



Initial Slices and Views

Draft Map Version: February 25, 2008



Boston-Area Healthcare Network

Visualize, Navigate, Analyze, Self-Organize

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Why This Presentation

Our mission is to improve people's ability to cross boundaries through collaboration.

By improving people's ability to organize themselves,
we impact their ability to improve the world they know best and care about most.

We want to apply our expertise in organizational networks to healthcare.

This presentation is focused on how a new tool for mapping, navigating, and analyzing large-scale organizational networks applies to healthcare

- **Visualize.** Seeing is understanding. People need common mental models to collaborate across boundaries. Organizational empathy requires ability to take other people's perspective
- **Navigate.** Use map for searching and finding specific nodes in larger context, creating new organizational routes, and serendipity. URLs connect map to internal and external webs of disparate information
- **Analyze.** Where data is relatively complete, the map-as-model can be analyzed by network science. Node metrics and distributions provide management tools and scientific measures for improvement and comparison with medical performance measures

What we need:

- Help in constructing a credible framework for representing the major components of a regional healthcare network
- Help in identifying the parts of the network that could most benefit from organizational maps right now
 - In particular, people who have comprehensive viewpoints and are "early adopters" of new ideas



Contents

- Big picture of organizational change
- Overview of Boston-area healthcare network
- Healthcare providers framework
- Story Slice 1: How a neurologist fits into Partners
- Story Slice 2: A BIDMC physician in multiple roles

APPENDIX:

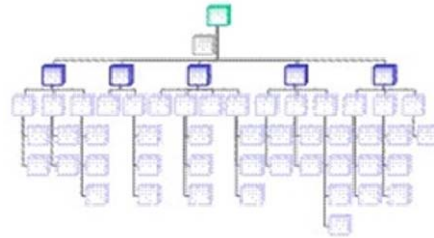
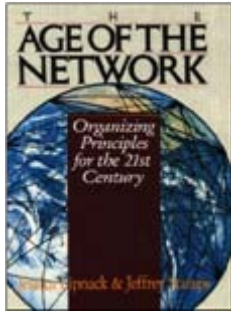
- Visualizing and analyzing organization networks
- NetAge background

All information presented here comes from public websites. By mapping organizations and representative positions as a single interconnected network, we hope to show the larger ecology within which any particular node in the Boston healthcare network functions.

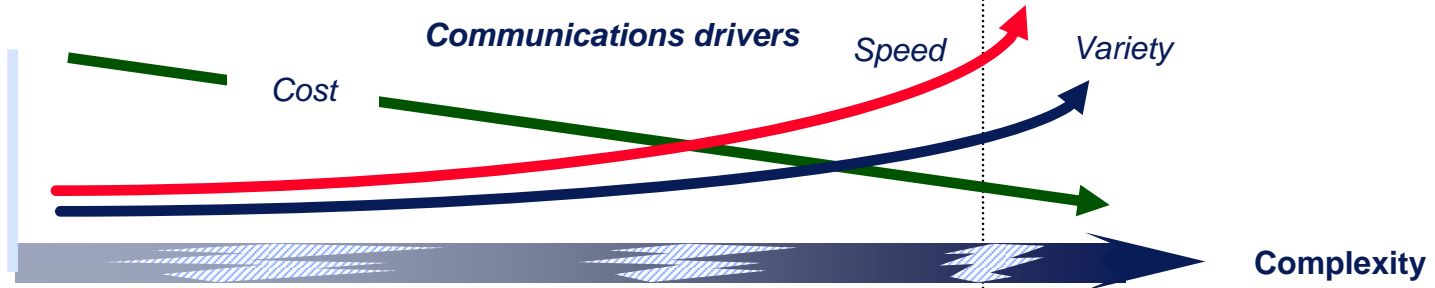
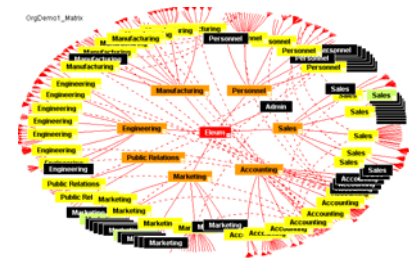


Healthcare Structures Have Evolved Out of a Complex Organizational History

Internal complexity must match or exceed external complexity (Ross Ashby)

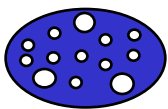


Today



Nomadic

 Members
Small groups

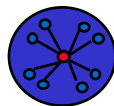


Tribes

+

Agricultural

 Levels
Hierarchy

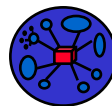


Empires

+

Industrial

 Specialties
Bureaucracy



Corporations

+

Information

 Links
Networks



Networks

Diagram developed with Shell Oil Co

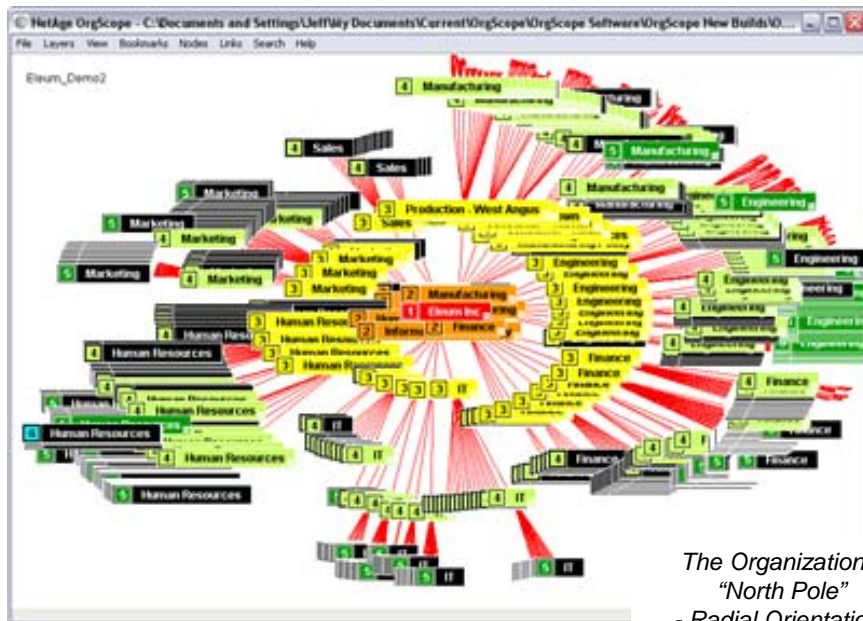
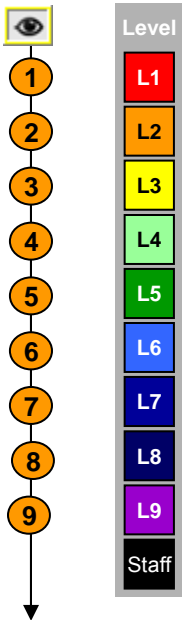


We Use OrgScope to Map Organizational Network Structures

OrgScope enables the visualization, navigation, and analysis of complex, large-scale organizational networks

The nested hierarchy of organizations and positions serves as the infrastructure for adding layers of nodes and links (i.e., other networks)

Levels of organization

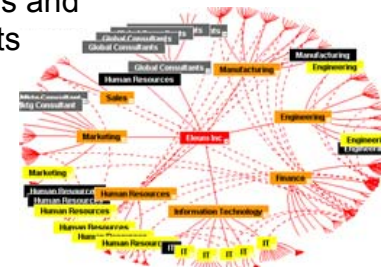


The Organization's "North Pole" - Radial Orientation -

We map positions and organizations (in a nested hierarchy of whole-part relationships) and color code them by level

Add layers of nodes - like contractors and consultants

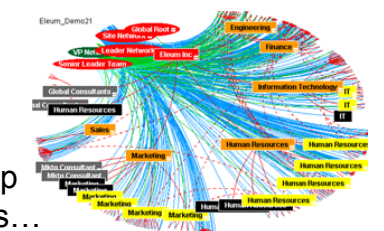
And more links, like matrix reports



Multiple links like team relationships



And cross-membership links in multiple layers...





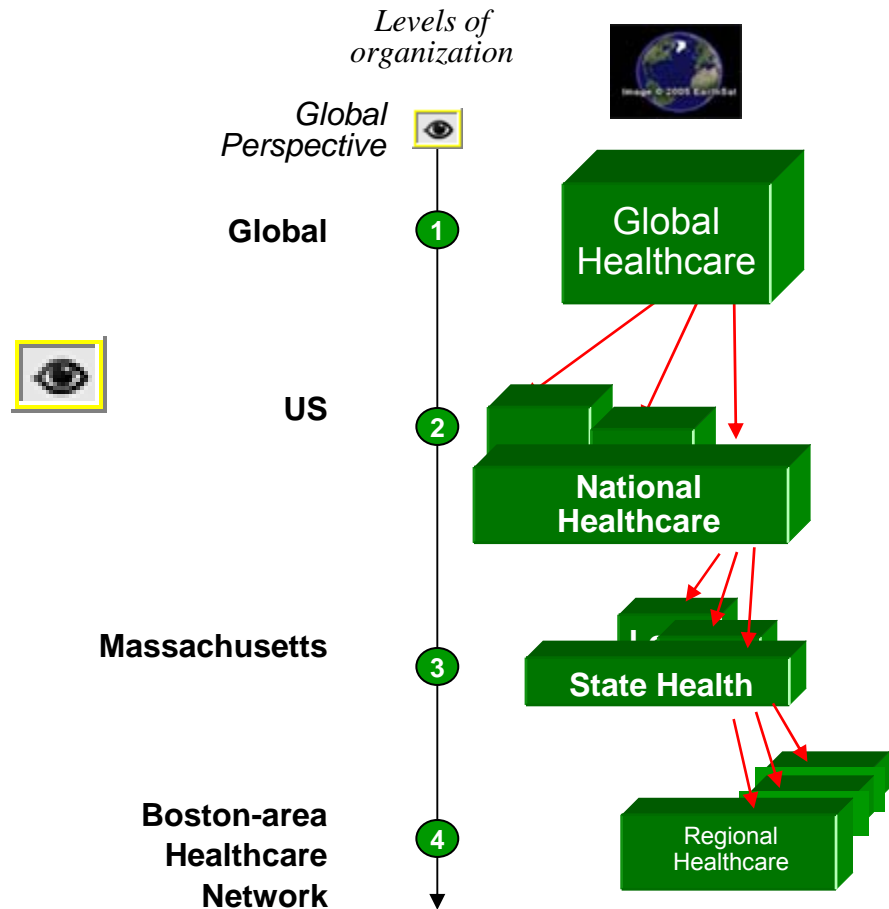
Boston Area Is Regional Hub in Global Healthcare Network

Healthcare is a multi-scale network of interconnected organizations and people

Networks are naturally organized in nested sets of whole-part relationships (hierarchy)

To represent a network, we have to establish a perspective, a particular point of reference as the “top” (root). Here, we work with four top points of reference. Each time we generate a network, we begin with one of these nodes as the starting point:

- Global healthcare (see right)
- Boston-area healthcare
- Boston-area “Medical” Network
- Partners and PCHI





