Update on the Administration's Policy Framework for Advanced Manufacturing:

Visiting Committee on Advanced Technology
June 19, 2012

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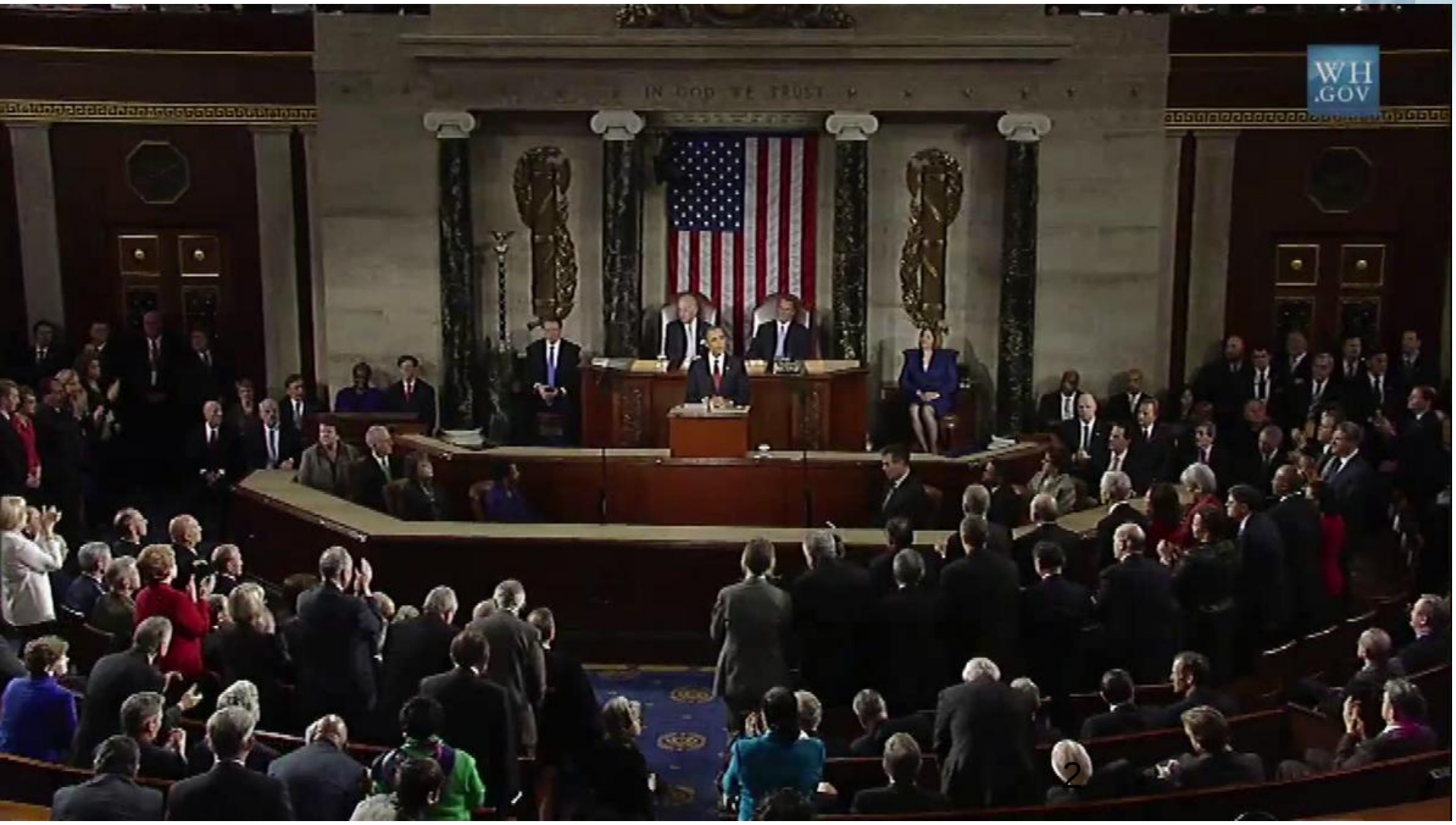
An Economy “Built to Last”



