

# O\*NET Program Briefing

National Academy of Science

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National Center for O\*NET Development

February 3, 2009



# Goals of the Update Briefing

- Overview of O\*NET Project
- Products & Tools
- O\*NET Users
- Data Collection Program
- Special Projects



# O\*NET Project Team

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- U.S. Department of Labor, Employment & Training Administration
- National Center for O\*NET Development
  - North Carolina Employment Security
    - RTI; MCNC; HumRRO; NC State University; Maher & Maher

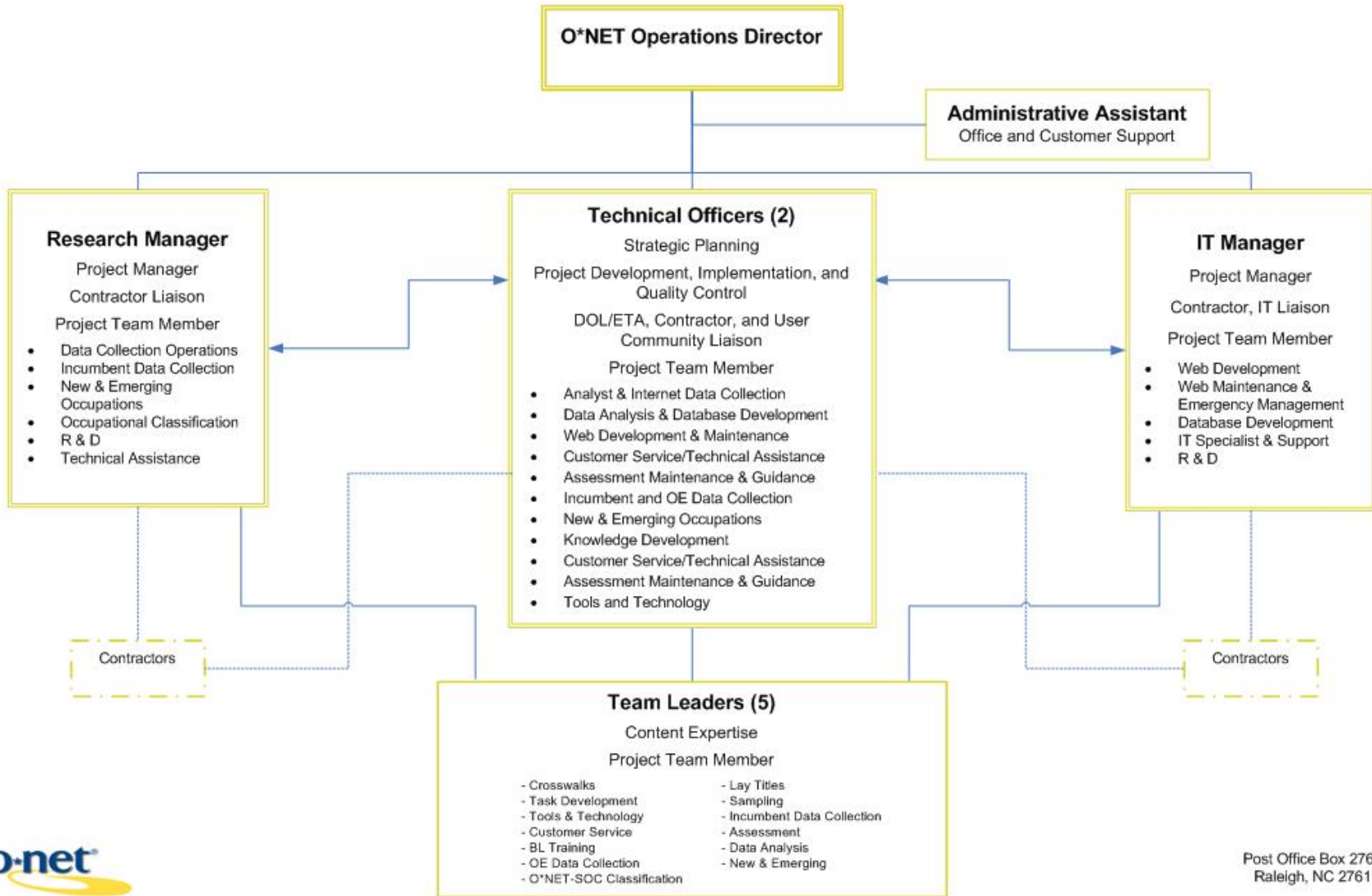
# National Center for O\*NET Development

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- Data Collection
- Dissemination
- Implementation
- Research and Development
- Technical Assistance/Customer Support

# National Center for O\*NET Development

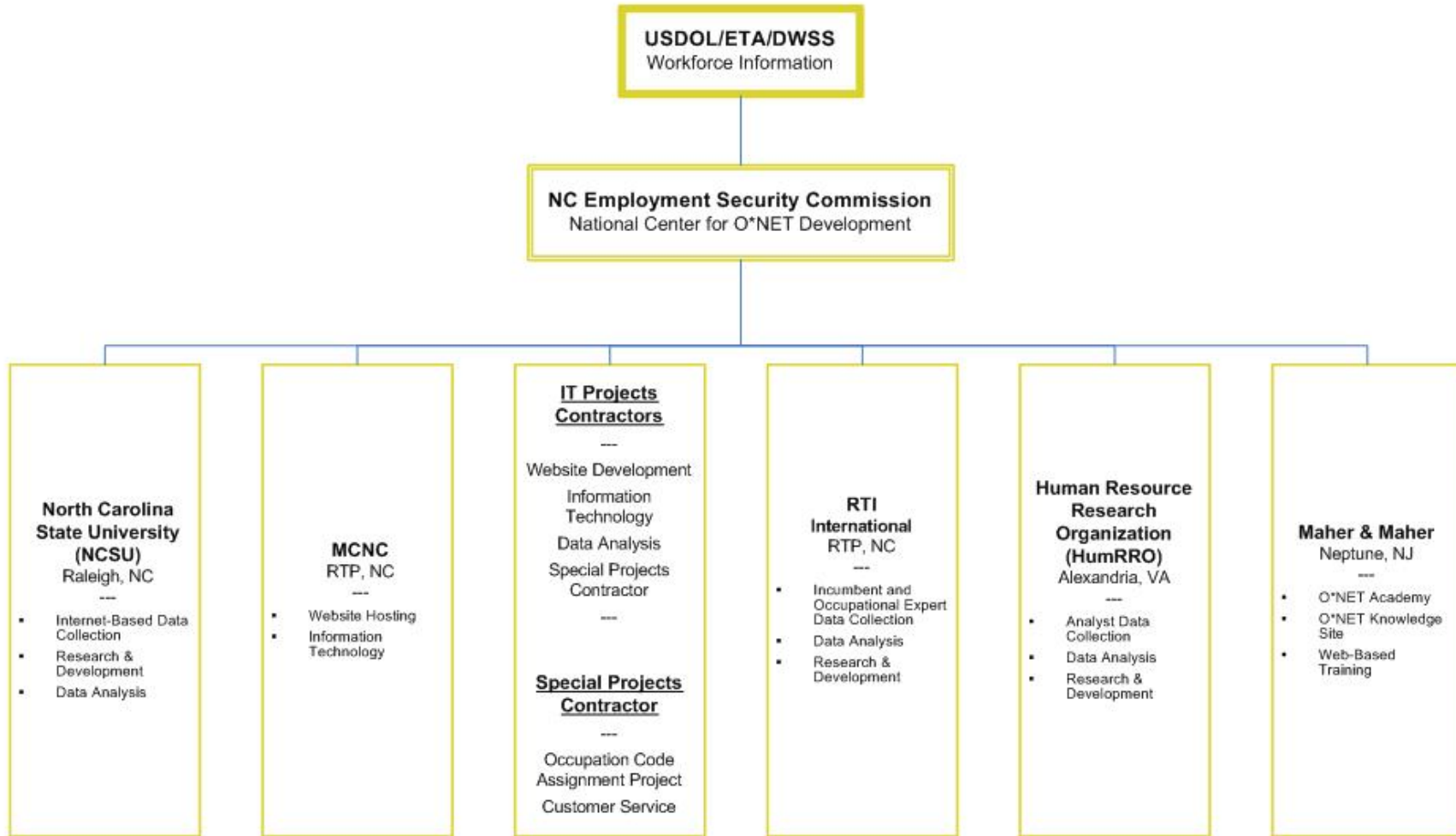
February - 2009





# National O\*NET Resource Group

February - 2009



# What is O\*NET?

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- A “**common language**” and dynamic system for describing the world of work for both the public and private sectors
- A **comprehensive system** for collecting and disseminating information on occupational and worker requirements

# What is O\*NET?

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- Flexible competency-based system with emphasis on skills transferability
- Framework for organizing job and worker information
- Data on occupations covering the entire U.S. Economy

## What is O\*NET?

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- Uses information technologies to facilitate the collection, storage, and distribution of quality data
- A resource for businesses, educators, job seekers, HR professionals, and publicly funded government programs

# O\*NET Structure

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- The O\*NET-SOC Occupational Taxonomy
- The O\*NET Content Model

# SOC and O\*NET-SOC

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- SOC mandated by US Office of Management and Budget
- Developed by multi-agency initiative

