries</td>
<td>1.1 trillion</td>
</tr>
</tbody>
</table>

Events Processed Daily
(In billions)
What to Look For

Machine to Machine (M2M)

Clean Slate Research Network

Better Data Analytics

Connected Home
Naming is everywhere;
DNS is evolving