INNOVATIONS for the CONTENT WAVE
Welcome

Tony Takazawa
Director, Global Investor Relations
This presentation contains "forward-looking statements" as defined under the Federal Securities Laws. Actual results could differ materially from those projected in the forward-looking statements as a result of certain risk factors, including but not limited to: (i) further adverse changes in general economic conditions; (ii) further delays or reductions in information technology spending; (iii) the company’s ability to effectively manage operating costs and increase operating efficiencies; (iv) further declines in revenues; (v) insufficient, excess or obsolete inventory; (vi) competitive factors, including but not limited to pricing pressures; (vii) component quality and availability; (viii) rapid technological and market change and the transition to new products; (ix) the uncertainty of customer acceptance of new products; (x) the relative and varying rates of product price and component cost declines; (xi) the effects of war or acts of terrorism, including the effect on the economy generally, on particular industry segments, on transportation and communication systems and on the company’s ability to manage logistics in such an environment, including receipt of components and distribution of products; (xii) the ability to attract and retain highly qualified employees; (xiii) the uneven pattern of quarterly sales; (xiv) fluctuating currency exchange rates; (xv) risks associated with strategic investments and acquisitions; (xvi) the Company’s ability to execute on its plans; and (xvii) other one-time events and other important factors disclosed previously and from time to time in EMC’s filings with the U.S. Securities and Exchange Commission.
INNOVATIONS for the CONTENT WAVE
Agenda

Joe Tucci, President and CEO
  – Innovations for the Content Wave
Jim Rothnie, Senior Vice President and CTO
  – Centera Explained
Joe Tucci
  – The Centera Opportunity
Questions and Answers
Partner Reception
Delivering the Unexpected

Joe Tucci
New Storage Challenge: Petabytes of Content

Information Technology Waves

Source: David Moschella, Waves of Power, and EMC.
## What is Fixed Content?

**Unchanging Data Objects With Long-Term Value**

<table>
<thead>
<tr>
<th>X-rays</th>
<th>MRIs</th>
<th>CAT scans</th>
<th>Blueprints</th>
<th>Insurance photos</th>
<th>Contracts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Letters</td>
<td>Newspapers</td>
<td>Periodicals</td>
<td>Books</td>
<td>Marketing collateral</td>
<td>Check images</td>
</tr>
<tr>
<td>MP3s</td>
<td>Movies</td>
<td>Recordings</td>
<td>Transcripts</td>
<td>Professional photos</td>
<td>Consumer photos</td>
</tr>
<tr>
<td>Educational videos</td>
<td>Surveillance videos</td>
<td>Seismic data</td>
<td>Astronomic data</td>
<td>Spreadsheets</td>
<td>Graphics</td>
</tr>
<tr>
<td>Source code</td>
<td>Training materials</td>
<td>Manuals</td>
<td>Genomic data</td>
<td>Proteomic data</td>
<td>Clinical trial results</td>
</tr>
<tr>
<td>Biometric data</td>
<td>Lab notebooks</td>
<td>Backups</td>
<td>Historical documents</td>
<td>Presentations</td>
<td>Monthly reports</td>
</tr>
<tr>
<td>Video conferences</td>
<td>Audio conferences</td>
<td>News clips</td>
<td>Sports videos</td>
<td>Government records</td>
<td>etc., etc., etc.</td>
</tr>
</tbody>
</table>
Introducing...

New Storage Technology for Fixed Content

CENTERA
Centera™ Explained

Jim Rothnie
Changing Data and Fixed Content

Changing Data

Account Balances

MRI in Process

Credit Card Transaction Records

Patient Record including Medical Images

In the past -- mainly stored offline

Fixed Content
Powerful Forces are Moving Fixed Content Online

Everything Going Digital

Everything Being Networked

Total Cost of Ownership
Powerful Forces are Moving Fixed Content Online

Over 50% of Online Data will be Fixed Content in 2005

‘95: $1.50/MB
‘00: $.30/MB
‘05: <$.01/MB

Total Cost of Ownership Costs Plummeting
## Storage System Requirements: Changing Data vs. Fixed Content

<table>
<thead>
<tr>
<th>Changing Data</th>
<th>Fixed Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lots of Data Objects</td>
<td>Vast Numbers of Objects</td>
</tr>
<tr>
<td>Very Active</td>
<td>Low Activity (per object):</td>
</tr>
<tr>
<td></td>
<td>very active in aggregate</td>
</tr>
<tr>
<td>Update Intensive</td>
<td>Never Update Objects</td>
</tr>
<tr>
<td></td>
<td>(often prohibited)</td>
</tr>
<tr>
<td>Often a Brief Stage (hours or days)</td>
<td>Very Long Stage of Life</td>
</tr>
<tr>
<td></td>
<td>(years or decades)</td>
</tr>
</tbody>
</table>
Storage System Requirements: Changing Data vs. Fixed Content

**Changing Data**

Key technology challenges center on performance and management

**Fixed Content**

Key technology challenges center on scale, longevity and management
New Category of Networked Information Storage: Content Addressed Storage (CAS)

- **SAN**
  - Typical Applications: OLTP, DW
  - Fixed or Updateable?: Updateable
  - Key Technology Issue: Performance
  - Type of Address: Type of Data Stored

- **NAS**
  - Typical Applications: CAD / CAM Collaboration
  - Fixed or Updateable?: Updateable
  - Key Technology Issue: Sharing updateable Files
  - Type of Address: Type of Data Stored

- **CAS**
  - Typical Applications: Content Management
  - Fixed or Updateable?: Fixed
  - Key Technology Issue: Scale, Longevity
  - Type of Address: Type of Data Stored
Introducing Centera:
New Storage Technology for Fixed Content
Introducing Centera:
New Storage Technology for Fixed Content