Big Picture of Boston-Area Healthcare Networks

Consumers

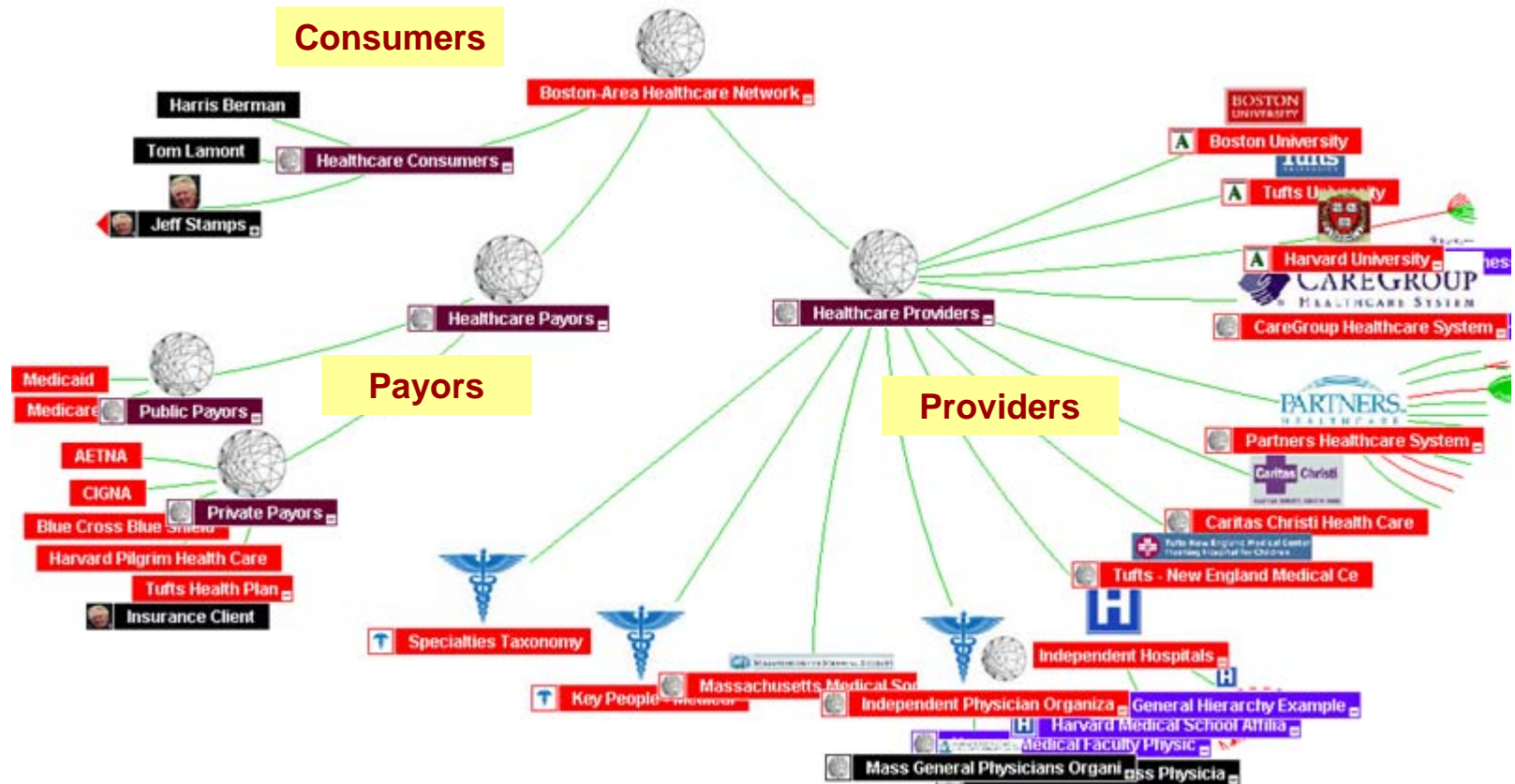
We are all consumers of healthcare, including the doctors and other healthcare workers who provide it

Providers

Hospitals, clinics, doctors, medical schools and other medical institutions

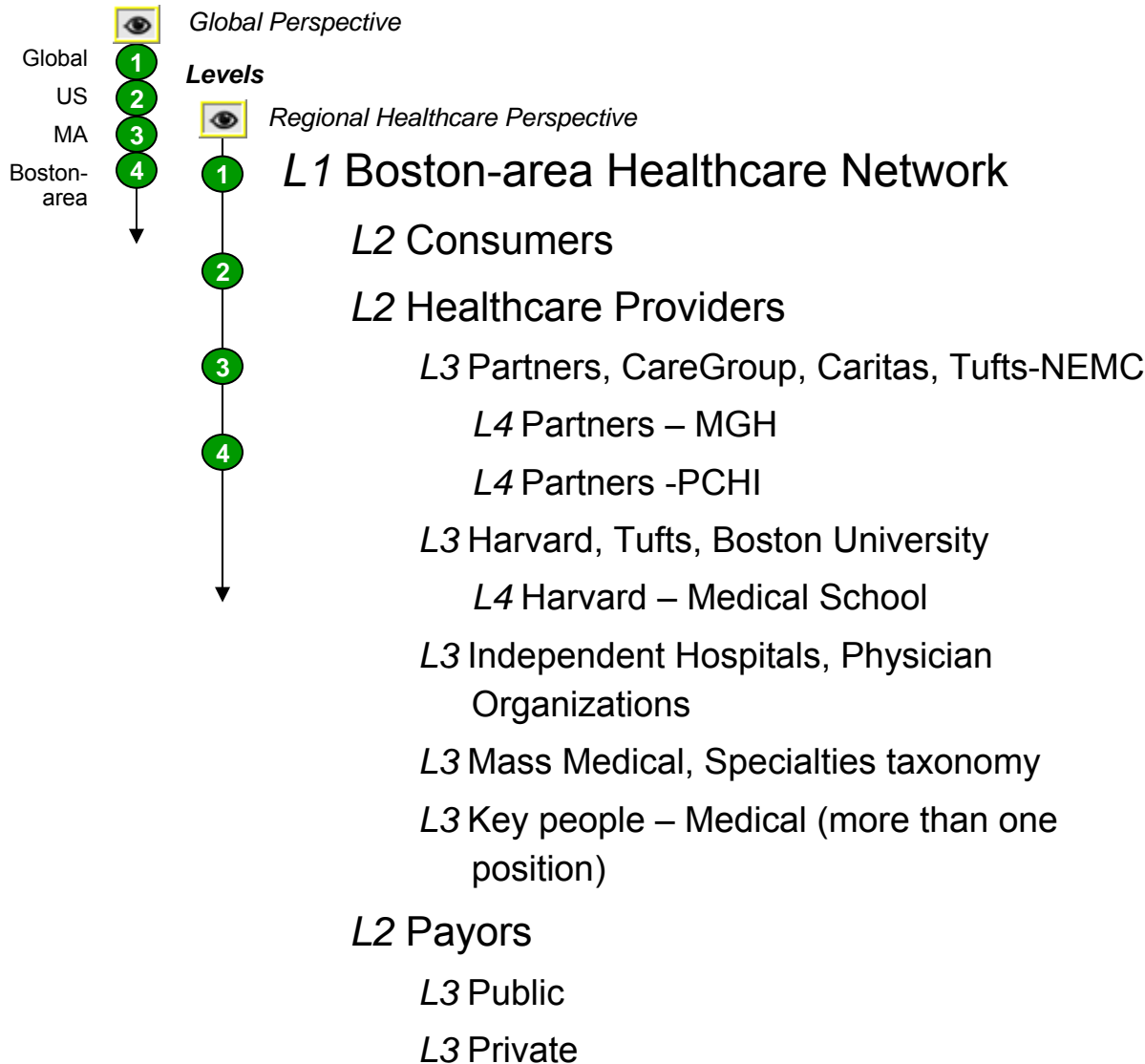
Payors

Health programs/plans, both public (government) and private organizations





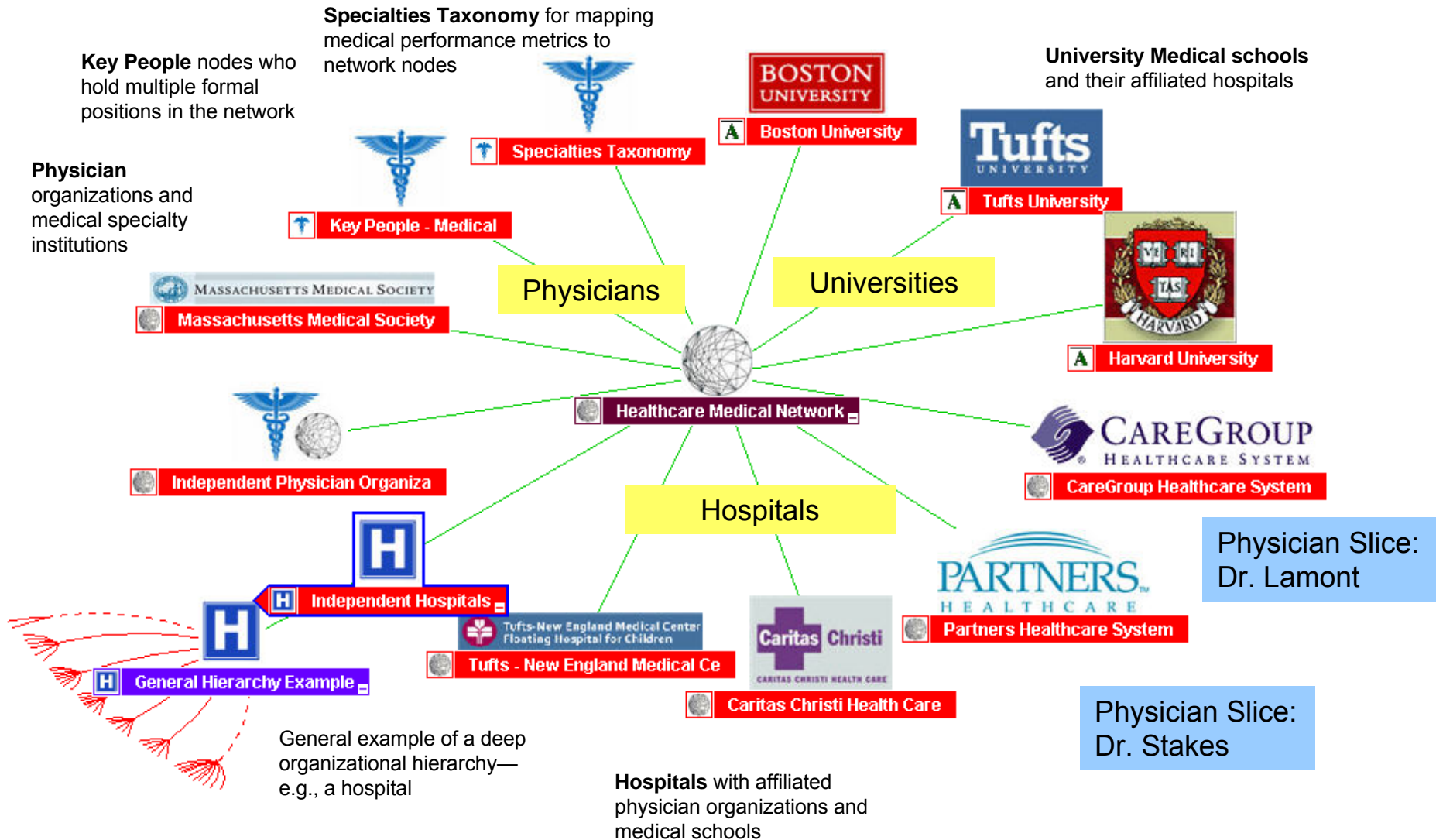
How We Stack the Healthcare Providers Network