Emerging Policy Consensus on Advanced Manufacturing

- Manufacturing is important to US economic productivity and global competitiveness
  - Quality jobs and large multiplier effects
  - Advanced technology exports
  - National security capability
  - Sustained innovation ecosystem
- Federal government role is to create a supportive environment for manufacturing through comprehensive policy approach
  - Technology
  - Trade
  - Training
  - Taxes
- Robust R&D regime is key to technology development
  - Amount of public/private R&D funding
  - Composition of R&D funding
  - Efficiency of R&D funding

Emerging Policy Consensus on Advanced Manufacturing

- Public/private partnerships improve the efficiency of the technology development life cycle
- Regional innovation clusters – a specific type of public/private partnerships - provide competitive national advantage
- State and local economic development organizations play a key role in fostering regional clusters
- Small and medium sized enterprises must be incorporated into R&D strategies

Third party Studies and Reports on Advanced Manufacturing – Selected List

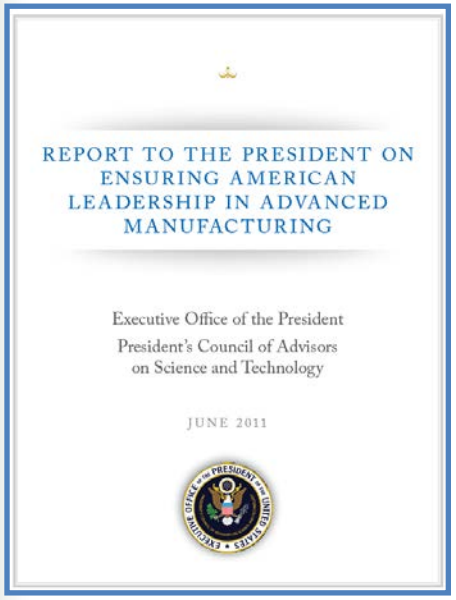
- The Case for a National Manufacturing Strategy
  Information Technology and Innovation Foundation (April 2011)
- International Benchmarking of Countries' Policy and Programs Supporting SME Manufacturers
  Information Technology and Innovation Foundation (September 2011)
- MAKE – An American Manufacturing Moment
  Council on Competitiveness (December 2011)
- Why Does Manufacturing Matter? Which Manufacturing Matters? A Policy Framework
  Brookings Institution (February 2012)
- Emerging Global Trends in Advanced Manufacturing
  Institute for Defense Analysis (March 2012)
- Locating American Manufacturing: Trends in the Geography of Production
  Brookings Institution (April 2012)
- A U.S. Traded Sector Competitiveness Strategy
  Information Technology and Innovation Foundation (April 2012)
- Review of MEP Programs, Operations, Achievements and Challenges
  National Academy of Sciences (Fall 2012)

Commerce and NIST's Role in Manufacturing Has Strong Bipartisan Support

Relevant provisions in America COMPETES Act of 2010

- Increases funding for basic research in NSF, DoE, NIST
- Supports STEM education
- Directs DoC to study innovation capacity and economic competitiveness of US
- Directs creation of inter-agency committee on technology under the NSTC
- Directs MEP to improve training at community colleges to serve the needs of small and medium sized manufacturers
- Directs DoC to create a program of federal loan guarantees for small and medium sized manufacturers
- Directs DoC to study barriers to use of high end computing simulating and modeling for small and medium sized manufacturers

Advanced Manufacturing Recommendations: PCAST



1) Launch a Federal Advanced Manufacturing Initiative

- Concerted, whole-of-government effort, led by DOC, DOD, DOE and NSF
- Report to President on priority needs for Federal investments, including:
  - Coordinated Federal support to academia and industry for applied research on new technologies and design methodologies
  - Development and dissemination of design methodologies
  - Shared facilities and infrastructure to help small and medium-sized firms compete globally
  - Public/Private Partnerships (PPPs) to advance such technologies through pre-competitive consortia

2) Improve Tax Policy

- Reform corporate income taxes, extend the R&D tax credit permanently and increase the rate to 17%, as advocated in the President's Innovation Strategy.

3) Support Research

- Strengthen research of three key science agencies: NSF, DOE O/S, NIST

4) Strengthen the Workforce

- Strengthen science, technology, engineering and mathematics (STEM) education

PCAST Definition of Advanced Manufacturing

"A family of activities that (2) depend on the use and coordination of information, automation, computation, software, sensing and networking, and/or (b) make use of cutting edge materials and emerging capabilities enabled by the physical and biological sciences, for example, nanotechnology, chemistry, and biology. This involves both new ways to manufacture existing products, and especially the manufacture of new products emerging from new advanced technologies."