## Key characteristics of U.S. SOC

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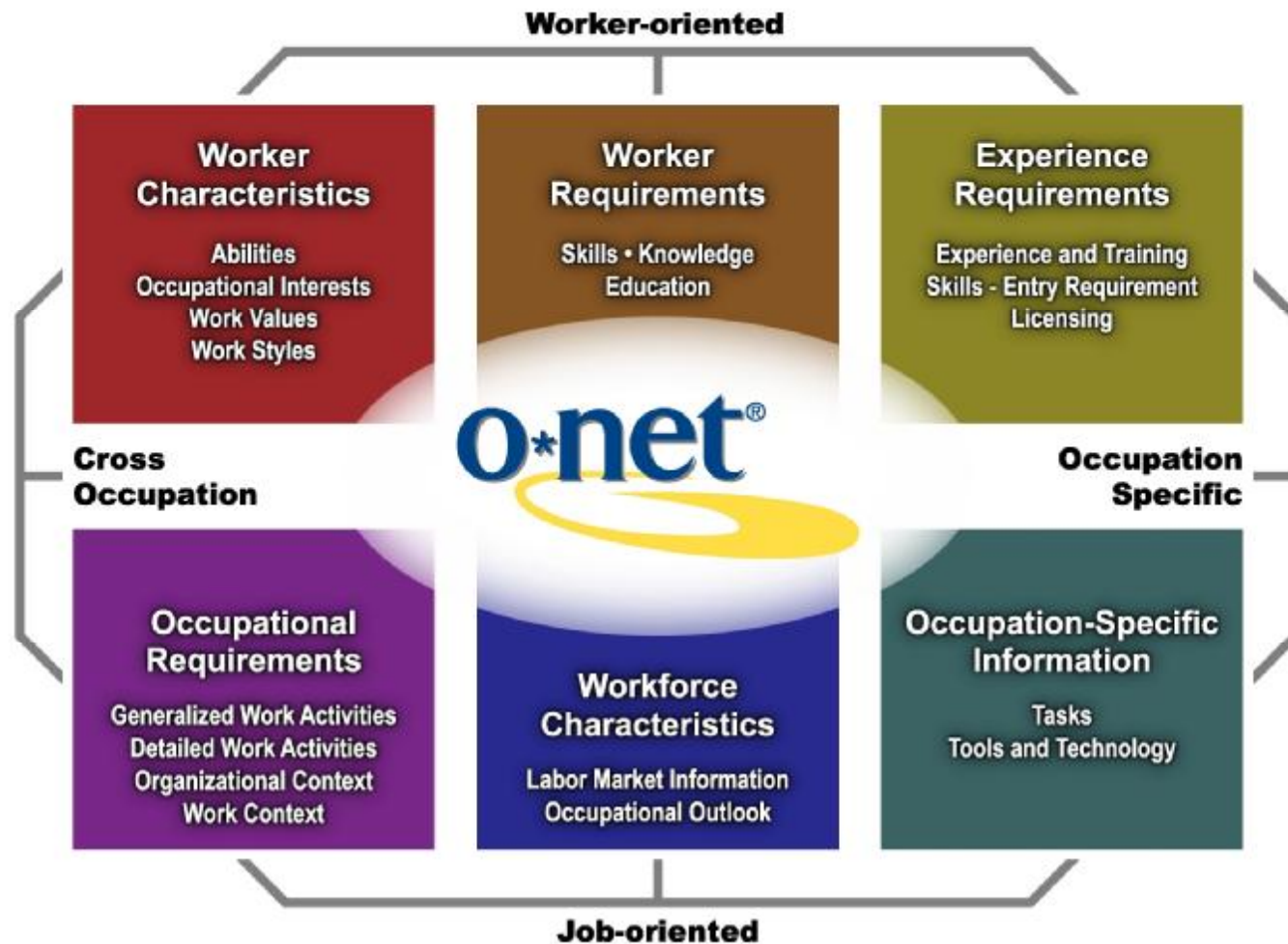
- Structured for comparability
- Unified classification structure
- Four hierarchical levels to enable data collectors to choose a level of detail corresponding to their needs and ability to collect data on different occupations

# SOC and O\*NET-SOC

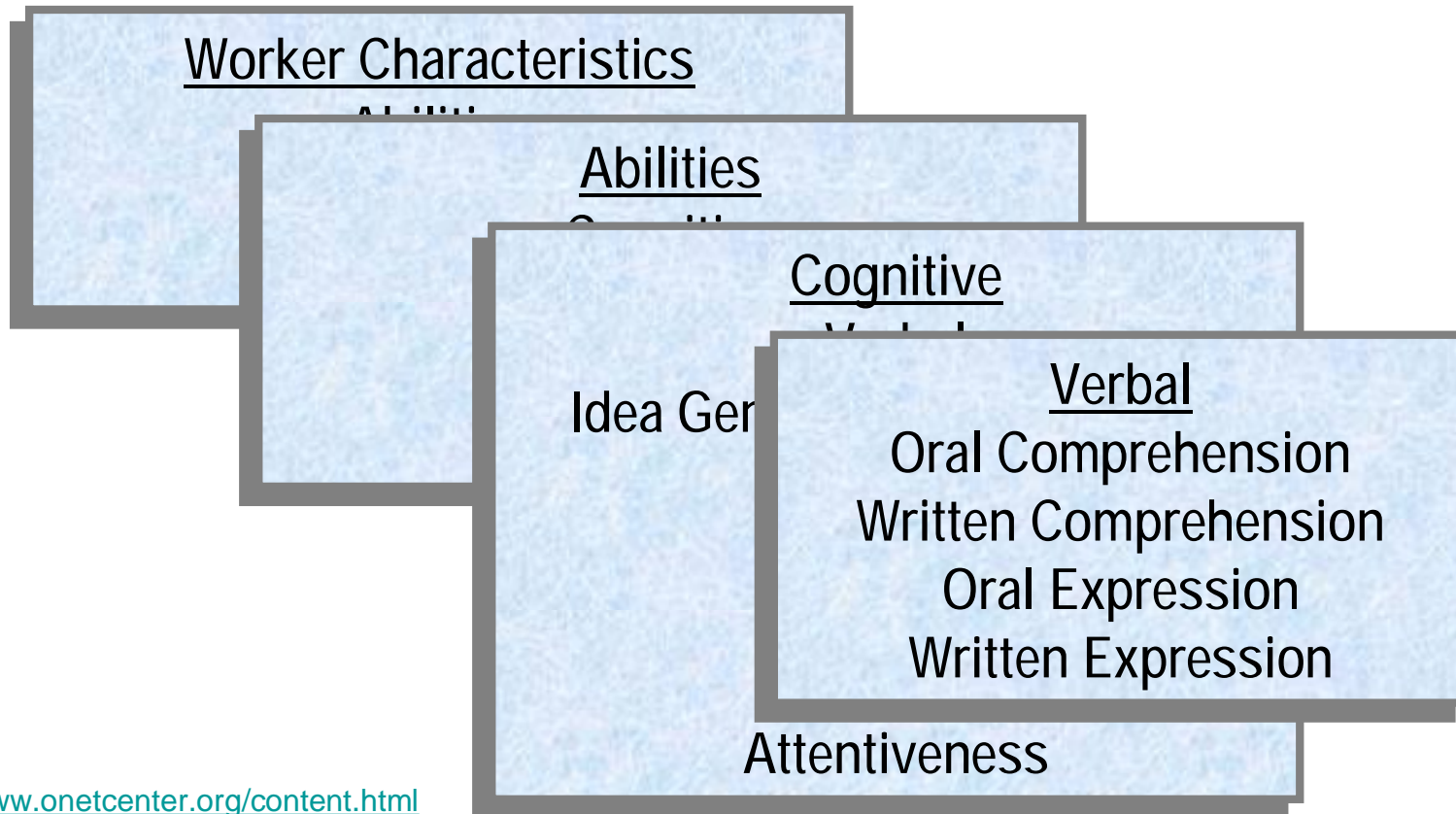
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- O\*NET-SOC is a SOC based classification that provides a greater level of detail as needed
  - Currently data collected on 812 O\*NET-SOCs
- O\*NET-SOC is growing to include important new and emerging occupations (N & E)
  - Currently 167 N & E occupations identified