Specific institutions, like hospitals or medical schools, have internal category structures (hierarchies) as well as interdependencies with other institutions (e.g., formal affiliations)



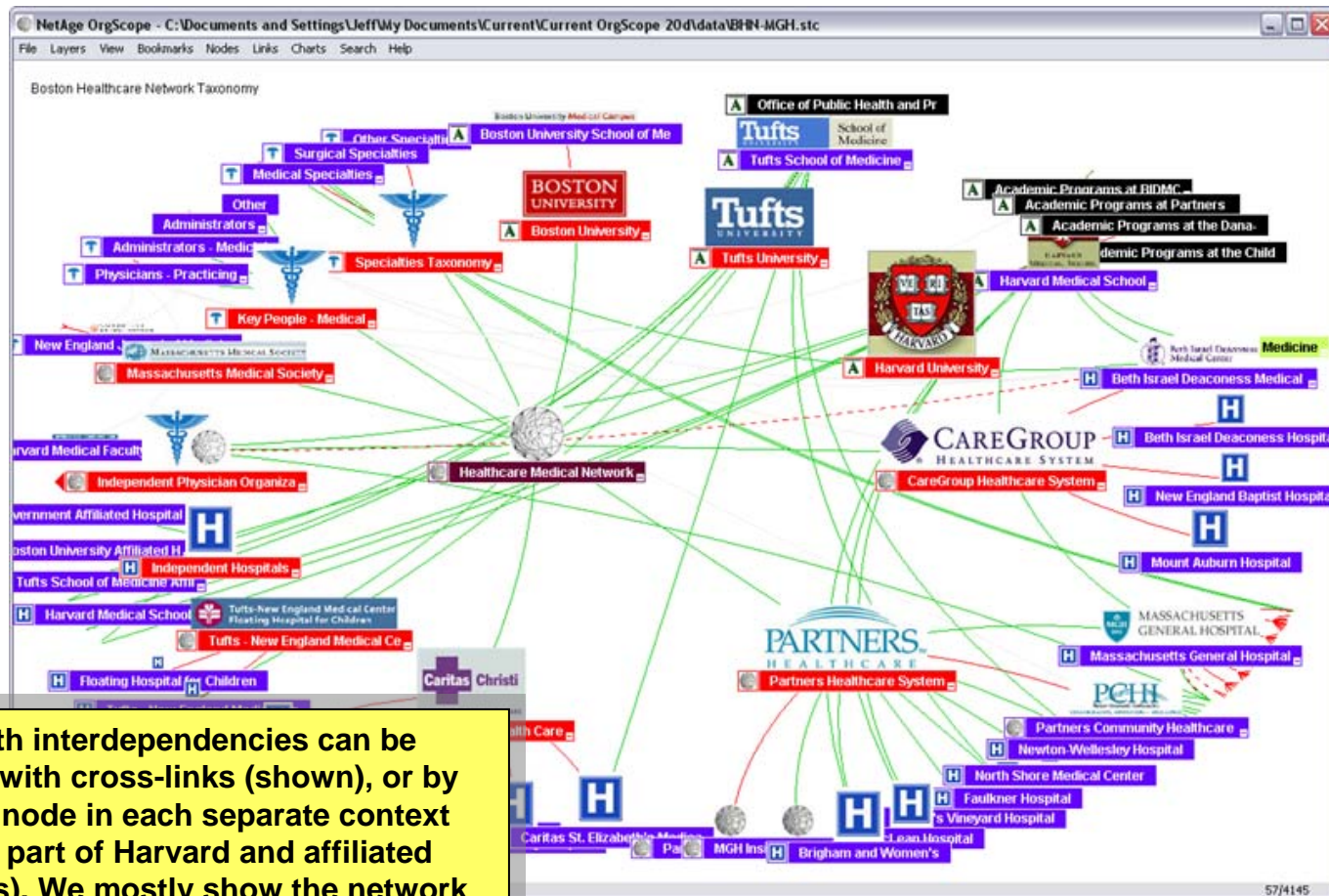
Boston-Area Medical Providers Network





One Picture of the Boston Medical Network Showing Some Interrelationships

- Skeleton framework of regional providers network ecology with institutional affiliations
- System and physician slices show network nodes with multiple organizational affiliations



Networks with interdependencies can be represented with cross-links (shown), or by displaying a node in each separate context (e.g., HMS is part of Harvard and affiliated with Partners). We mostly show the network with nodes represented multiple times.



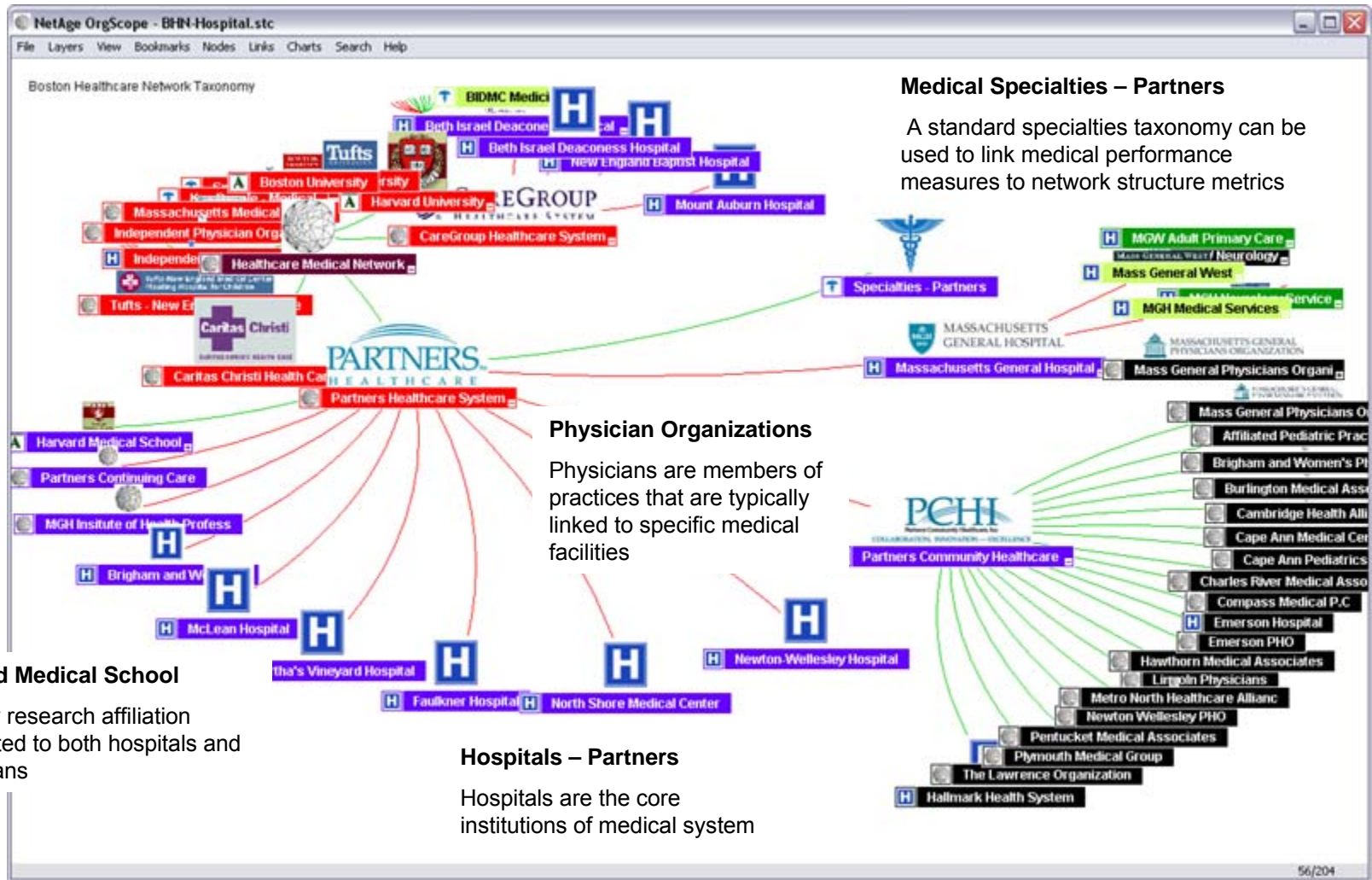
Partners Healthcare System & John Stakes MD: An Example of a System and a Physician





Partners Healthcare System

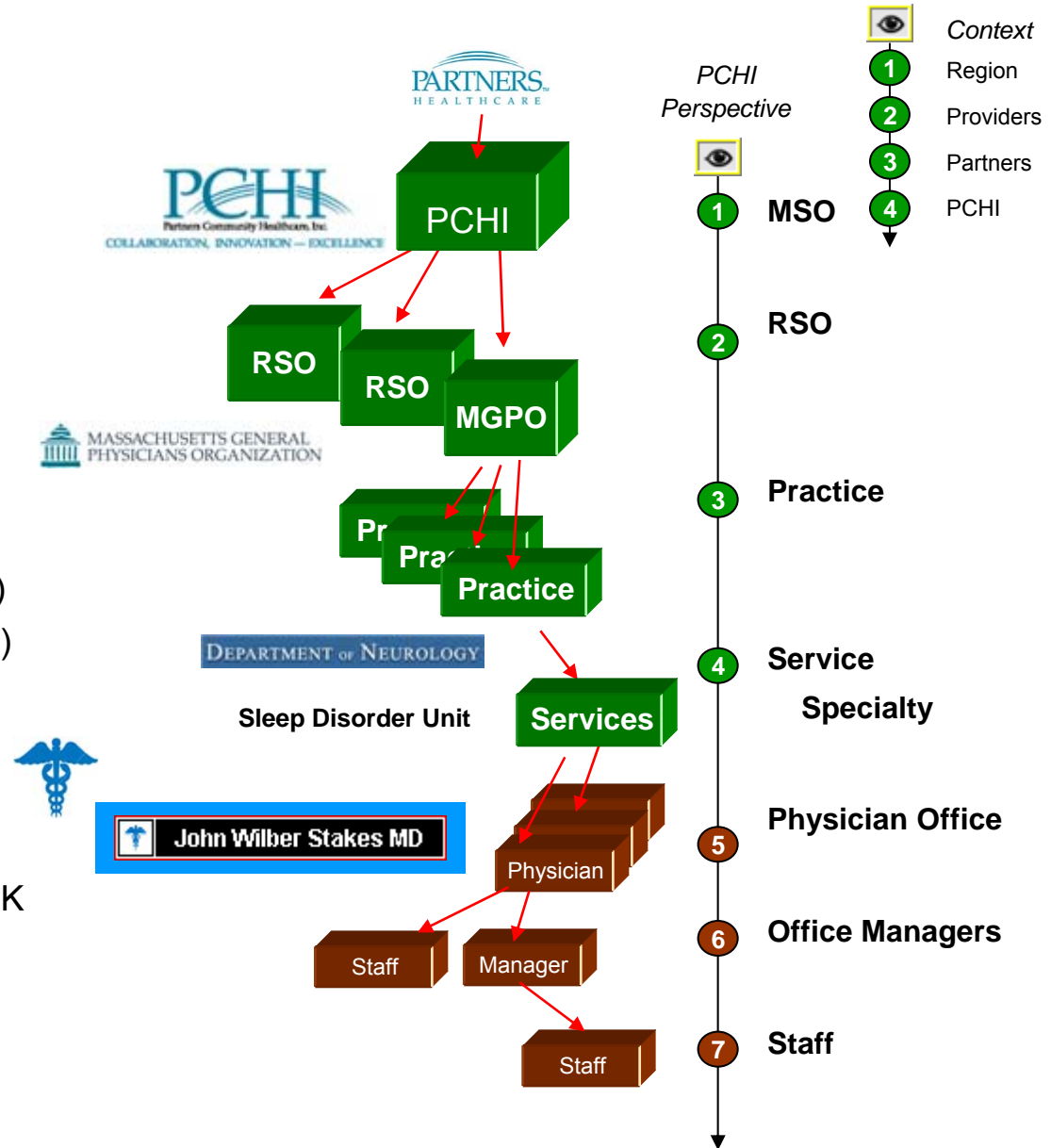
Partners consists primarily of hospitals and physician organizations. PCHI is the Partners network of physician organizations that work (predominately) with Partner hospitals and other clinical facilities