Technologies Identified by PCAST Critical to Advanced Manufacturing

- Nano-scale carbon materials
- Next generation optoelectronics
- Flexible electronics
- Nanotechnology enabled medical diagnostic devices and therapeutics
- Advanced robotics
- Nano-electronics
- Materials by design
- Bio-manufacturing

PCAST recommends creation of disciplined and transparent process to evaluate technology opportunities, define problems, and make investments

NSTC Interagency Working Group on Advanced Manufacturing

NSTC Committee on Technology:

Interagency Advanced Manufacturing working group

- chartered March 30, 2011
- Co-chaired by DOE, DOD, and NIST

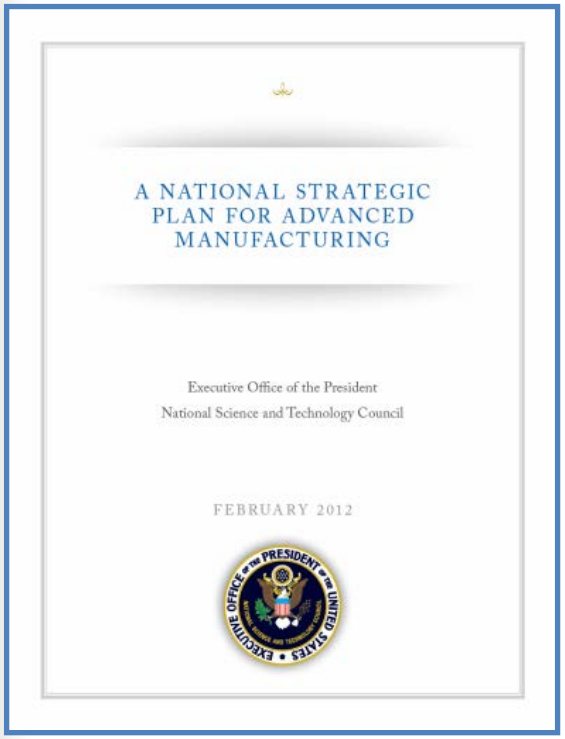
IAM Charter: to develop a strategic plan to guide Federal programs and activities in support of advanced manufacturing research and development

COMPETES REAUTHORIZATION 2010: Congress calls for strategic plan to address

- Foster transfer of R&D results into U.S. based manufacturing
- Strengthen education and training to ensure a well-trained workforce
- Assist SMEs in developing and implementing advanced manufacturing
- Specify objectives, metrics, and roles

Report was released in February 2012

NSTC Interagency Working Group on Advanced Manufacturing



NSTC Committee on Technology:

Interagency Advanced Manufacturing working group

- Co-chaired by DOE, DOD, and NIST
- Report released February 22, 2012

Five Objectives for Federal Policy:

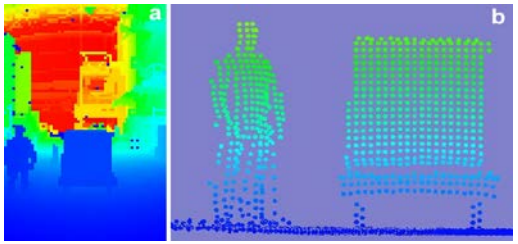
- Accelerating investment, especially by small- and medium-sized manufacturers;
- Making the education and training system more responsive to the demand for skills;
- Optimizing Federal advanced manufacturing R&D investments by taking a portfolio perspective;
- Increasing total public and private investments in advanced manufacturing R&D; and
- Fostering national and regional partnerships among all stakeholders in advanced manufacturing.

http://www.whitehouse.gov/sites/default/files/microsites/ostp/iam_advancedmanufacturing_strategicplan_2012.pdf

NIST 3-Year Programmatic Plan: Priorities for NIST FY2013-2015

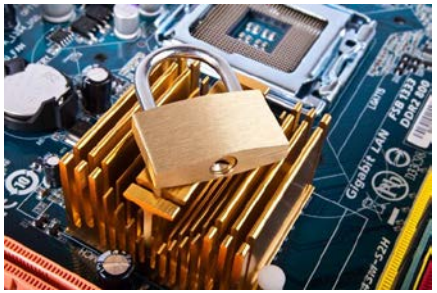
Strengthening US advanced manufacturing

- Develop and deliver measurement science tools
- Support small and medium manufacturing base through Hollings Manufacturing Extension Partnership
- Host Inter-agency Advanced Manufacturing National Program Office
- Launch Advanced Manufacturing Technology Consortia