# O\*NET Content Model



# Content Model: Sub-Domains

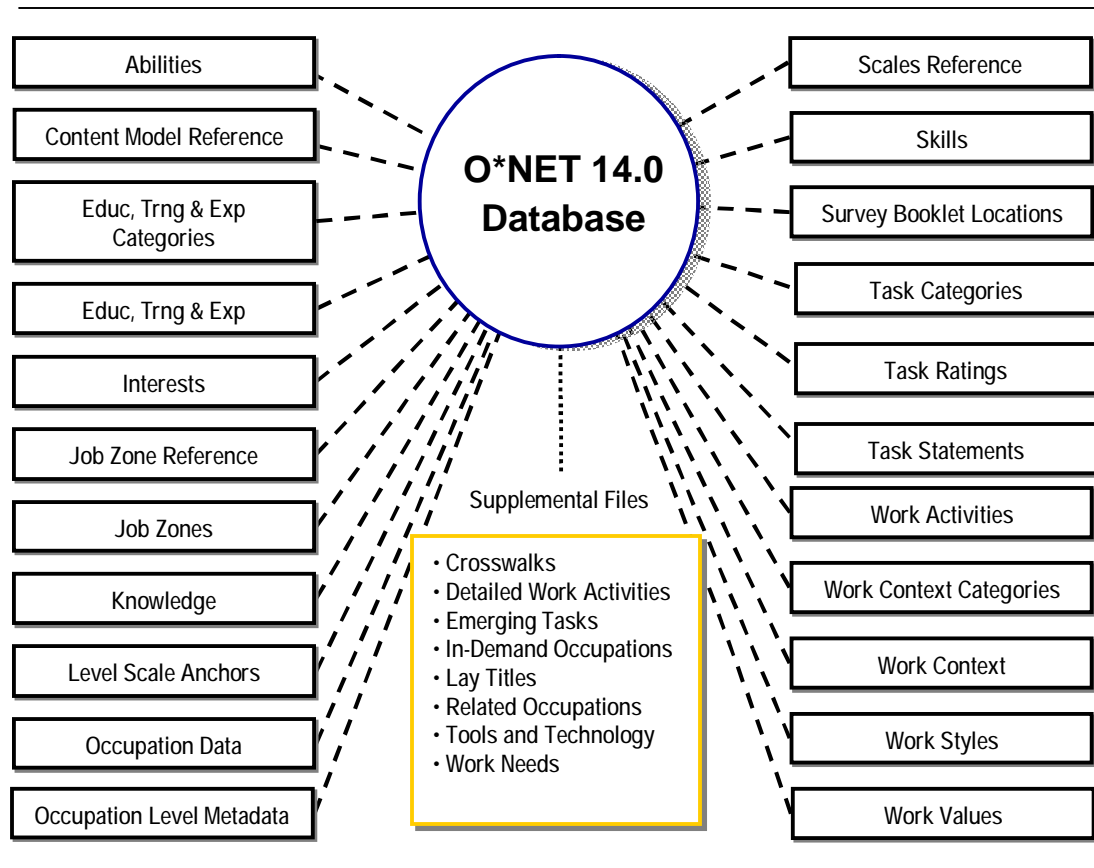


<http://www.onetcenter.org/content.html>



# The O\*NET Database- Version 14.0

- New/Updated Data for 827 Occupations
  - Cross-Occupational + Occupation Specific
  - 230+ variables
  - Importance, level, frequency
  - @ 500 ratings per occupation
  - @ 3500 metadata per occupation



# The O\*NET Database: Metadata

## Ratings Level Statistics

- Standard Error
- Lower 95% Confidence Interval Bound
- Upper 95% Confidence Interval Bound
- Sample Size
- Recommended Suppression
- “Not Relevant for the Occupation” flag

## Occupational Level Statistics

- O\*NET-SOC Establishment Response Rate
- O\*NET-SOC Employee Response Rate
- O\*NET-SOC Case Completeness Rate
- Total Completes for O\*NET-SOC

## Occupational Level Distribution Statistics

- Data Collection Mode
- How long at Current Job
- Industry

# O\*NET Data Publication Schedule

- New database released annually in June
  - Minimum of 100 occupations included
- 2001-2006 two releases per year, 100 occupations per release

# O\*NET 14.0 Release

- 14.0 Database will include 827 occupations with comprehensively updated information
  - 812 2006 O\*NET-SOC Occupations
  - 15 additional N & E Occupations
- The release will include new information for 111 occupations
- Since the initiation the O\*NET data collection, 173 of the 827 occupations have been refreshed twice by job incumbents/occupation experts

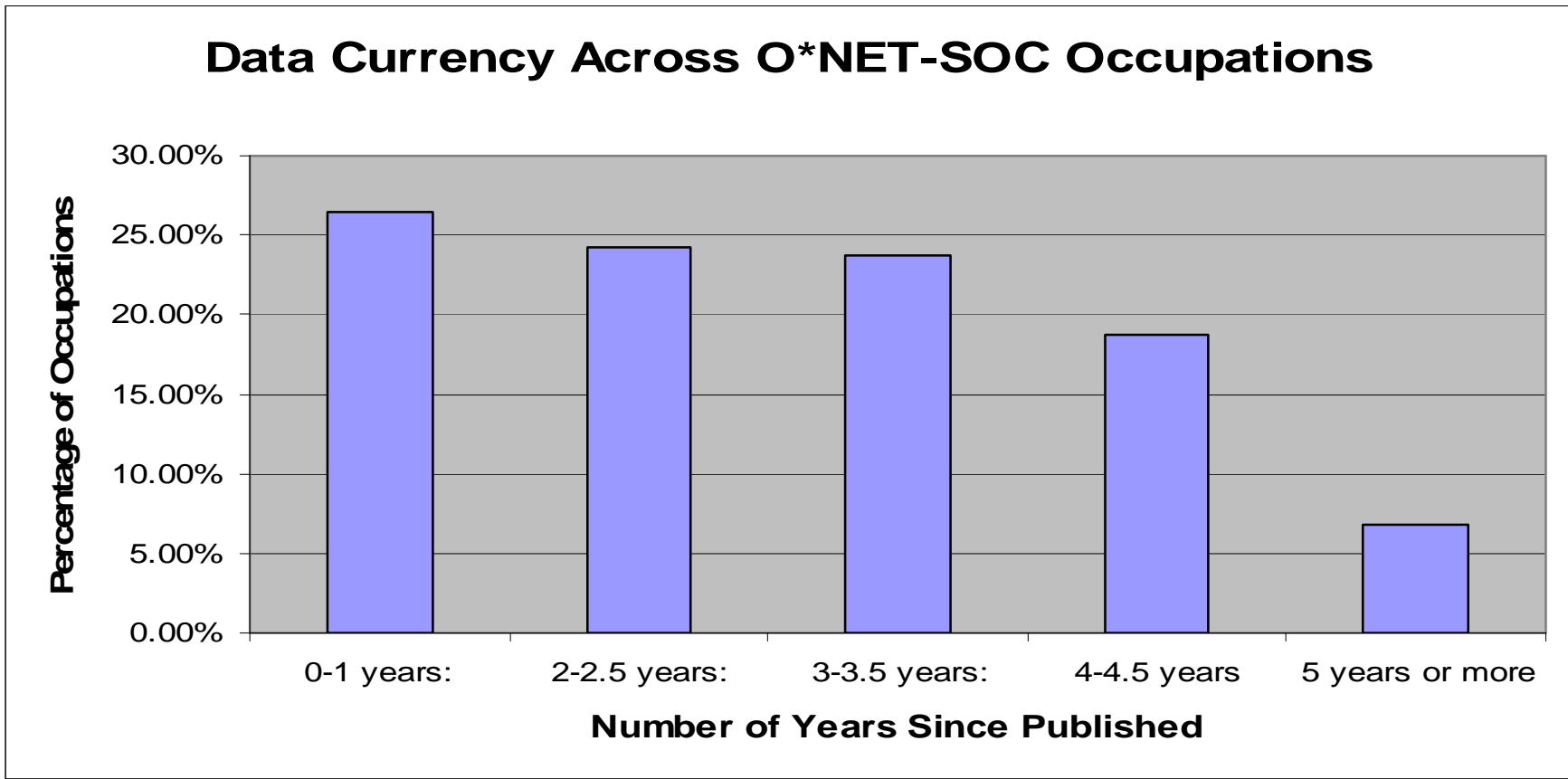
<http://preview.onetcenter.org/center/dataPublication.html>

# O\*NET Data Publication Goals

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- Average currency of all occupations = 2.59 years
- Maximum of 5 years between updates for “demand phase” occupations
  - Identified as “In-Demand” by DOL
  - “Top 50 occupations” identified by DOL
  - High growth rates and/or large employment numbers
  - Linked to technology, math, and science, computers, engineering, and innovation
  - Job Zone
  - Green occupations

# O\*NET Data Currency





# O\*NET Products & Tools

- Where Can O\*NET Products & Tools be found?
  - O\*NET Resource Center ([www.onetcenter.org](http://www.onetcenter.org))
    - Databases
    - Classification & Crosswalks
    - About O\*NET & O\*NET Content Model
    - Career Exploration Tools
    - Toolkit for Business
    - Questionnaires
    - Research & Technical Reports
    - Links to Related Sites
  - Incorporated within Private, Not-for-Profit, and Government tools and systems

# O\*NET Products & Tools

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- O\*NET Database ([www.onetcenter.org](http://www.onetcenter.org))
  - Core Database
  - Supplemental Files (e.g., lay titles, DWAs, crosswalks)
  - Production versus Development
- O\*NET OnLine ([www.onetonline.org](http://www.onetonline.org))
  - Easy access to information in the database
  - Links to national/state information
- O\*NET Code Connector ([www.onetcodeconnector.org](http://www.onetcodeconnector.org))
  - Occupational coding assistant

# O\*NET Products & Tools (Cont.)

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- O\*NET Career Exploration Tools
  - Interest Profiler
  - Work Importance Profiler/Locator
  - Ability Profiler
- Training and E-Learning (<http://www.onetacademy.com/>)
  - 60,000+ registered participants
- Technical Assistance
  - Testing & Assessment Guides
  - Implementation guidance
- Customer Service
  - [onet@ncmail.net](mailto:onet@ncmail.net)

