Peer to Peer:

Ray's New Groove

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Introductions & agenda

- Groove Networks
  - More info later

- Hugh Pyle
  - CEO, Cabezal Ltd

- Changing Assumptions
- Peer-to-Peer
- Groove

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Changing Assumptions

Assumptions (1)

- Processing power, storage and bandwidth all keep growing
  - Moore's Law
  - Storage grows even faster
  - Bandwidth grows, but in big leaps (capital expense)

- Connectivity
  - Dialup, ISDN, DSL, Cable, 802.11b, T1, T3, STS-3, OC-12, ...
    - At least 3 orders of magnitude difference in regular use
  - Previously "mostly disconnected"
  - Now "mostly connected"
  - Offline capability is still important

- But extreme interactivity will always be difficult
  - The latency problem remains

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Latency: the universal constant

```
>ping rtfm.mit.edu

(1991)
Pinging 18.181.0.29 with 32 bytes of data:
Reply from 18.181.0.29: bytes=32 time=120ms TTL=230
Reply from 18.181.0.29: bytes=32 time=120ms TTL=230
Reply from 18.181.0.29: bytes=32 time=120ms TTL=230
Reply from 18.181.0.29: bytes=32 time=120ms TTL=230

(2001)
Pinging 18.181.0.29 with 32 bytes of data:
Reply from 18.181.0.29: bytes=32 time=120ms TTL=230
Reply from 18.181.0.29: bytes=32 time=120ms TTL=230
Reply from 18.181.0.29: bytes=32 time=120ms TTL=230
Reply from 18.181.0.29: bytes=32 time=120ms TTL=230
```

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Assumptions (2)

- Firewalls are here to stay, but they get in the way of real work
- The network is fundamentally broken
    - My IP address changes daily
    - Your IP address changes daily
    - I can't ping you, or vice versa
    - Proxies even change the network protocol on the way through
    - WAP, 3G, walled gardens

- This was not always the case
- IPv6 won't fix it any time soon
- Napster fixed parts of it, though
    - Another addressing scheme, not DNS
    - Cross-firewall traffic
    - Client = Server

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Assumptions (3)

- Centralised systems are capital expenditure

    - Change is slow
    - Change is expensive

- Personal systems (at the "edge" of the network) are not

    - Cheaper
    - More disposable
    - Therefore more "churn"
        - = more innovation, flexibility, growth

- Multiple users per device; multiple devices per user

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Assumptions (4)

- Network "option value"
    - Broadcast
        - How many potential receivers? ("Sarnoff's Law")
        - **$O(N)$**
    - Point-to-Point
        - How many potential 1-on-1 conversations? ("Metcalfe's Law")
        - **$O(N^2)$**
    - Grouping
        - How many potential groups? ("Reed's Law")
        - **$O(2^N)$**

- Of course not all these options are exercised
    - But the network value = the option value

- Group-forming-networks become the dominant value form with increasing numbers N

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Implications for long-term platforms

- Latency and network unpredictability
  - Asynchronous comms (message queues) not synchronous (RPCs)

- Offline use
  - Local data, distributed databases, synchronisation

- Evolvability
  - Component architectures not layered architectures

- Asymmetry
  - Universal resource identifiers, protocol flexibility, public rendezvous points

- Friction vs. Option Value
  - Open standards, low "connectivity friction"

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Groove

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Groove

- Groove Networks Inc
  - 1997: Ray Ozzie & others. Beverly, MA
  - Private and VC funding
    - Intel $10m
    - Microsoft $51m
  - 200+ employees
  - International office (Borehamwood, UK)

- Business model
  - Preview software $0
  - Enterprise software license $49 + $96/year
  - Enterprise "bot server" license $xxxx
  - SME licensing to be announced very soon

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Other opinions

Ray has a history of building breakthrough applications. With Groove, he and his team have built a deep and innovative application that is a great example of where the Internet is going.

Bill Gates

As the first major application platform to aggressively exploit the possibilities of peer-to-peer networking, Groove… is a potentially revolutionary technology.

Tom Austin, Gartner Group

Groove is important not because its success is assured, but because it marks an inflection point in the collaboration market evolution.

Matt Cain, Meta Group
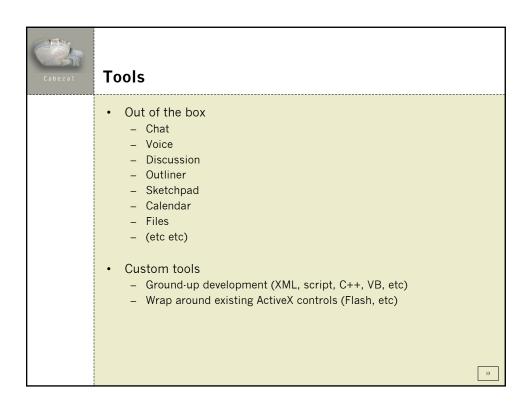
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Groove Transceiver

- Transceiver = "send and receive"
  - This is not (primarily) a broadcast mechanism