Key Centera Innovations:

- Content Addressing
- Stored objects
- RAIN implementation
- Distributed Content
Content Addressing in Centera

Application Server

Content address

IP connection

Data object

1011101

Centera
Content Addressing

- 128-bit digital fingerprint
- Globally unique
- Location-independent
Key Benefits of Content Addressing

**Data immutability:**
Proof the data hasn’t changed

**Duplicate elimination:**
Stores identical objects only once

**Manageability:**
Quantum improvement for massive volumes of long-lasting fixed content
Content Addressing vs. Location Addressing

App System

Location Addressing

Storage System

Complexity escalates as scale increases

Content Addressing

Content Addressing vs. Location Addressing

Complexity does not increase as scale increases
Introducing Centera: New Storage Technology for Fixed Content

Key Centera Innovations:

- Content Addressing
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Data Immutability
Duplicate Elimination
Manageability
New Category of Networked Information Storage: Content Addressed Storage (CAS)

**Typical Applications**
- **SAN**: OLTP, DW
- **NAS**: CAD / CAM Collaboration
- **CAS**: Content Management

**Fixed or Updateable?**
- **SAN**: Updateable
- **NAS**: Updateable
- **CAS**: Fixed

**Key Technology Issue**
- **SAN**: Performance
- **NAS**: Sharing updateable Files
- **CAS**: Scale, longevity

**Type of Address**
- **SAN**: Location
- **NAS**: Location
- **CAS**: Content

**Type of Data Stored**
- **SAN**: Location
- **NAS**: Location
- **CAS**: Content
Introducing Centera:
New Storage Technology for Fixed Content

Key Centera Innovations:
- Content Addressing
- Stored objects
- RAIN implementation
- Distributed Content
Centera Stores and Retrieves **Objects**
-- Not Volumes or Files

BLOB: Binary Large Object

**MRI**

Data object

XML Format
Descriptive Metadata

Content address

IP connection
New Category of Networked Information Storage: Content Addressed Storage (CAS)

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<tr>
<td>Volume</td>
<td>File</td>
<td>Object with metadata</td>
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...
Introducing Centera: New Storage Technology for Fixed Content

Key Centera Innovations:
- Content Addressing
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- RAIN implementation
- Distributed Content
Introducing Centera:
New Storage Technology for Fixed Content

Key Centera Innovations:

- Content Addressing
- Stored objects
- RAIN implementation
- Distributed Content
Up to 32 nodes/cab

850MHz PIII with 256MB RAM
4ea. 160GB EIDE
3ea. 10/100BT NICs

Access Nodes provide external API access
Storage Nodes store and protect information
Everything is Redundant
No Single Point of Failure

Data objects mirrored across nodes

- Redundant: nodes
  communications
  power
Self-Managing

- Self-configuring
- Self-diagnosis
- Self-healing
- Remote monitoring
Unprecedented Scalability – Petabytes Plus

Hyper-scalable
• Up to 10TB mirrored capacity per rack
• Up to 160TB mirrored capacity per cluster
• Over 1PB mirrored capacity in Centera domain
Cost-Effective

Off-the-Shelf Hardware Economics
Revolutionary Software-based Value-add

List Prices

Hardware:
16 node system
(10TB raw)
---$100,000

Software:
16 node system
---$110,000
Introducing Centera: New Storage Technology for Fixed Content

Key Centera Innovations:

- Content Addressing
- Stored objects
- RAIN implementation
- Distributed Content

Redundant
Self-Managing
Hyper-Scalable
Cost Effective
Introducing Centera:
New Storage Technology for Fixed Content

Key Centera Innovations:

- Content Addressing
- Stored objects
- RAIN implementation
- Distributed Content
Distributed Content: For Disaster Recovery
Introducing Centera: New Storage Technology for Fixed Content

**Key Centera Innovations:**

- Content Addressing
- Stored objects
- RAIN implementation
- Distributed Content
INNOVATIONS for the CONTENT WAVE
The Centera™ Opportunity

Joe Tucci
Centera Launch Partners

EMC
MOBIUS
AGFA
Fujitsu
Storagen
IXOS
documentum
FileTek
KPMG
Connected
NICE
c-terporch digital
front porch digital
KVSoft
Scientific
quest
SOFTWARE
Tower
Legato
CommaTec
BakBone
software
Hummingbird
Gauss
Avid
Amicas
CSC
Sector
Artesia
Technologies
Virage
J&B Software
CommVault
Systems
Sarnoff
Corporation
EMC ACQUIRES FILEPOOL

HOPKINTON, Mass. – April 11, 2001 - EMC Corporation (NYSE:EMC) today announced it has acquired FilePool NV, a venture-backed software development company based outside of Brussels, Belgium, in a cash transaction valued at less than $50 million. FilePool is the sixth software acquisition EMC has made since January 2000.

David A. Donatelli, EMC’s Senior Vice President of New Business Development, said, “Acquisitions such as FilePool position EMC for continued industry leadership in the burgeoning information storage market. FilePool helps expand EMC’s enterprise software capabilities and intellectual capital.”

Jan Van Riel, Founder
Kurt Van Looveren, GM Belgium Development Group
Addressable market opportunity in 2005

$10+ Billion
The Market Leader
Creates the Next Market

1991  EMC creates intelligent information storage

1994  EMC creates Storage Software

1995  EMC creates Open Storage

1998  EMC creates Networked Storage

2001  EMC delivers Open Storage Mgt.

Today:  EMC creates a new Category of Storage
Recap

Fixed Content
vast majority of online information by 2005

Content Addressed Storage (CAS)
a new storage category

Centera™
the world’s first CAS solution

EMC’s Opportunity
large and projected to grow larger
INNOVATIONS for the CONTENT WAVE