([www.onetcenter.org](http://www.onetcenter.org))



# O\*NET Widespread Use

## O\*NET Downloads Jan 2002 – Dec 2008

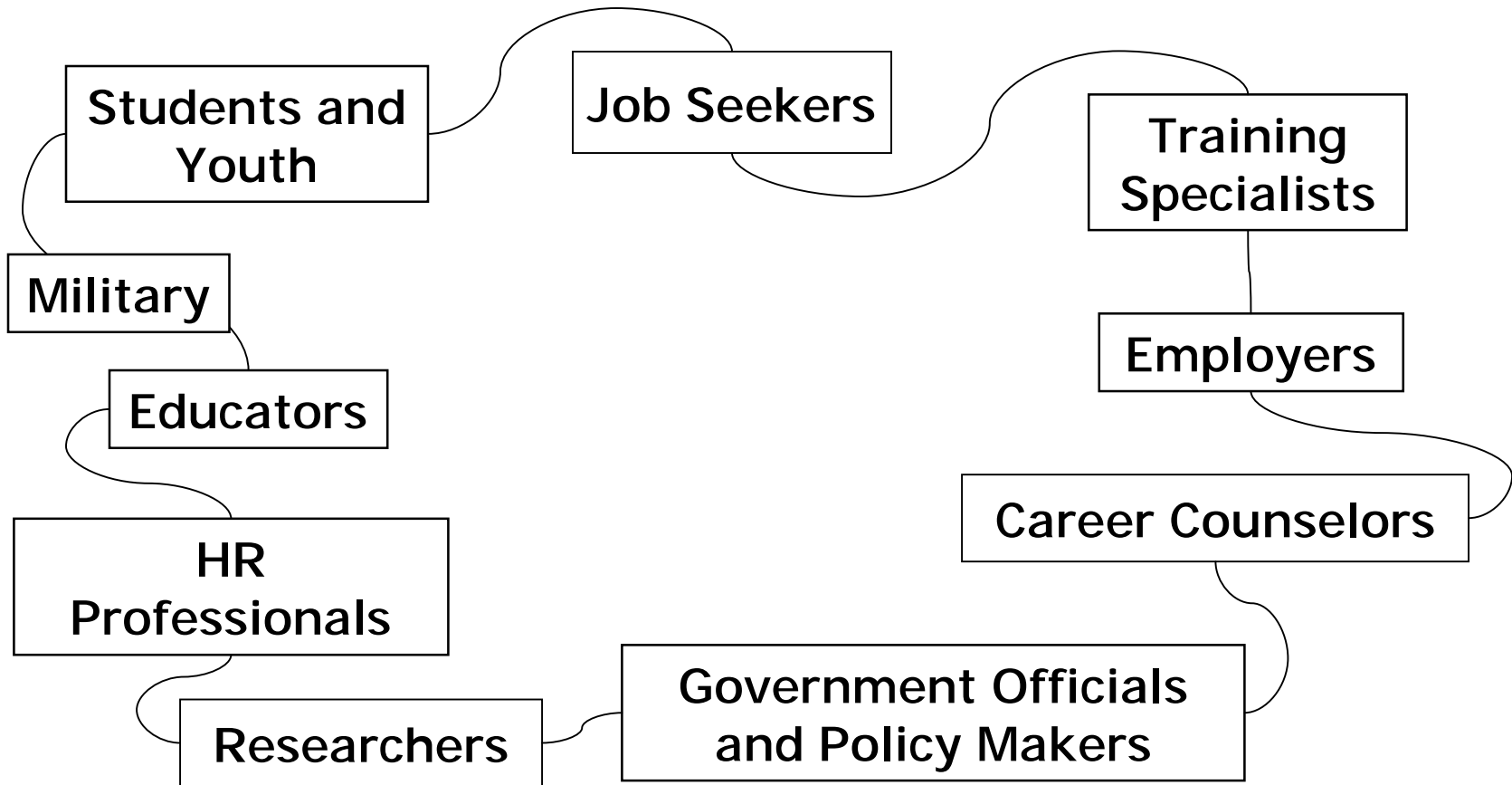
Product	Number of Downloads
Database	70,135
Career Exploration Tools	
Ability Profiler	123,449
Interest Profiler	130,187
Work Importance Locator	68,062
Computerized IP, WIP	88,565
Total Career Exploration Tools	410,263
Other (e.g., Toolkit for Business)	76,930
<b>TOTAL O*NET PRODUCTS</b>	<b>557,328</b>

# O\*NET Widespread Use (cont.)

## O\*NET Website Statistics - 2008

O*NET Online	
average visits per month	766,000
linked sites	14,496
O*NET Resource Center	
average visits per month	76,000
linked sites	4,223
O*NET Code Connector	
average visits per month	37,000
linked sites	1,585
<b>TOTAL VISITS PER MONTH</b>	<b>879,000</b>
<b>TOTAL LINKED SITES</b>	<b>20,304</b>

# Who uses O\*NET?



# Employers Using O\*NET

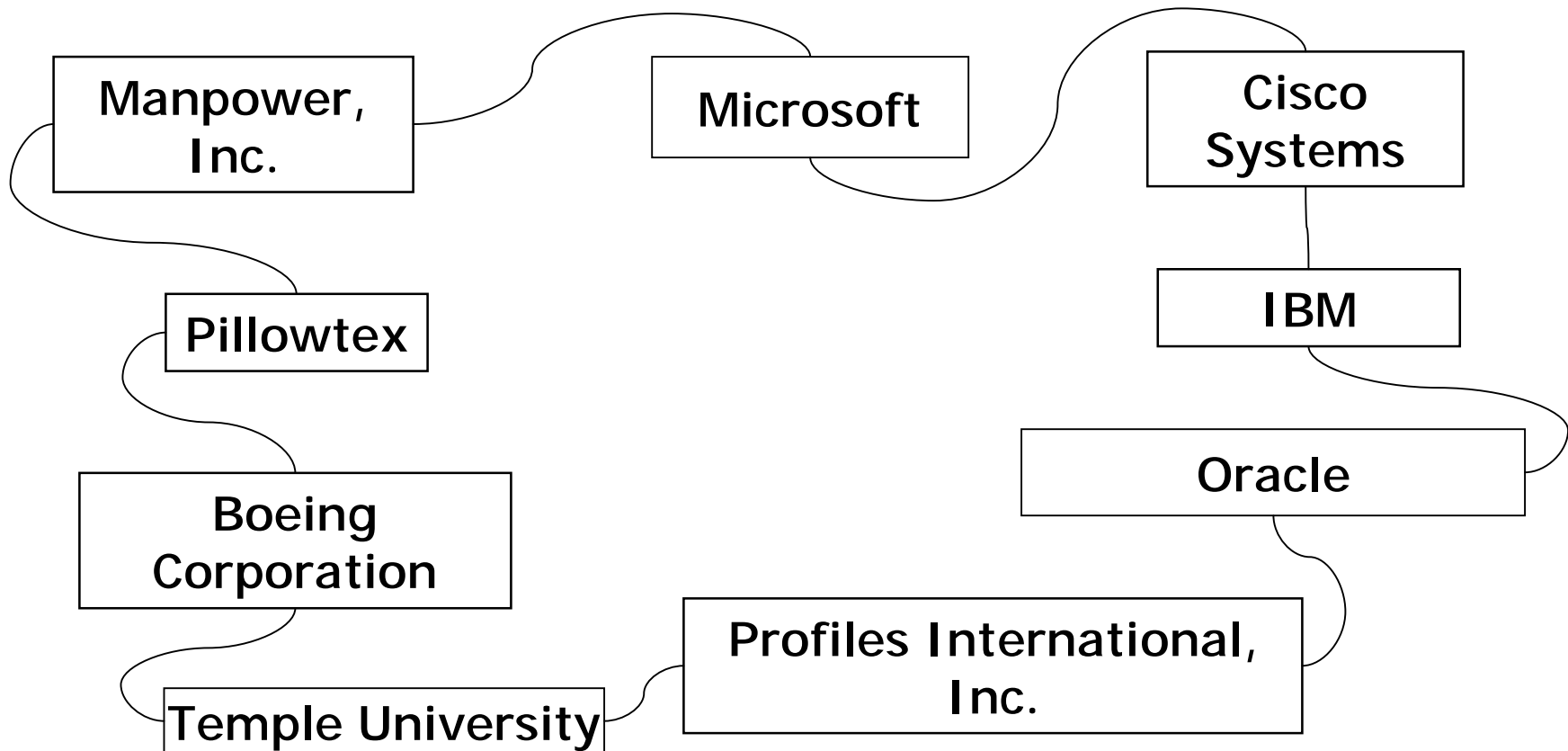
- Job Matching and Training
  - Writing job descriptions and resumes
  - Identifying competencies
  - Identifying skills gaps/training needs
  - Developing training programs

# Employers Using O\*NET

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- Human Resources Personnel
- Business Forecasters
- Industry Analysts
- Organizational Consultants
- Workforce and Economic Development Specialists
- Curriculum Developers
- Researchers

# Employers using O\*NET



# Individuals Using O\*NET

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- Career exploration
- Career development
- Job search
- Employment transitions