How We Stack the PCHI Network of Physician Organizations

- PCHI - MSO for distributed network of physicians, hospitals
 - 130 employees
 - Serving 1.5 million patients
- Regional RSOs
 - 17 voting units
 - MGPO largest RSO
 - 1200 physicians (MGH web)
 - 2500 employees (MGH web)
- 900+ Practices
- 6000 Physicians
- Total network employees
 - Docs + 2x employees = ~20K positions in PCHI network?
- Total with contractors?





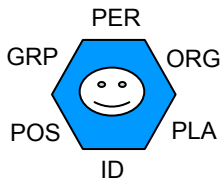
One Partners' Physician: John Wilber Stakes MD

- **Organization:** Mass General Hospital
- **Position:** Neurologist Specialist
- **Person:** John Wilbur Stakes MD
- **Group:** Mass General Physicians Organization
- **Place:** Boston MA



HARVARD MEDICINE

John Wilbur Stakes III, M.D.	
Academic Title	Instructor in Neurology
Administrative Title	(none)
Department	Neurology-Massachusetts General Hospital
Institution	Massachusetts General Hospital
Address	Massachusetts General Hospital Wac 834 55 Fruit St Boston, MA 02114
Telephone	617/726-3643
Fax	(none)
E-Mail	jstakes@partners.org



These are the five node types mapped in one OrgScope node (ID)



Neurology

For our patients' convenience, we offer neurolog

Our neurologists are:

[Dr. John Stakes](#)
Dr. Richard Toran

Phone: 781-487-4300
Location: 3rd Floor, Suite 300



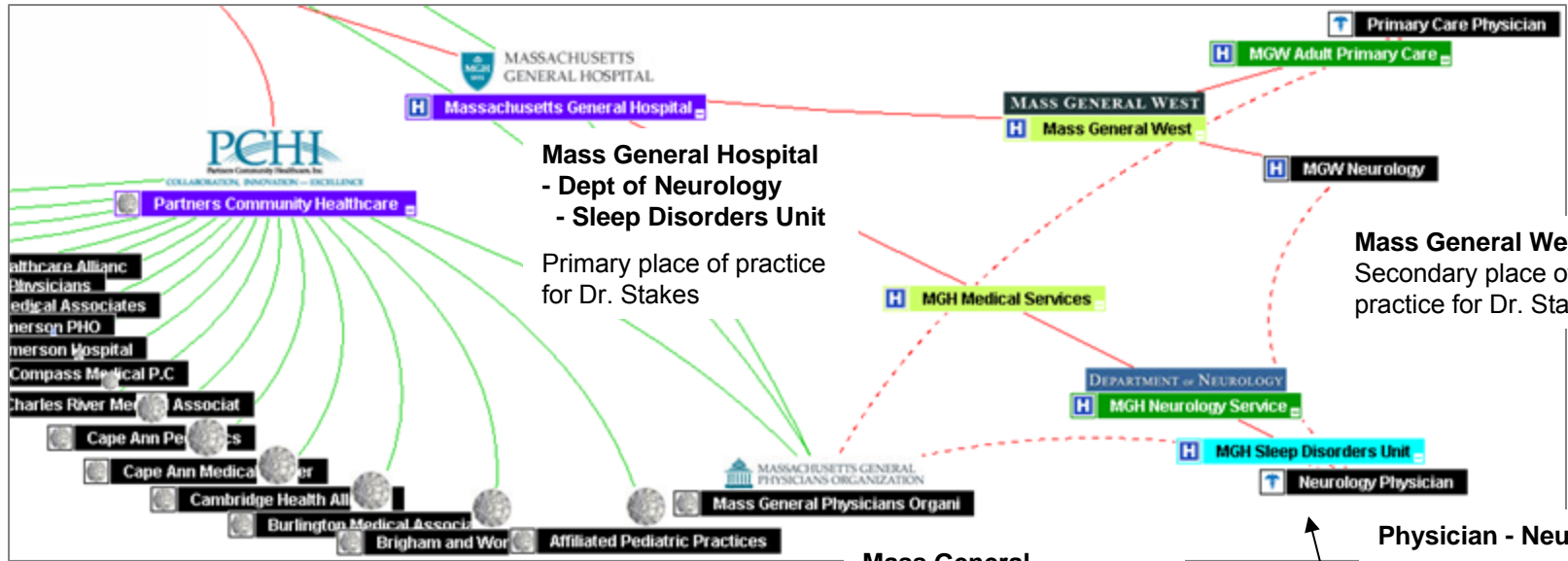
John Wilbur Stakes, MD

Service:	Neurology Service
Office:	Address: Mass General West, 40 Second Avenue, POB-1, Waltham, MA 02451 Phone: 781-522-8900 Accepting New Patients: Yes
Board Certification:	Neurology (Lifetime) Internal Medicine (Lifetime)
Medical Education:	Cornell University Medical College, MD
Languages:	French
Provider Type:	Specialist
Clinical Interests:	Sleep Disorders Medicine, General Neurology

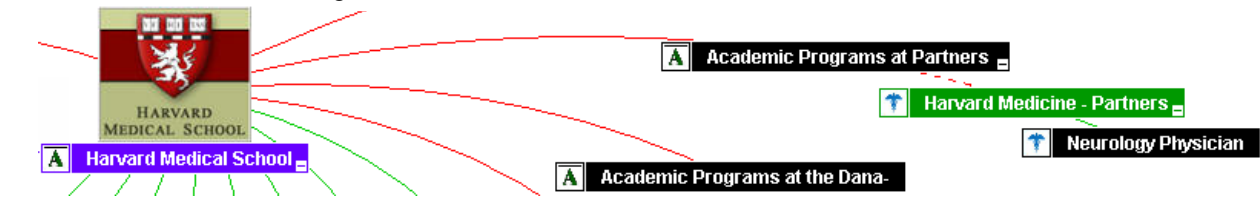


Map Snippets Representing Roles of John Stakes MD within Partners

John Wilber Stakes MD



John Wilber Stakes MD



Physician - Neurology
 John Stakes MD with neurology specialty has multiple roles in medical system



Connecting Medical Performance to Organizations and Physicians

A taxonomy of specialties can be attached to any level of the network to link medical performance metrics to medical network metrics

- Regional, like Boston area
- System, like Partners (shown)
- Sub-network, like PCHI
- Institution, like a hospital

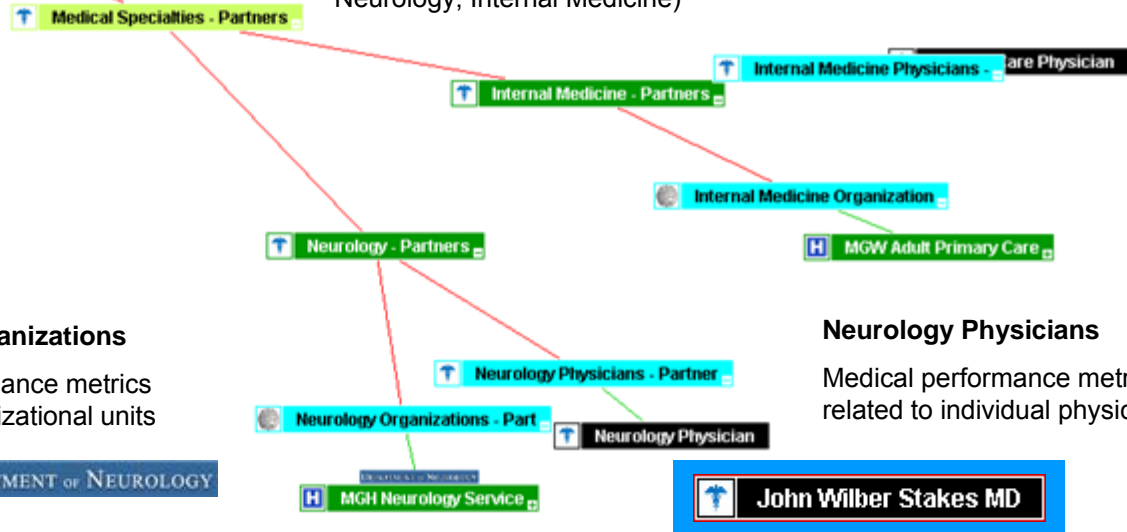
Specialties - Partners

Standard taxonomy of all applicable specialties within healthcare



Medical Specialties

Medical specialty taxonomy that applies both to physicians and organizational units (e.g., Neurology, Internal Medicine)