- Contacts
  - Awareness
  - Instant messaging

- Shared Spaces
  - Activities
  - Tools
  - (Roles and permissions)

- Ubiquitous synchronisation – contacts, spaces
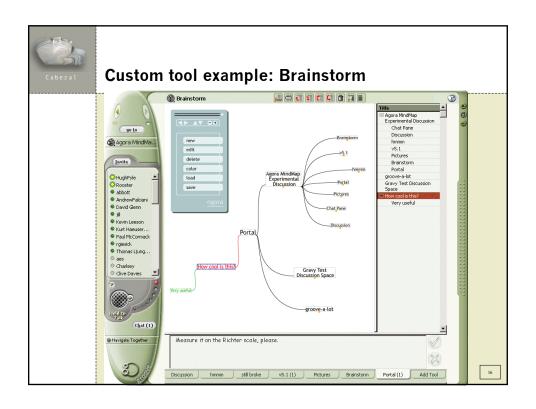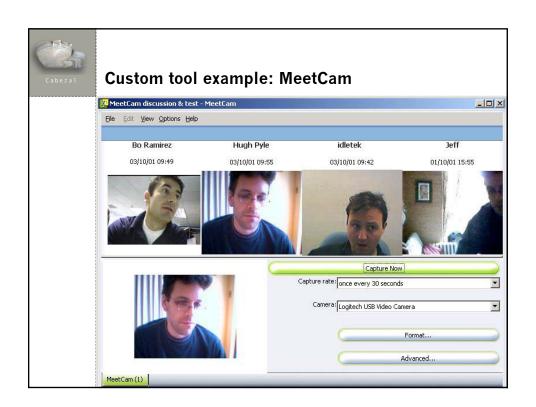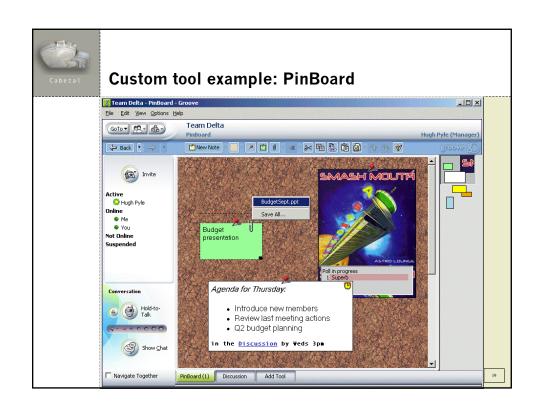- Very consistent

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Security

- Personal trust model
- X·509 identities from corporate structure
- "Directory" is <u>not</u> in the security model

- Extremely strong encryption
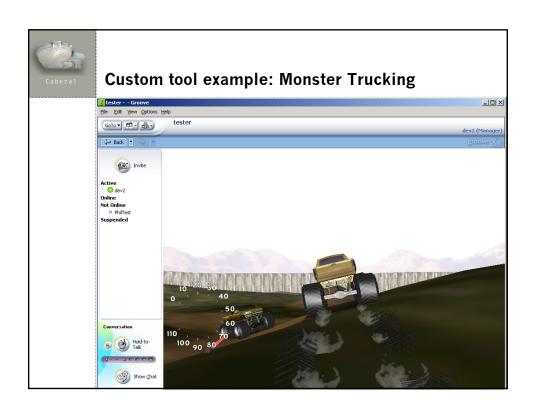 - On disk
  - On the wire

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Tools

- Out of the box
  - Chat
  - Voice
  - Discussion
  - Outliner
  - Sketchpad
  - Calendar
  - Files
  - (etc etc)

- Custom tools
  - Ground-up development (XML, script, C++, VB, etc)
  - Wrap around existing ActiveX controls (Flash, etc)

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Custom tool example: Brainstorm

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Custom tool example: News

Custom tool example: MeetCam

Custom tool example: PinBoard

Custom tool example: Monster Trucking

Bots and Integration

- Integration from each endpoint
  - Local integration (Palm synch, etc)
  - Central integration: Web services (HTTP, XML, SOAP)

- Integration from a single endpoint
  - "Deep" integration possible
  - Bot Server = scalable platform for dedicated integration endpoints

- Technologies: XML, HTTP, SOAP, COM, ODBC, (etc etc)
- Capabilities: complete Groove transaction access
  - Eg. catch any transaction → search center → return results
  - Eg. synchronise Groove discussion with Notes/Domino
  - Eg. publish from Groove to Web server

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Applications

- Coordination between tools, central systems, business processes

- Design point 1: get together to do stuff

  - Low-friction collaboration
  - Intensive work
  - Out-of-the-box tools

- Design point 2: extend process across traditional boundaries

  - The richness of a portal (and more), but as accessible as phone or email
  - Start with out-of-the-box tools
  - Integrate into process: "bootstrap" or "bot"

- Low risk infrastructure: little IT impact, positive benefits to integration

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Application examples

- Partner relationship management

- HR performance review

- Competitive intelligence response

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"so far, a head"

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