## Job Seekers Using O\*NET

- Learn which jobs fit your interests, skills, & experience
- Comparing skills required for different jobs
- Explore in-demand occupations and industries using the latest workforce information
- Identify success factors in your current field & related occupations

# Department of Labor

## Employment & Training Administration

- **Career Voyages**
- **America's Career InfoNet and CareerOneStop E-Tools**
- **Foreign Labor Certification**
- **Apprenticeship**



**U.S. Department of Labor**  
*in the 21st Century*



# One-Stop Partners:

- Career Counselors
- Interviewers
- Rehabilitation Counselors
- Veterans' Representatives
- Training Providers
- Business Consultants



\*IITEL

# O\*NET Data Collection Program

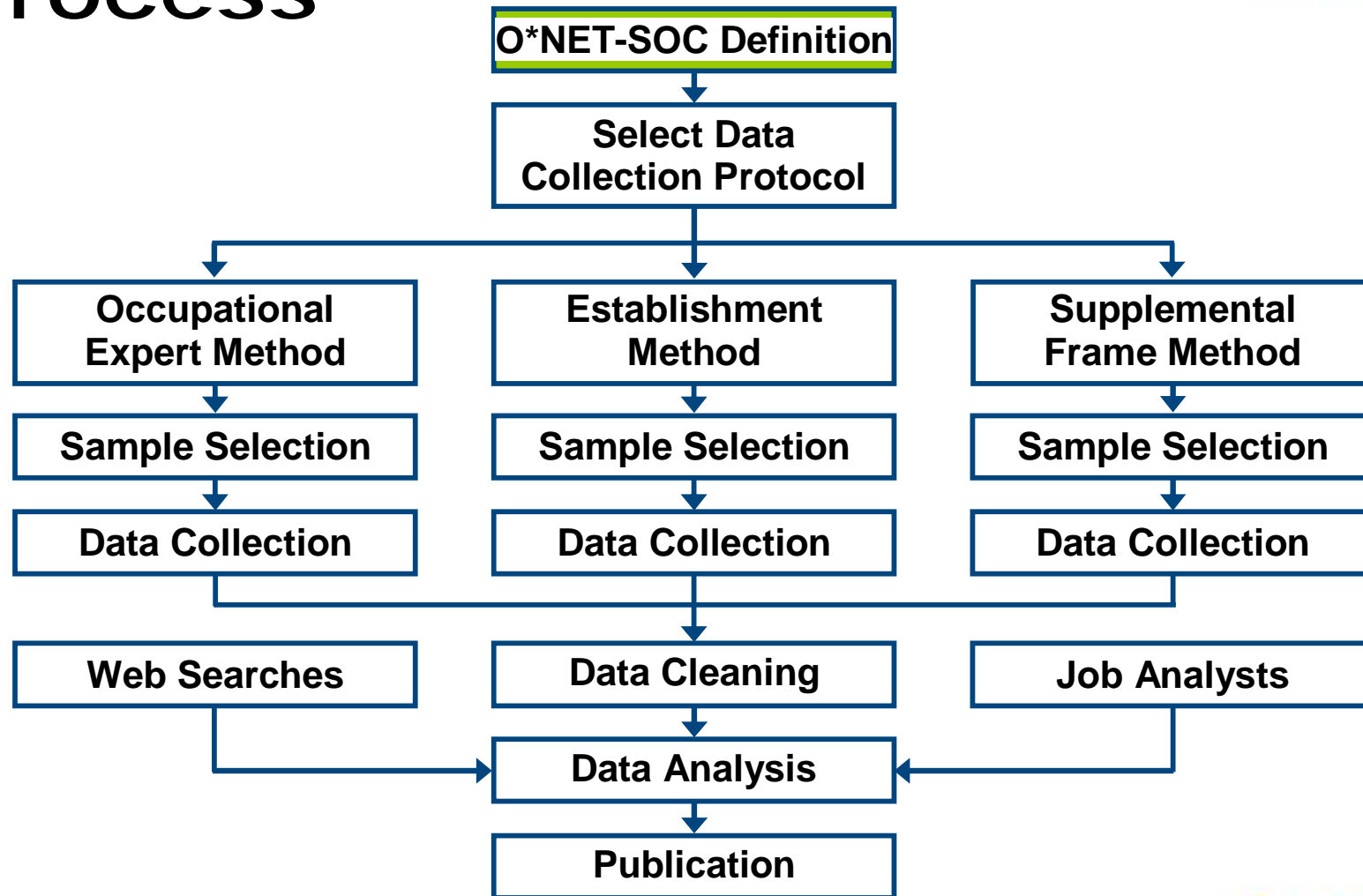
# O\*NET Data Collection Overview

- Proven successful and cost effective methodology designed to collect and yield high quality occupational data
- Multi-method approach to provide flexibility within a framework of standardized procedures
- Approved by Office of Management & Budget (OMB)

# O\*NET Data Collection Overview

- Major Project Milestone
  - Comprehensive update by job incumbents and occupational experts of the 2006 O\*NET-SOC occupations
  - Unparalleled partnership between Department of Labor and private/public community
    - 35,000+ business/organizations
    - 145,000+ job incumbents/experts
    - 450+ National Associations

# O\*NET Data Collection: Overall Process



# Sources of Occupational Data

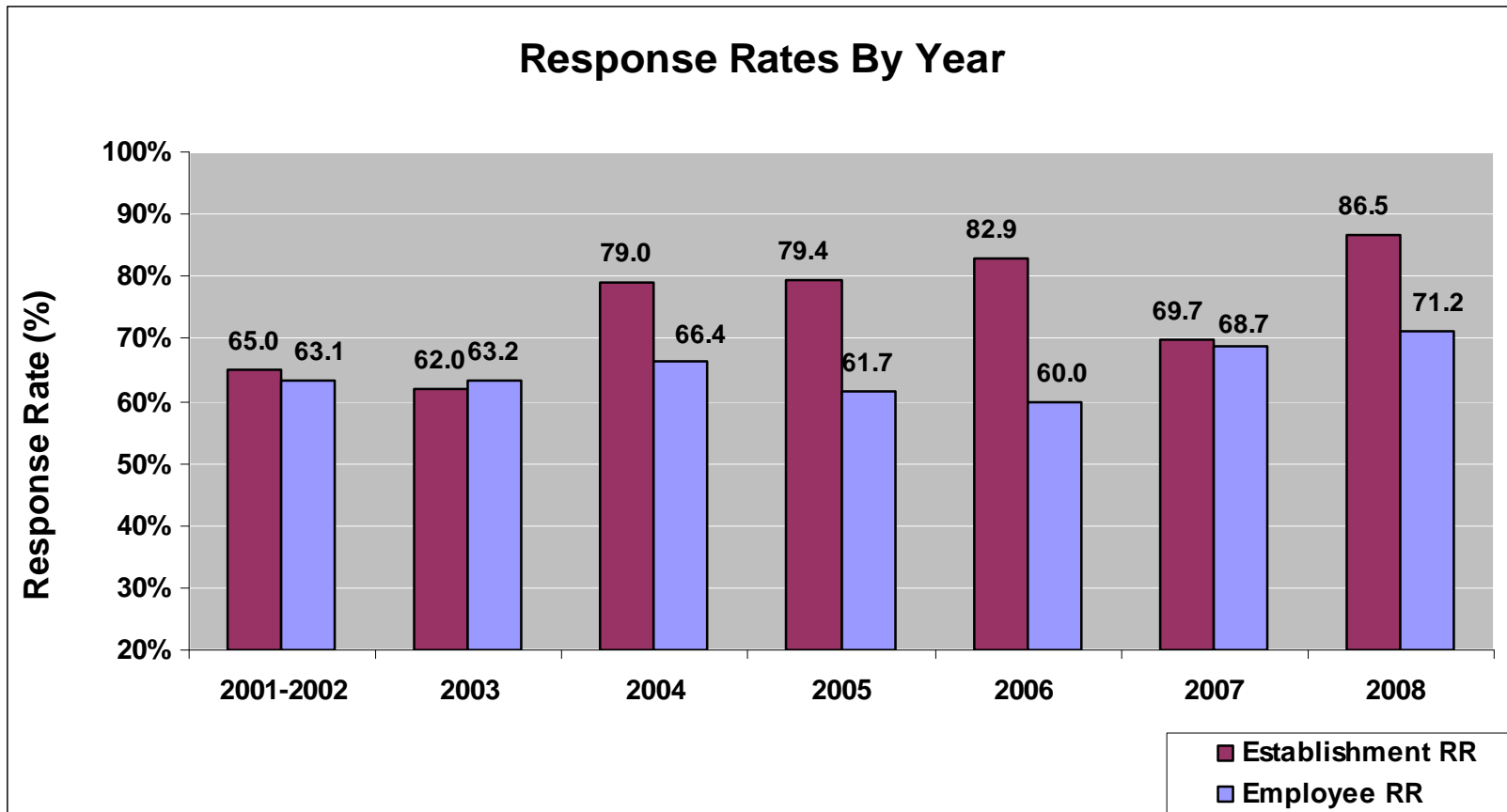
- Job Incumbents and Occupation Experts
  - Knowledge, Skills\*, Work Activities, Work Context, Work Experience, Work Styles, Tasks, Education, Job Titles
- Job Analysts
  - Abilities
  - Skills\*
- Internet sites
  - Tasks
  - Detailed Work Activities
  - Tools and Technologies (T2)