Neurology Organizations

Medical performance metrics related to organizational units



Neurology Physicians

Medical performance metrics related to individual physicians





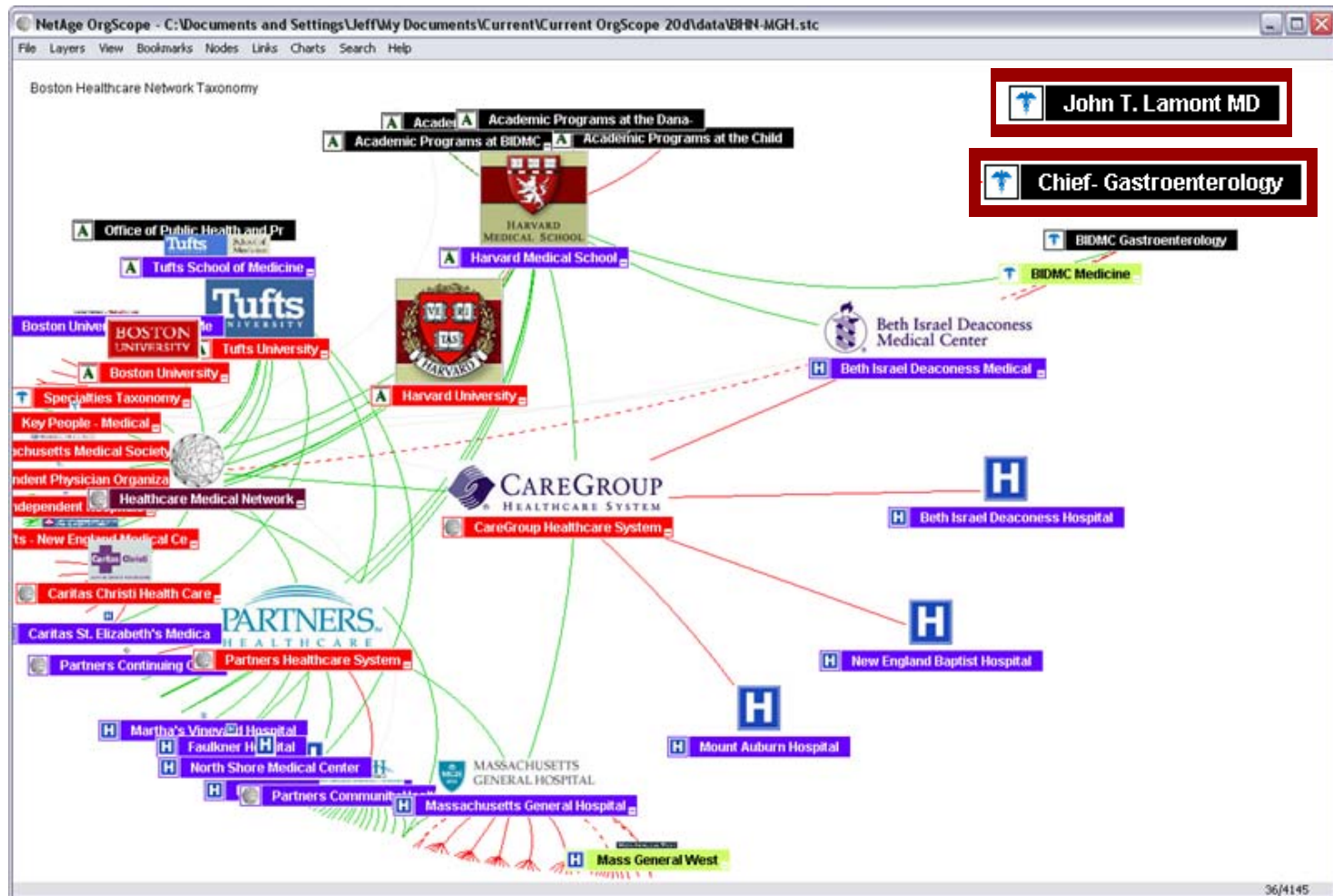
CareGroup Healthcare System – Tom Lamont MD: Example System and Physician Position Slice





CareGroup Slice to BIDMC Gastroenterology Department

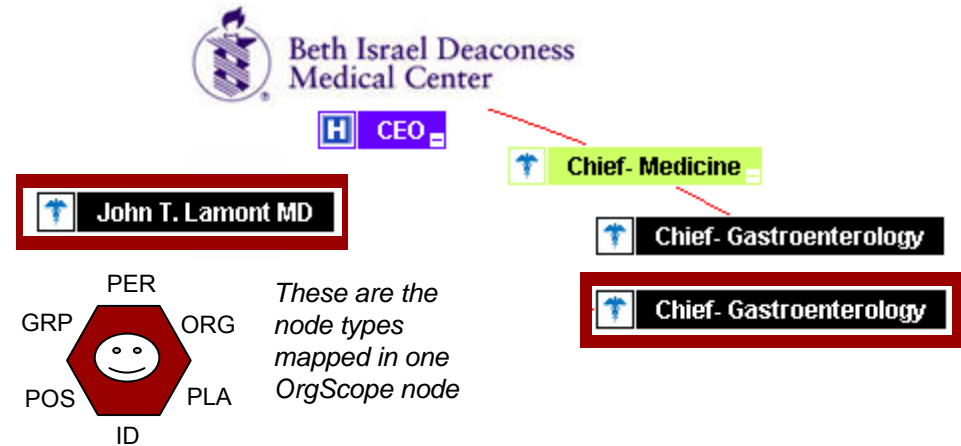
Dr. Lamont's primary association is as Chief of Gastroenterology at BIDMC, a position that is part of the hospital's formal structure. Tom, a neighbor, also holds positions in other key medical organizations





One Organizational Node: Chief of a Medical Specialty at a Hospital

- **Organization:** BIDMC (Hospital)
- **Position:** Chief – Gastroenterology
- **Person:** John T. Lamont MD
- **Group:** Harvard Medical Faculty Physicians (aka BIDPO)
- **Place:** Boston MA



Beth Israel Deaconess Medical Center



A teaching hospital of Harvard Medical School

Name	Practice Affiliation (See Legend Below)	Specialty	Clinical Interest(s)	Hospital(s)	Office Location(s)
Lamont, John T.	HMFP	Gastroenterology	GI Infections; C. Difficile; IBD	Beth Israel Deaconess Medical Center	Boston, MA

Practice Affiliation Legend:

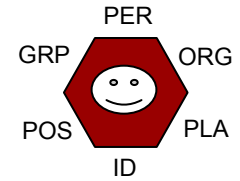
- API Member of Affiliated Physicians, Inc.
- HMFP Member of Harvard Medical Faculty Physicians (HMFP) at Beth Israel Deaconess Medical Center
- JOSLIN Member of Joslin Diabetes Center
- NEEDHAM Member of Beth Israel Deaconess Hospital - Needham Medical Staff

Last Name	First Name	Middle Name	Organization	Specialty
Lamont	John	T.	Beth Israel Deaconess Physician Organization	Gastroenterology