# O\*NET Data Collection Overview

- High quality data from a national sample of job incumbents/occupational experts
  - Strong business participation
    - 75% plus response rate
  - Strong employee participation
    - 64% plus response rate
  - Strong occupation expert participation
    - 82% response
  - Strong national association support
    - 450+ endorsements

# O\*NET Data Collection Overview

- Response rates continue to improve



# Establishment Data Collection

- Two stage sample
  - business establishments
  - job incumbents within business establishments
- Job incumbents choose either paper-and-pencil or web-based response options (requires 25-30 minutes)
- One of three survey questionnaires completed by each job incumbent: Generalized Work Activities, Knowledge/Work Styles, or Work Context
  - Task List
  - Background Info

# Stage One Sampling

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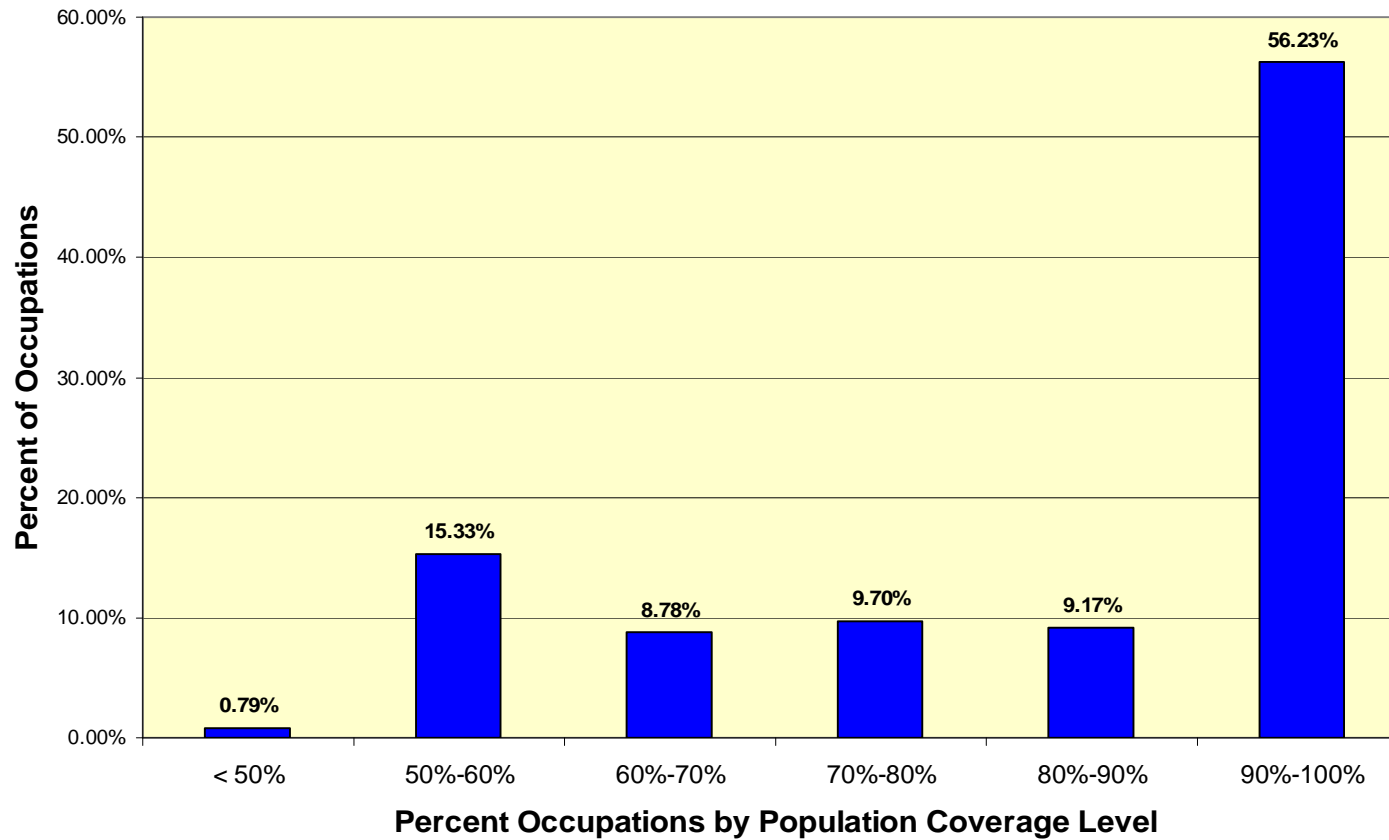
- BLS data used to determine industry distribution for each occupation
- Sample business establishments selected from database of business locations

# Population Coverage

- Gather data on the “core” of the occupation
  - Where the majority of incumbents employed
  - Average coverage level is 85%

# Population Coverage (cont.)

Population Coverage for Occupations Collected Via Establishments



# Establishment Frame

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- ~15 Million Establishments From Dunn & Bradstreet (D&B)
  - Info obtained from several sources
  - Continuously updated

## Design of Collection Waves

- Identify ~50 primary occupations to target in a sample wave (Plus additional secondary occupations)
  - Wave X.1: Designed to get 34% of sample
  - Wave X.2: Designed to get 33% of sample
  - Wave X.3: Designed to get 33% of sample
  - Wave X.4: Sample residual

## Stage Two Sampling

- Each sampled establishment:
  - asked about 10 or fewer occupations
  - never more than 20 employees selected
  - only sampled once each year
- List of eligible employees identified by employer point-of-contact
- Automated random selection of job incumbents from list

# Other Key Features

- **Incentives**
  - Employer incentive
  - Point-of-contact incentive
  - Employee incentive
- **Outreach to professional/trade associations increase awareness**
- **Continuous improvement**
  - Refinement of materials and procedures
  - Continuous monitoring of progress and assessment of effectiveness of processes
  - Parallel research and development track for improvements to instrumentation and methods

# Revision of Data Collection Instruments

- Variety of cognitive methods used to evaluate the content and design of the initial O\*NET data collection surveys
  - Expert evaluation (*cognitive forms appraisal*)
  - Expanded interviews with individual respondents
  - Focus group interviews
- Results led to significant enhancements to the instruments while maintaining comparability to the theoretical underpinnings of the variables and taxonomies, as well their psychometric qualities
  - Simplification of instructions and layout
  - Reduction in the number of items and scales per item
  - Wording changes to specific variable definitions
- Current item response rate range 96-99%

[http://www.onetcenter.org/reports/Data\\_appnd.html](http://www.onetcenter.org/reports/Data_appnd.html)

# Model-Aided Sampling (MAS)

- Innovative sampling approach that reduces data collection cost and burden to the public by preventing occupations from greatly exceeding their targeted sample
  - Builds on existing sampling paradigms: traditional and model based
  - For each occupation, a targeted sample size for specific demographic domains is modeled
    - Census region
    - Establishment size
    - Industry division
- Data collection is halted in a MAS cell when the targeted respondent sample size is projected to be achieved

# Supplemental Frame Method

- Multiple strategies to augment the establishment data collection
  - Supplemental Frame Incumbent
    - Job incumbents are directly accessed via an association listing to complete the data collection
      - e.g. Industrial Organizational Psychologists
  - Supplemental Frame Establishment
    - Targeted employer sample developed via expert contact/associations where the sampling frame coverage is significantly high but is not adequate by itself
      - e.g. Freight and Cargo Inspectors
  - Special Frame Establishment
    - Targeted employer sample completely developed via expert contact/associations where coverage is extremely high
    - Normal establishment method is bypassed
      - e.g. Nuclear Power Reactor Operators; Flight Attendants

# Occupational Experts

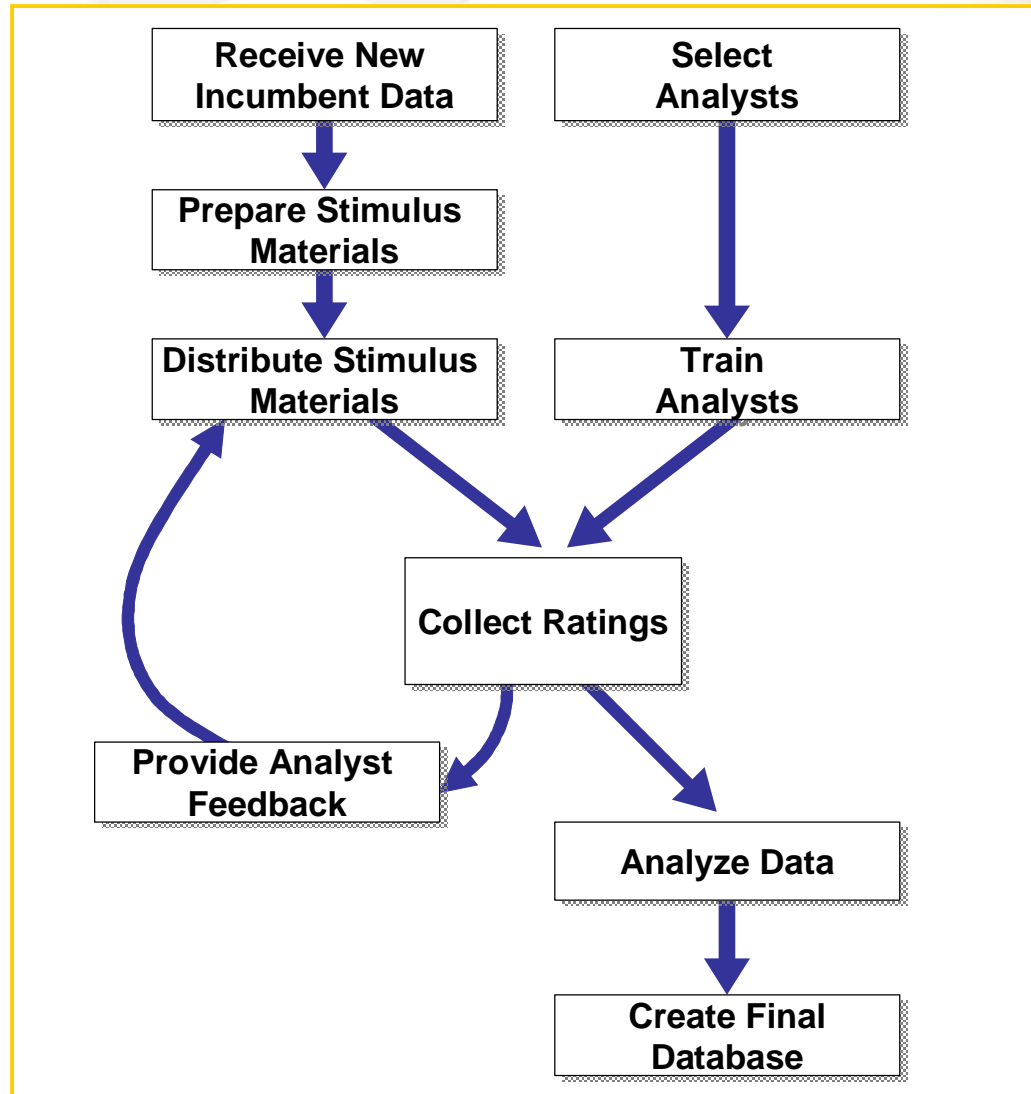
- Supervisors, trainers, or others who are familiar with the work and requirements of an occupation, but are not necessarily job incumbents
- Used when occupation is difficult to locate in establishments
  - Small employment size
  - Job incumbents inaccessible due to work in remote locations
  - New and emerging occupations

# \* IITEL Analyst Ratings

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- Occupational Analysts Rate the Ability and Skill Domains
  - Updated occupation information collected from job incumbents used to describe occupation and assist with the rating process
  - Extensive training and quality assurance procedures

# Analyst Ratings



# Internet Based

- Trained analysts collect and process more specific occupational information from industry, professional, labor, and educational organizations
  - Scan internet for existing information linked to O\*NET-SOC
  - Collect tasks and detailed information
  - Compile data, analyze data/expert review
  - Organize using standardized taxonomies
  - Generate final output

## Special Projects

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# O\*NET Integration Projects

- Occupational Code Assignment
  - Formal request of an assignment of a job/occupation to the O\*NET-SOC Taxonomy
- Lay titles
  - 50,000+ titles
  - Average of 57 titles linked per occupation
- Crosswalks
  - Military Occupational Classification (MOC)
  - Registered Apprenticeship Partners Information Data System (RAPIDS)
  - Classification of Instructional Programs (CIP)
  - Dictionary of Occupational Titles (DOT)
  - Standard Occupational Classification (SOC)
- O\*NET Online Applications
  - Browse by Career Cluster
  - Browse by In-Demand Industry Cluster
  - Browse by Job Family
  - Browse by Science Technology Engineering & Math (STEM)
- O\*NET Occupation Browser
  - CD-ROM based version of O\*NET Online
  - Designed for organizations serving populations with little to no access to the internet

# O\*NET Career Exploration Tools

Tool	Format	Purpose
O*NET Interest Profiler (IP)	Paper/Pencil	Work-related Interests
O*NET Computerized Interest Profiler (CIP)	Standalone or Network	Work-related Interests
O*NET Work Importance Locator (WIL)	Paper/Pencil	What is Important in a Job (Values)
O*NET Work Importance Profiler (WIP)	Standalone or Network	What is Important in a Job (Values)
O*NET Ability Profiler (AP)	Paper/Pencil	What Individual Can Do Well (Ability)

<http://www.onetcenter.org/tools.html>

# \* **Tools and Technology (T2)**

- Machine, Equipment, Tools, and Software workers must be able to use for optimal functioning in a high performance workplace
  - This is what employers refer to as “Hard Skills”
  - Emphasis placed on cutting edge technologies and emerging workplace practices

<http://online.onetcenter.org/link/summary/17-2081.00>

## Tools and Technology (T2)

- 427 high-demand occupations populated
- 32,572 objects
- 76 objects per occupation on average
  - Range = 12-300
- 111 have had an update

# T2 Development

- Internet based data collection
  - Build on previous O\*NET project tasks (i.e., task development)
  - Trained analysts
    - Strong proficiency in Internet searching procedures
    - Strong background and training in occupational analysis

# T2 Development (Cont.)

- First tier
  - Use occupational information to “scrape” the web for T2s
    - Occupational description, tasks, and “raw” task information
  - Successful in capturing objects central to occupation performance
  - Produced the majority of T2s
- Second tier
  - Use industry terms and first tier T2 examples
  - Use the classification system to identify potential gaps or weak areas
  - Successful in capturing cutting-edge technologies, newer, emerging T2s, and increases occupational coverage

# T2 Development

- Data classification
  - *United Nations Standard Products and Services Code* classification system (UNSPSC)
- Quality control
- Customer input
  - Feedback via O\*NET Online & O\*NET Resource Center <http://www.onetcenter.org/t2/>
  - Transactional analysis of DOL's Job Description Writer

## T2 Development (Cont.)

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- Occupation Expert (OE) verification
  - Reviewed sample of occupations
  - High degree of overlap, consensus
  - OE additions at the T2 Example Level, not at the Commodity Level

# O\*NET New & Emerging Project

- New & Emerging Occupations:
  - Significantly different work from existing O\*NET-SOCs
  - Not adequately reflected in current classification
  - Significant employment
  - Positive projected growth rate
  - Education, credentialing, certification programs
  - Related professional associations

<http://www.onetcenter.org/reports/NewEmerging.html>

# O\*NET New & Emerging Project

- Investigate 17 In-Demand Industries
  - Advanced Manufacturing
  - Aerospace
  - Automotive
  - Biotechnology
  - Construction
  - Education\*
  - Energy
  - Financial Services
  - Geospatial Technology
  - Green\*
  - Health Care
  - Homeland Security
  - Hospitality
  - Information Technology
  - Nanotechnology
  - Retail
  - Transportation

*\* Research completed, results being finalized.*

## O\*NET New & Emerging Project

- Extensive Web Search Conducted by Trained Occupational Analysts:
  - Industry Associations and Organizations
  - Educational Programs
  - Job posting sites
- Information Gathered, Documented, and Detailed Criteria for Inclusion Applied

# Identify

- Trained occupational analysts conduct extensive web searches to investigate each industry
  - Background of industry (i.e., when industry started changing)
  - Major innovations in industry
  - Employment trends
  - New products
  - Government regulations (e.g., Automotive Emissions Standards)

## Identify (cont.)

- **Identify potential N & E Occupations within each industry**
  - Search the internet to investigate each industry
    - Industry associations, organization, education, and government websites, job search engine and posting websites.
  - Follow leads from DOL/ETA to study specific N & E occupations
    - Investigate leads to acquire information on changes within industries, and industry specialties

## Identify (cont.)

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- For each potential occupation:
  - Gather and document supporting information
  - Develop initial title and definition

# Evaluate

- Each potential occupation is evaluated in terms of specific criteria:
  - Significantly different work performed from other O\*NET-SOCs
  - Not well-reflected in O\*NET-SOC classification structure
  - Appropriate occupation level
  - Significant employment (at least 5,000+ job incumbents)
  - Positive projected growth
- Each potential occupation is evaluated within the context of its related industry
  - Stems from identifiable industry trend
  - Education, licensure/certification
  - Professional associations and journals/publications

## Incorporate

- For each approved N & E occupation:
  - Finalize and publish title and definition
  - Confirm placement within the Revised O\*NET-SOC Taxonomy

## **Incorporate (cont.)**

- Develop a task list for each approved N & E occupation
  - Implement existing task development procedures
    - Researching relevant websites
    - Reviewing available task lists provided by industry/occupation experts
    - Information obtained during the investigation and evaluation stage of the N & E process serves as strong foundation for developing task lists