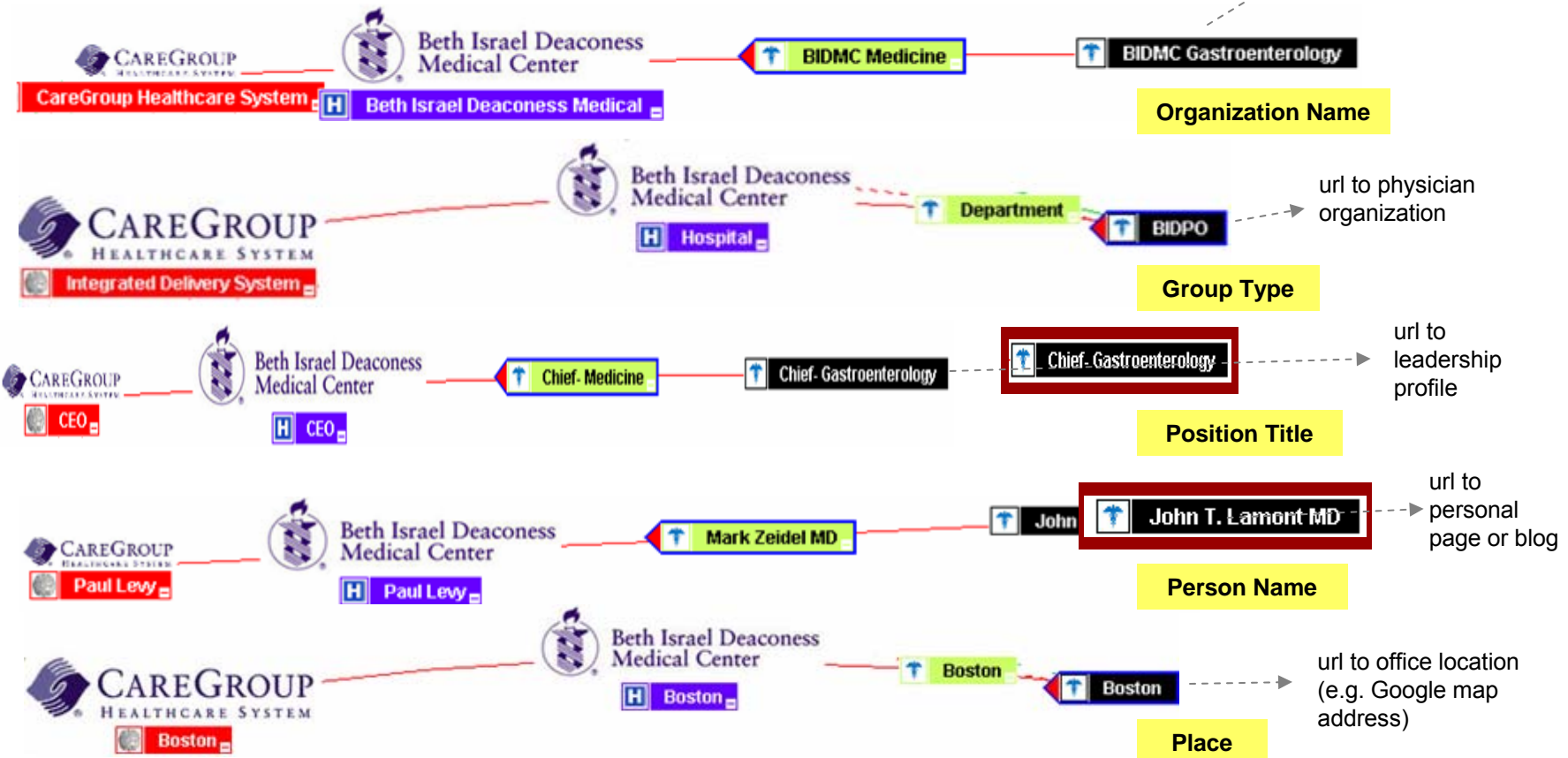


Slice 2: One Position Represents Five Node Types

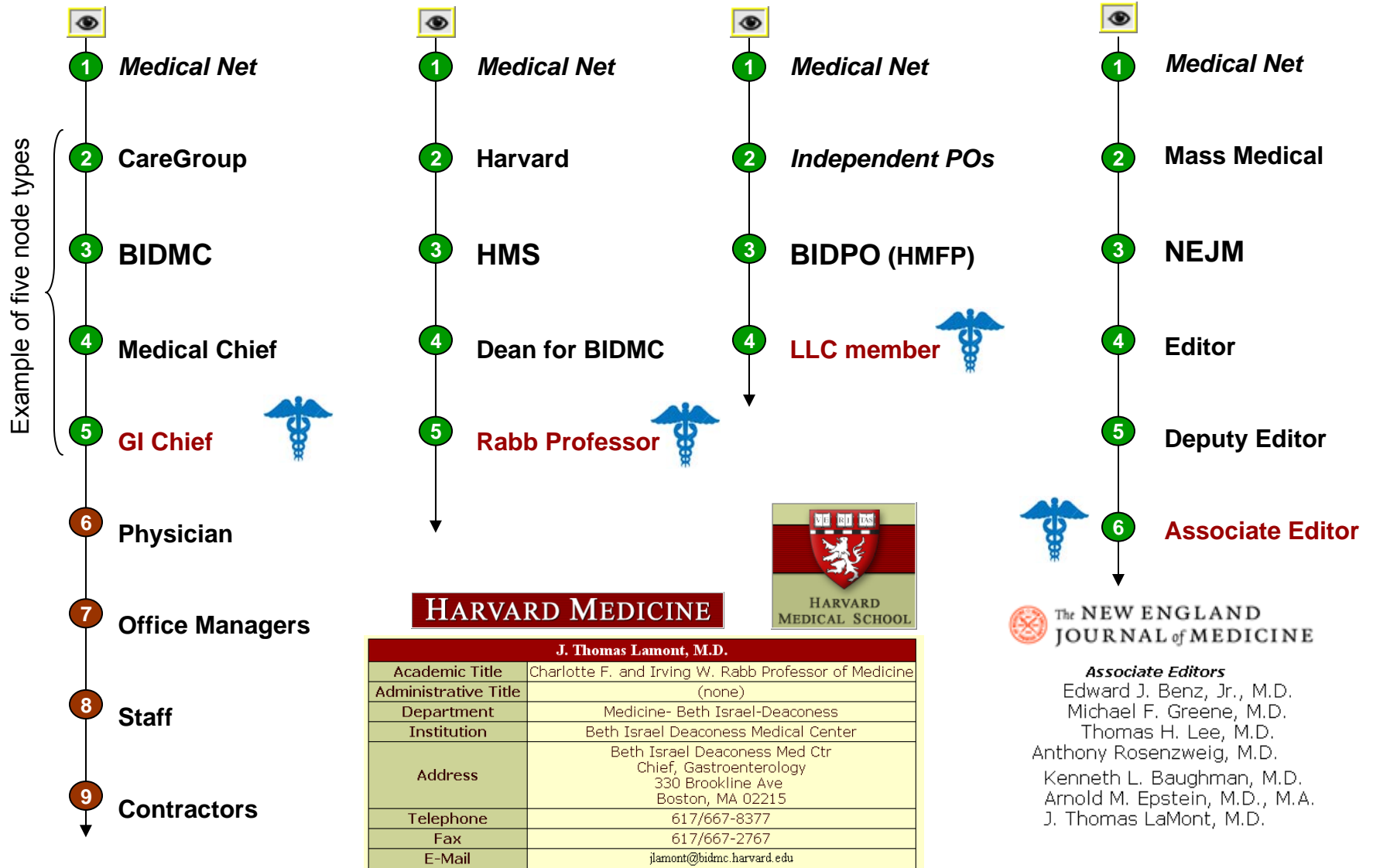
- Map: Each formal network node (ID) can represent 5 node types simultaneously: organization (ORG), group (GRP), position (POS), person (PER), place (PLA)
- Navigate: Up to six URLs can be attached to each node (five types + ID) enabling web connections to many different sources from each point on map



E.g., url to hospital department page

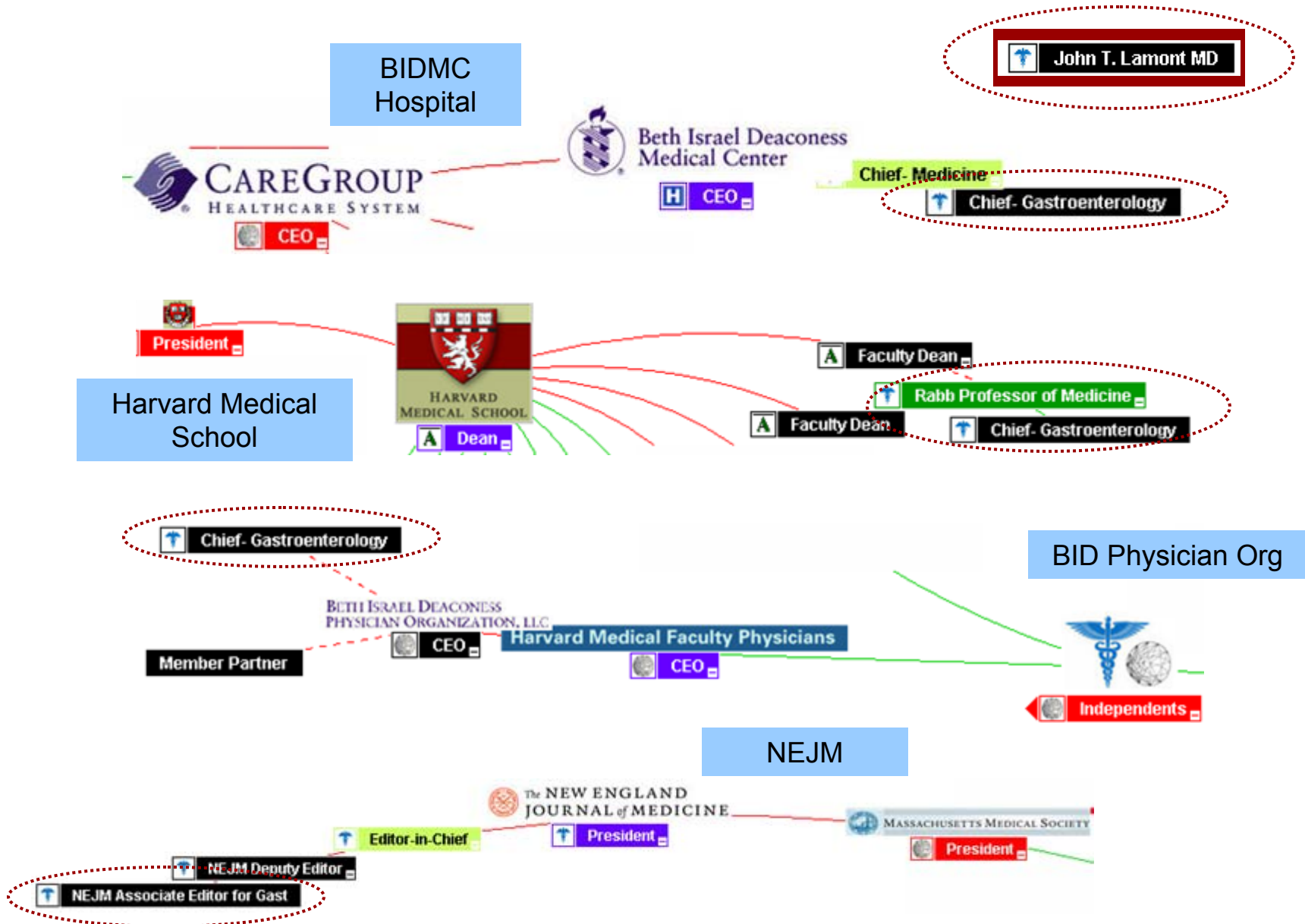


Slice 2: Stacks for (Some of) Dr. Lamont's Formal Positions

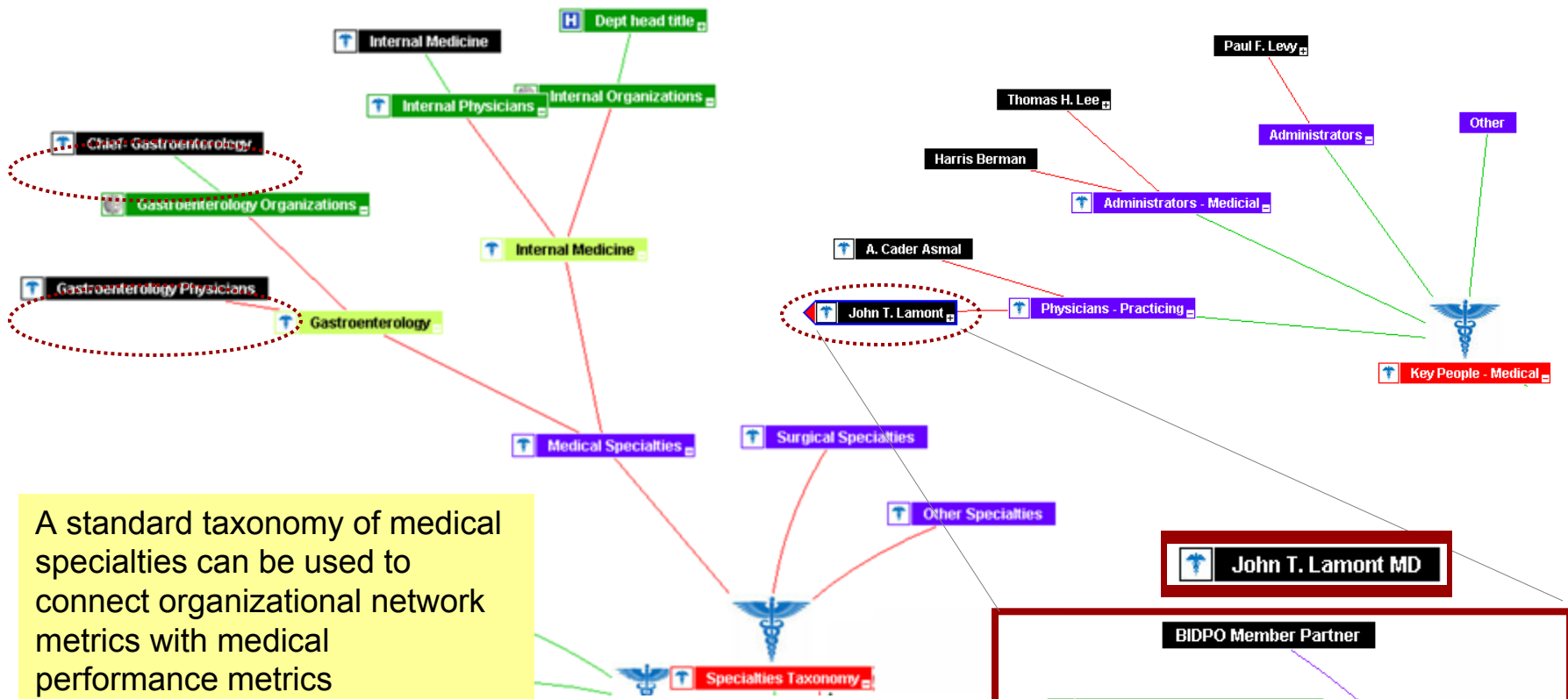




Map Shows Multiple Organizational Positions Held by One Physician



Other Node Groups – Key People and Medical Specialties

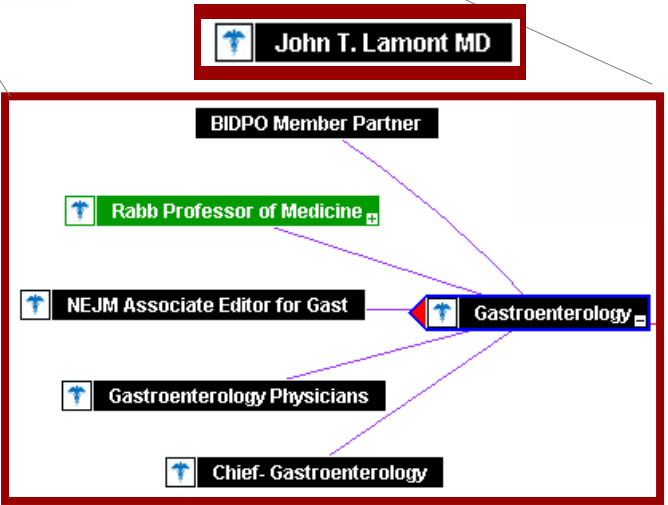


A standard taxonomy of medical specialties can be used to connect organizational network metrics with medical performance metrics