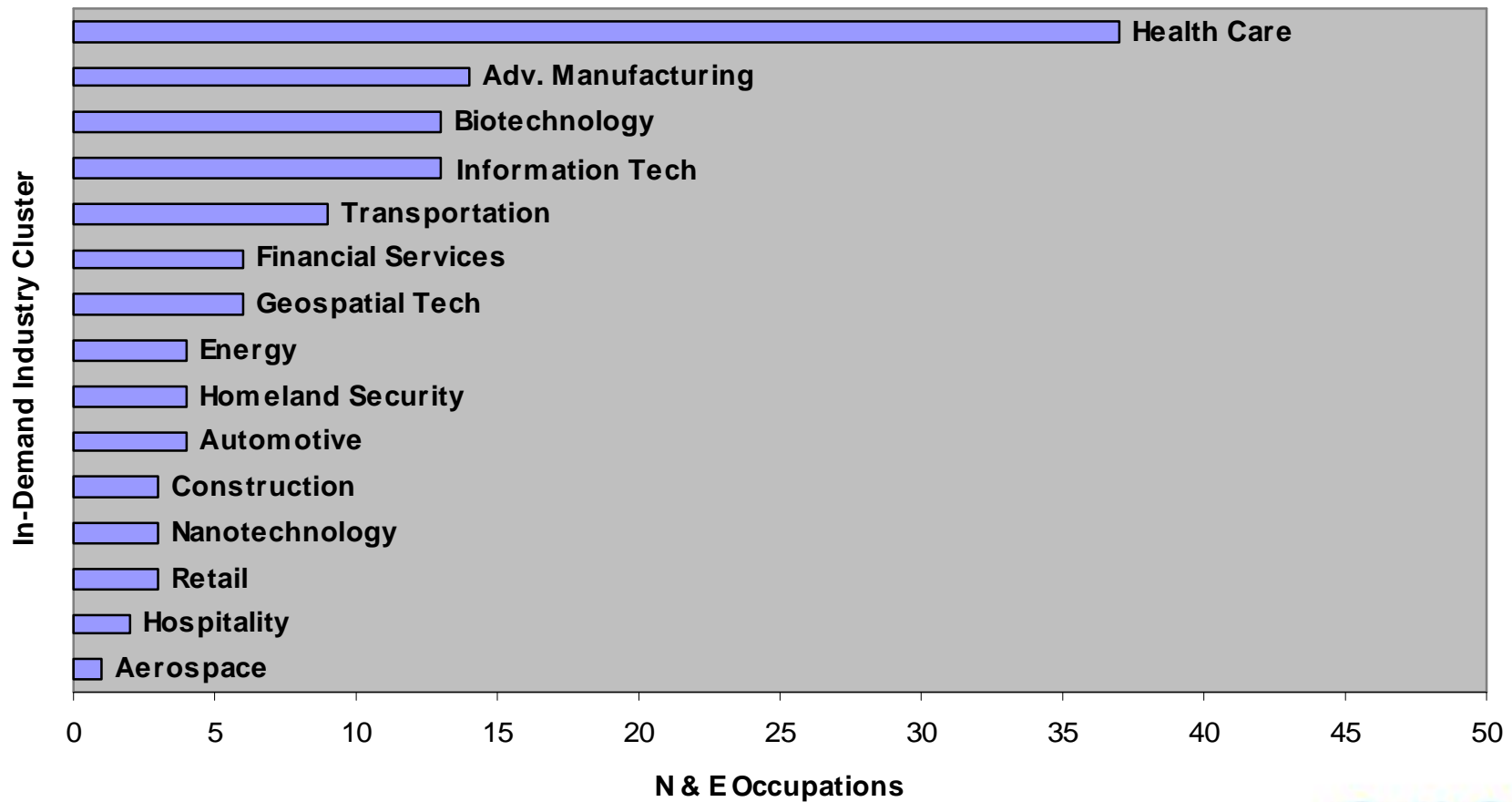
## Results to Date

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- Research on 15 of the 17 In-Demand Industries is completed
  - Education and Green Industries currently being processed
- Currently 167 N & E Occupations have been identified
  - Data collection complete for 21 N & E Occupations
  - Data collection initiated for 114 N & E Occupations

# Results to Date (Cont.)

Total N & E Occupations Identified by In-Demand Industry Cluster



# 37 New Health Care O\*NET-SOCs

- 13-1199.02 Patient Representatives
- 19-3039.01 Neuropsychologists and Clinical Neuropsychologists
- 21-1019.01 Genetic Counselors
- 29-1069.01 Allergists and Immunologists
- 29-1069.02 Dermatologists
- 29-1069.03 Hospitalists
- 29-1069.04 Naturopathic Physicians
- 29-1069.05 Neurologists
- 29-1069.06 Nuclear Medicine Physicians
- 29-1069.07 Ophthalmologists
- 29-1069.08 Pathologists
- 29-1069.09 Physical Medicine and Rehabilitation Physicians
- 29-1069.10 Preventive Medicine Physicians
- 29-1069.11 Radiologists
- 29-1069.12 Sports Medicine Physicians
- 29-1069.13 Urologists
- 29-1129.01 Low Vision Therapists, Orientation and Mobility Specialists, and Vision Rehabilitation Therapists
- 29-1199.01 Acupuncturists
- 29-1199.02 Informatics Nurse Specialists
- 29-1199.03 Acute Care Nurses
- 29-1199.04 Advanced Practice Psychiatric Nurses
- 29-1199.05 Clinical Nurse Specialists
- 29-1199.06 Critical Care Nurses
- 29-1199.07 Nurse Anesthetists
- 29-1199.08 Nurse Practitioners
- 29-2099.01 Cytogenetic Technologists
- 29-2099.02 Cytotechnologists
- 29-2099.03 Electroneurodiagnostic Technologists
- 29-2099.04 Hearing Instrument Specialists
- 29-2099.05 Histotechnologists and Histologic Technicians
- 29-2099.06 Ophthalmic Medical Technologists and Technicians
- 29-2099.07 Orthoptists
- 29-2099.08 Nurse Midwives
- 29-9099.02 Midwives
- 31-9099.01 Anesthesiologist Assistants
- 31-9099.02 Endoscopy Technicians
- 31-9099.03 Speech-language Pathology Assistants

# Greening of the World of Work

- Investigated the implications for the O\*NET System
  - Current O\*NET-SOC Taxonomy
  - N & E Occupations

- “Green Economy”

*economic activity related to reducing the use of fossil fuels, decreasing pollution and greenhouse gas emissions, increasing the efficiency of energy usage, recycling materials, and developing and adopting renewable sources of energy.*

## Green Economy Sectors

- *Renewable Energy Generation*
- *Transportation*
- *Energy Efficiency*
- *Green Construction*
- *Energy Trading*
- *Energy and Carbon Capture*
- *Research, Design, and Consulting Services*
- *Environment Protection*
- *Agriculture and Forestry*
- *Manufacturing*
- *Recycling and Waste Reduction*
- *Governmental and Regulatory Administration*

## Greening of Occupations

- *The extent to which green economy activities and technologies increase the demand for existing occupations, shape the work and worker requirements needed for occupational performance, or generate unique work and worker requirements*

# Greening of Occupations (cont.)

- **Light greening:**

- increase in the employment demand for an existing occupation
- changes in work context
- few if any significant changes in work (tasks) and worker requirements of the occupation

- **Moderate greening:**

- significant changes in work and worker requirements
- essential purposes of the occupation remain the same, but tasks, skills, knowledge, and external elements, such as credentials, have changed
- may or may not result in an increase in employment demand for the occupation

- **Heavy greening:**

- impact of green economy activities and technologies creates unique work and worker requirements, which results in the generation of a new occupation relative to the O\*NET taxonomy.
- The new occupation could be new or “born” from an existing occupation.

# O\*NET Green Results

- **Light greening:**

- 69 O\*NET-SOC occupations

- Geological and Petroleum Technicians; Locomotive Engineers; Architectural Drafters; Chemists; Natural Science Managers; Agricultural Inspectors

- **Moderate greening:**

- 59 O\*NET-SOC occupations

- Power Plant Operators; Electrical Engineers; Heating and Air Conditioner Mechanics and Installers; Roofers; Nuclear Engineers; Construction Managers; Farmers and Ranchers; Hazardous Materials Handlers

# O\*NET Green Results (cont.)

- **Heavy greening:**

- 89 total N & E Occupations

- 45 O\*NET-SOCs previously identified through research on in-demand industry clusters

- Logistic Engineers, Fuel Cell Engineers, Energy Auditors, Precision Agriculture Technicians, Photonics Engineers, Robotics Technicians, Manufacturing Engineering Technologists

- 45 additional candidate N &E occupations

- Wind Turbine or Farm Engineers, Wind Turbine Service Technicians, Biofuels Plant Operators, Solar Power Plant Technicians, Solar Sales Representatives/Assessors, Weatherization Technicians/Installers, Carbon Credit Traders

# Spanish Translations of O\*NET Questionnaires

- Now available along with the previously available generic, customizable versions in English
- Can be used as a starting point to collect occupational data in support of a wide range of economic/workforce investment activities and human resource management functions
- <http://www.onetcenter.org/questionnaires.html>

# O\*NET Toolkit for Business

- Information of the features of O\*NET and its many uses for human resource professionals and businesses
- On-screen and print version

<http://www.onetcenter.org/toolkit.html>

# Questions, Feedback, Additional Input?

[www.onetcenter.org](http://www.onetcenter.org)  
[online.onetcenter.org](http://online.onetcenter.org)

or

Customer Service

National Center for O\*NET Development:

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