- Individual physicians with specialty (e.g., Lamont as GI specialist)
- Org units responsible for a specialty (e.g., Lamont's GI unit at BIDMC)

Specialties taxonomy can be attached to any level of the network to make comparisons

- Top level regional
- System, like Partners
- Sub-network, like PCHI
- Institution, like a hospital





Appendix:

Visualizing and Analyzing Organizational Networks



Two Networks Drive Enterprises - Formal and Informal: We Focus Principally on the Organizational Network

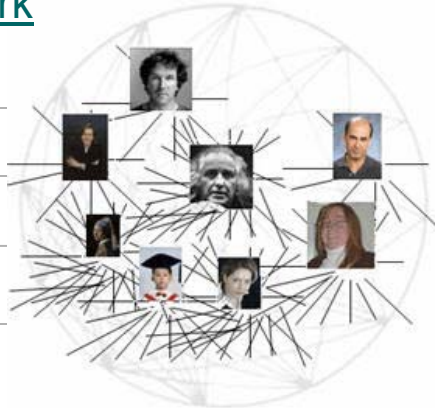
Social Network

People

Informal

Culture

Interactions



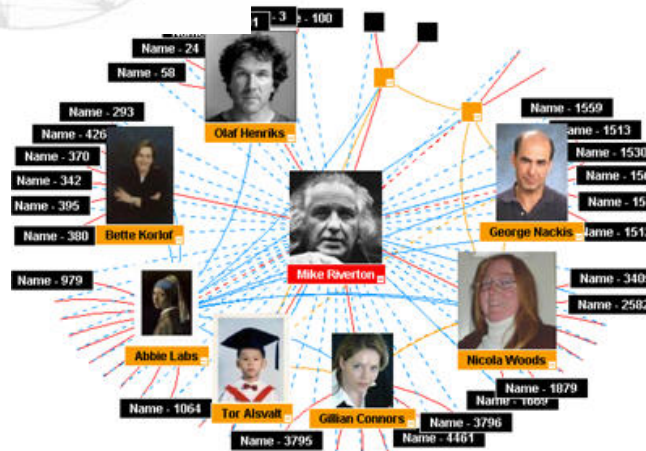
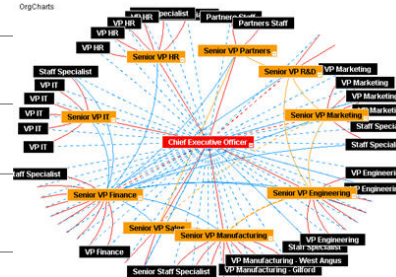
Organizational Network

Positions

Formal

Structure

Processes

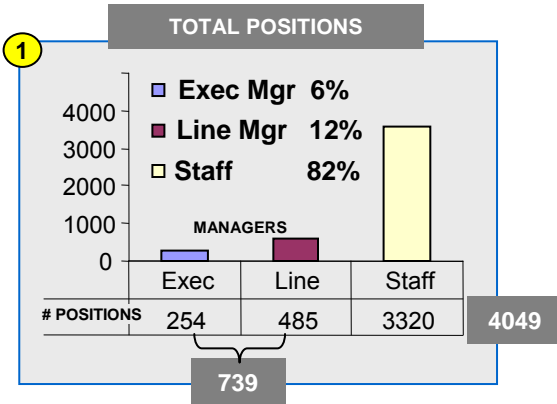


We bring the formal organizational network into view for its members and into analysis for its management

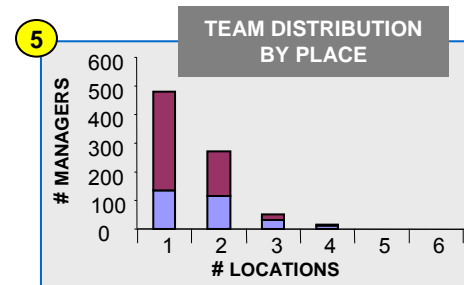
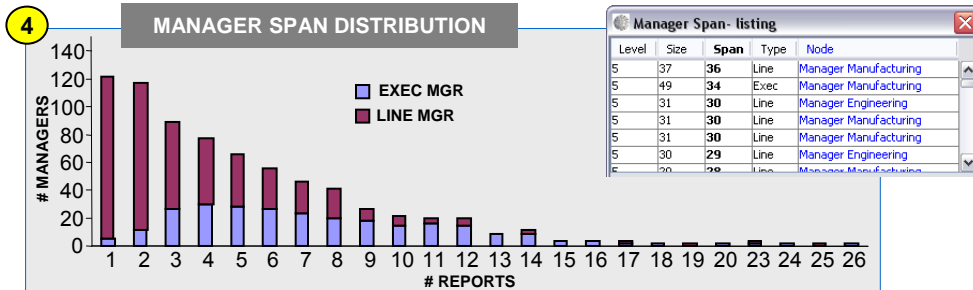
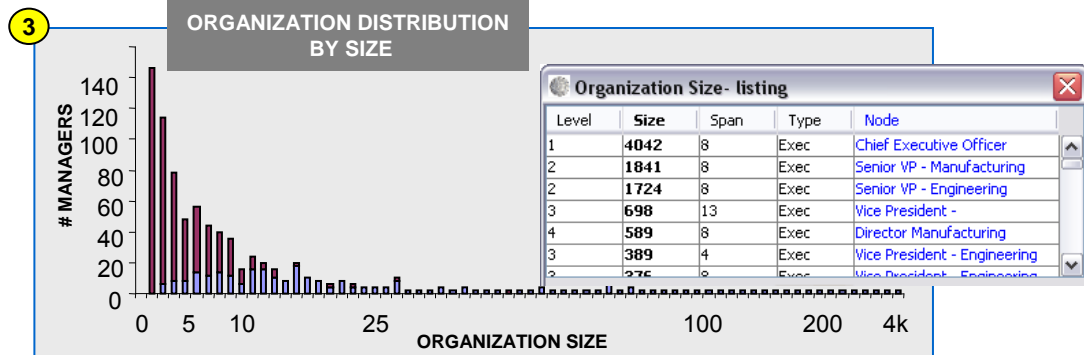
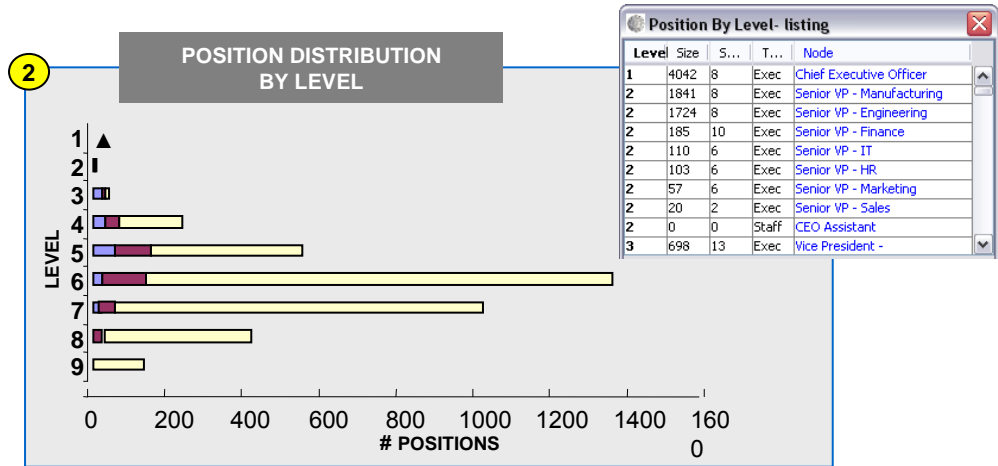


Analysis of Network Metrics Reveals Hotspots, Vulnerable "Hubs"

OrgScope provides metrics for every position, charts and lists for every organization



'Executive' managers lead other managers; 'Line' managers direct only staff.





Three Myths About Hierarchies, All Wrong

- Three **myths** about hierarchy
 - *Myth #1: Hierarchies are shaped like pyramids*
 - *Myth #2: Most managers have roughly the same average span*
 - *Myth #3: Executives at the same level run organizations of roughly the same size*
- Three **realities** about hierarchy
 - *Reality #1: Hierarchies are shaped like diamonds, wide in the middle, narrow at both ends. Picture a bell curve turned on its side.*
 - *Reality #2: Manager spans are not average. They vary widely with many managers directing quite small teams with only a few direct reports while a few manage large teams with many direct reports.*
 - *Reality #3: The size of most internal sub-organizations is small, at all levels. And, there are a few large organizations that show up at nearly all levels, not just the top.*

For more, see “Organizing at the Edge of Chaos” (narrative)
and “The Hierarchy in the Network” (data and analysis)
Draft papers on organizational network science available from Netage



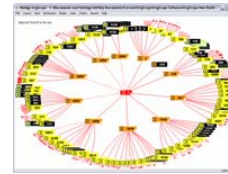
Organizational Structure Arises From Dynamics of Communications and Decision-Making

Is flatter always better?

An institutional network seeks to minimize communications pathways while maximizing its capacity for complex decision-making

Communications

Sameness →
Constraint →
Stability →



Decisions

← Variety
← Freedom
← Creativity

*Generic
dynamic*



Communications

Org missions
Clinical services
Physician functions

Delivery →
Primary →
Treatment →



Decisions

← Research
← Specialty
← Diagnosis

*Healthcare
dynamic*



Communicate
Centralize
Simplify
Collaborate

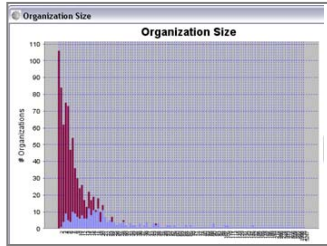
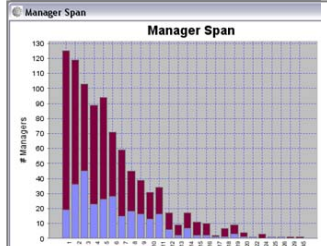
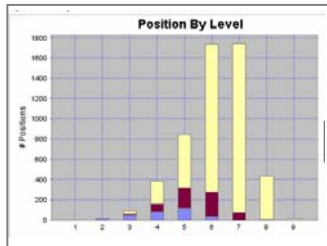


Decide
Decentralize
Complexify
Compete



Everything on One Chart: Organizational Framework, Eleum's Data Results, and Interpretation

With relatively complete data, network analysis provides insight into organizational structure and its complementary dynamics, minimizing communications paths while maximizing capacities for complex decision-making

Organizational Scale	Measures	Eleum Data	Eleum Data Distributions	Myths and Realities	
3	Organization - Size				
	<ul style="list-style-type: none"> Total Nodes Av size all Std dev Av manager size 	5247 6.136 85.862 30.84		COMMUNICATIONS <i>Myth #3: Sub-orgs at same level are same size</i> <i>Reality #3:</i> Many small orgs "Size smalls"	DECISIONS Few big orgs "Size hubs"
	Team - Span				
2	<ul style="list-style-type: none"> Maximum span Av degree all Std dev Av manager span 	29 1.000 2.934 5.81		<i>Myth #2: There is an average manager span</i> <i>Reality:</i> Few big teams "Span hubs"	Many small teams "Span smalls"
	Position - Levels				
	<ul style="list-style-type: none"> Maximum level Av level all positions Std dev Av manager level 	9 6.136 1.143 5.135		<i>Myth #1: Organization shaped like pyramid</i> <i>Reality:</i> Fewer levels	More Levels

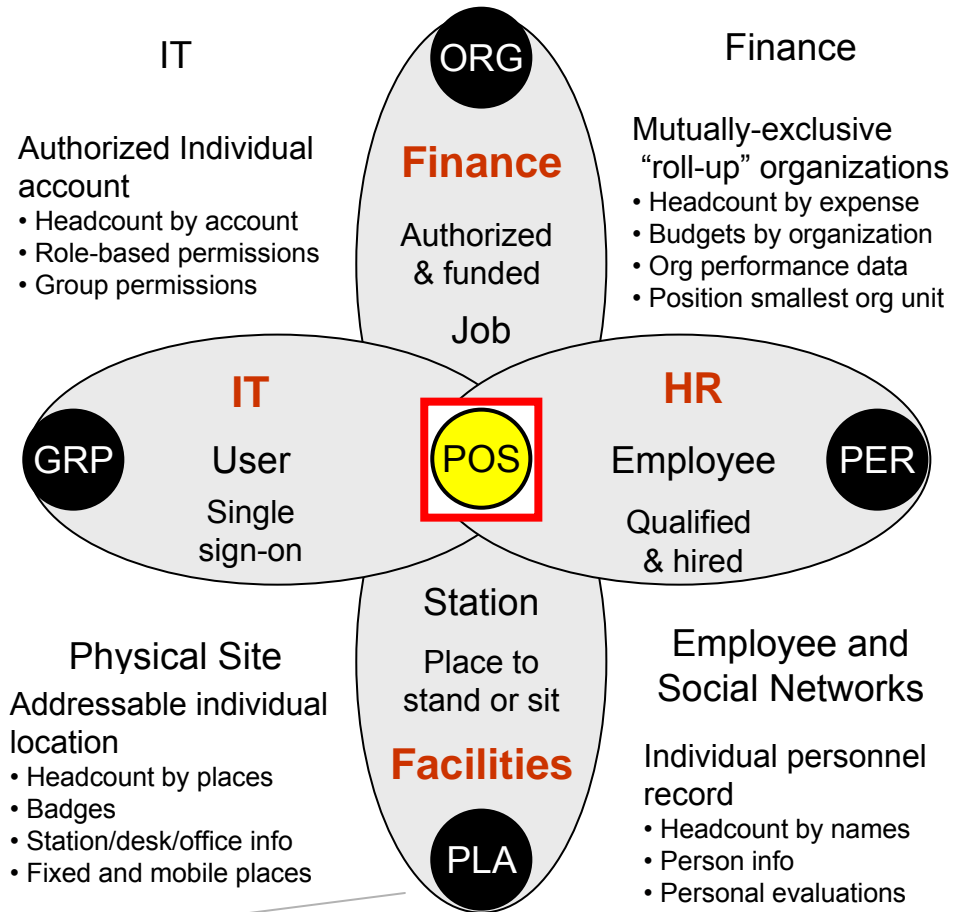


IT Integrates Data from Four Support Functions

Major support systems of most large organizations intersect and overlap in a single position: one job, one person, one user, one place

- **Finance** views a position as an authorized job, a “head” with a cost assigned to a budget held by a logically distinct sub-organization.
- **HR** sees the people, positions filled by individuals who are employees that compile personnel records.
- **IT** treats people-in-positions as users with permission profiles based on multiple roles and group memberships, but, hopefully, a single sign-on.
- **Facilities**, often part of Finance, matches each position with a place, traditionally a fixed station or a desk, often related to job-required capabilities or assets, an association that grows more complicated in the age of the network.

Each of four basic support functions offers potential data sources for complex organization network maps



KEY
 POS = Position
 ORG = Organization
 GRP = Group
 PER = Person
 PLA = Place

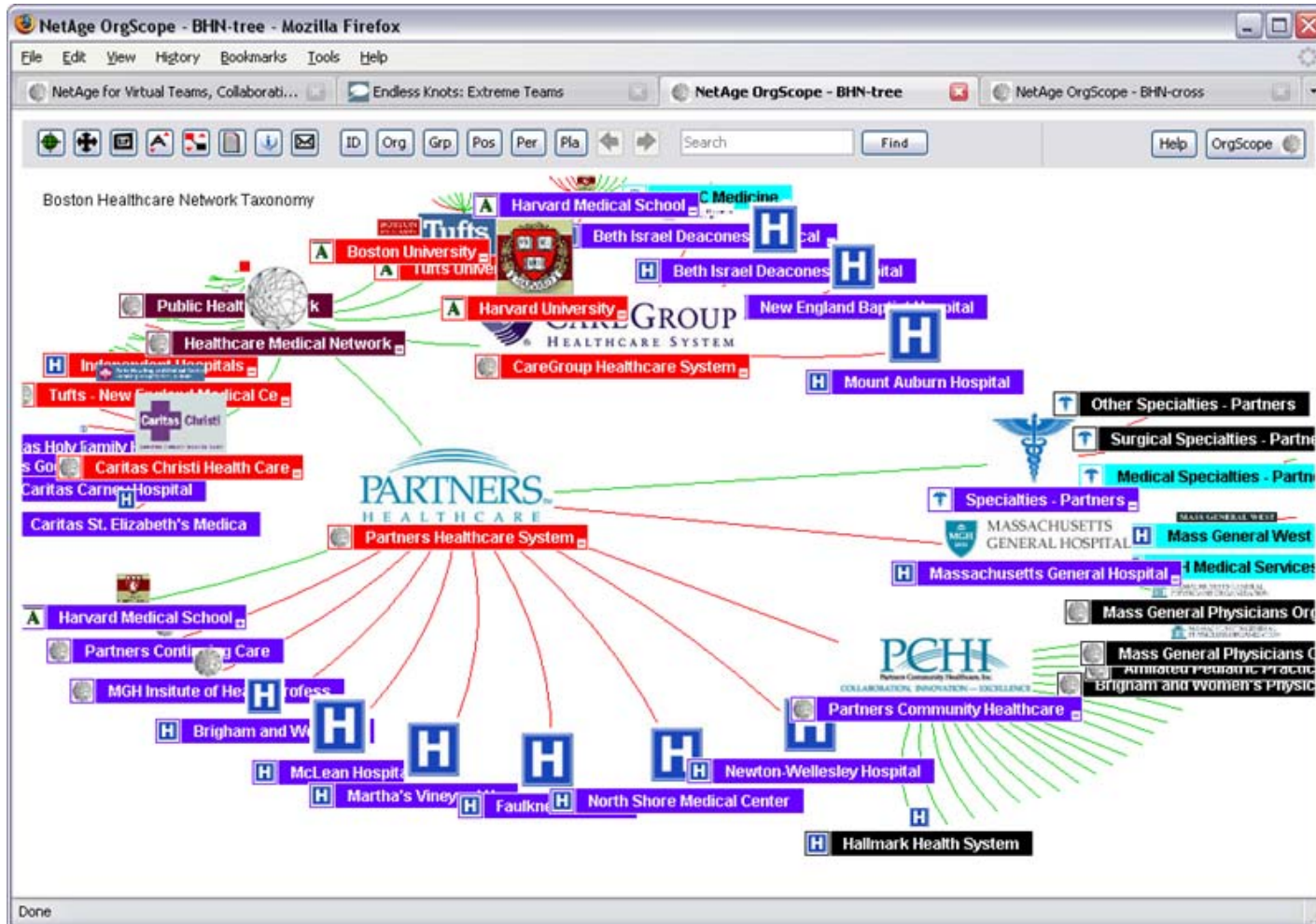


How “Eleum” Used Network Mapping

- 5,000-person, regional organization of eight countries mapped its formal hierarchy, finding:
 - **Shorter communication paths.** By identifying managers at all levels, CEO could communicate with whole organization quickly. This proved much faster than the typical cascade from level to level, which took as many as eight links, a lot of time, and often resulted in garbled messages.
 - **Highly-connected managers.** By knowing the reporting span of each manager, they identified a much smaller group who, in essence, spoke to much of the organization on a regular basis. These people became channels for targeted internal communications.
 - **Managers with the largest organizations.** Buried deep in the hierarchy, more than three links from top, these people were not part of existing leadership development programs. Once identified, Eleum rectified this omission.
 - **Managers missing from leadership forums.** Again, because of their placement deep in the organization, people with unusually large leadership responsibilities were not immediately visible and thus not included in extended leadership groups. Likewise, once recognized, they were included.
 - **The truly virtual teams.** By comparing locations of members, they could distinguish management teams who needed support in distributed operations from those who worked principally face-to-face.
 - **The people at risk.** By comparing measures of organization size, span, and physical distribution, they were able to spotlight positions where people’s loads were unusually great. Responsibilities were reconsidered and reassigned as necessary.

A Shared View of Complexity: Maps Publish to the Web

Can publish high-level maps to the web for wide use,
detailed maps to secure sites for executive use



A Possible Approach to Mapping an Organizational Network

- Create accurate hierarchy of all organizations
 - Need to identify consistent data source(s) and evaluate quality
- Generate and analyze org metrics (e.g., hotspots, hubs)
 - Enhance executive insight and ability to pinpoint high-risk positions
 - Can compare these metrics with existing performance and financial measures
- Recruit network to add links among components at all scales (e.g., institutions, individual docs have ties to HMS and MGH)
- Integrate with technology for collaboration



Visualize the whole

Stage 1: I See Us

Provides personal identity and orientation in complex, largely invisible organisation
Eases navigation, supports communication, improves 'on-boarding'
Generates desire to see self and others in relationship to one another

OrgScope-in-a-Browser

Publish read-only, click-anywhere, network maps to web for unlimited distribution
Annotation and feedback features enable participatory map improvement

Calculate metrics of relationship in the hierarchy

Stage 2: I See Me

Each position is unique, has own organizational metrics
Facilitates conversations about accountabilities in context of cross-org comparisons
Generates desire to see more detailed maps with matrix reports, contractors, work teams, leadership networks, governance groups, etc.

OrgScope Science

Ability to calculate network metrics puts every job into context
Considerable metrics variety from adding new types of nodes, links to base org chart via layers

Add layers to the basic hierarchy for the working organization

Stage 3: They See Me

Each position participates in many working networks threading through the hierarchy
Facilitates cross-organisational conversations with greater transparency and views to new pathways
Generates desire and data to self-organise: change, adapt, and realign local working networks

OrgScope Layers

Ability to create new network maps, add detail, and/or change features in separate layers that overlay base hierarchy
Developing on-screen OrgScope Editor for easy creation of custom network layer maps

Integrate with collaboration tools

Stage 4: We See Us

Combine continuous organisational awareness with technologies of connection and collaboration
Facilitates local improvement and innovation in context of shared cross-organisation purposes
Generates a smarter, quicker, more adaptive 'self-organisation', a key strategic advantage in times of accelerating complexity

OrgScope Integration

Extensive current untapped ability as clickable navigation tool tying together disparate collaboration spaces and addresses
Can integrate with variety of collaboration tools



NetAge Background

IDEAS

CLIENTS



With others



SOFTWARE





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