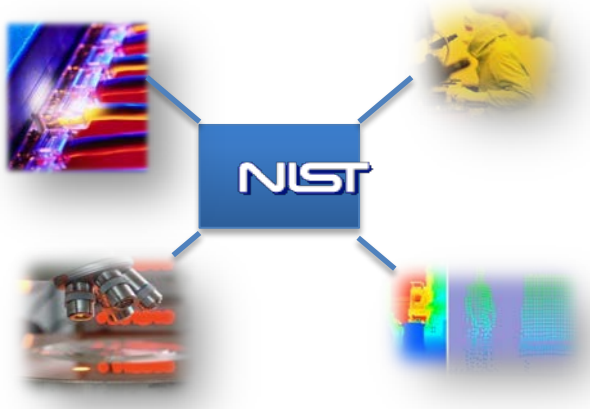
Advancing the state of art in cyber-security solutions

- Cyber security Center of Excellence
- National Strategy for Trusted Identity in Cyberspace



Accelerating technology transfer and commercialization

- Establish/implement 5 year plan to commercialize technology
- Develop a comprehensive definition of technology transfer
- Lead the federal government Inter-agency Work Group on Tech Transfer
- Apply rigorous economic impact models and tools to impact analysis
- Establish new competitive Centers of Excellence



Credit: NIST

NIST and Advanced Manufacturing in FY2013

- A total of $135M invested in Advanced Manufacturing R&D in the NIST Laboratories
  - A $45M increase supporting programs in Advanced Materials, Smart Manufacturing Processes, Biomanufacturing, and Nanomanufacturing
- $128M to support the Manufacturing Extension Partnership programs to strengthen increase the competitiveness of U.S. small and medium manufacturers
- $21M to launch the Advanced Manufacturing Technology Consortia Program
- $1B to establish the National Network for Manufacturing Innovation

Innovation and Industry Service Programs – *Aligned with Manufacturing Priorities*

Technology Partnership Office

- SBIR Program focused on manufacturing
- Partnering with MEP to provide further support to SBIR applicants

Economic Analysis Office

- Provides ground-breaking economic research on advanced manufacturing and R&D
- Launching an economic analysis of infrastructural technology and standards needs in advanced manufacturing

Advanced Manufacturing Office

- Standing up interagency National Program Office
- Designing the National Network for Manufacturing Institutes
- Reviewing proposals for DoD led Additive Manufacturing Institute
- Responding to recommendations from AMP Steering Committee

Technology Innovation Program

- As part of close-down plan – conducting an analysis of the impact of ATP/TIP manufacturing projects

Baldrige Performance Excellence Program

- Successfully transitioned to non-federal appropriation funding model through multi-year commitment of Baldrige Foundation

Hollings Manufacturing Extension Partnership

- Central to federal government's efforts to strengthen manufacturing
- Participant in EDA-led Advanced Manufacturing Jobs and Innovation Accelerator Challenge
- Sponsor 8 State "Policy Academies" with NGA to develop manufacturing strategies

MEP Enabling Legislation – 15 U.S.C. 278k

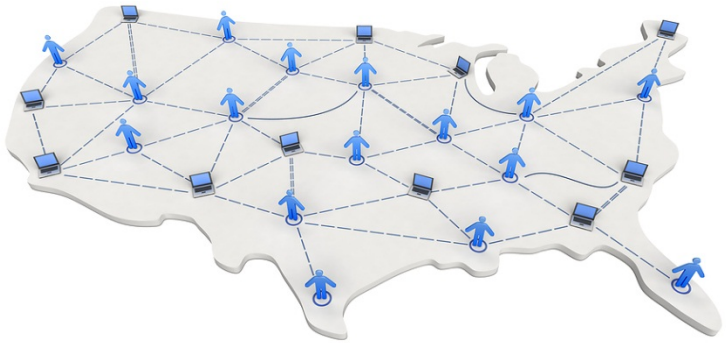
Creation and support of regional centers for the transfer of manufacturing technology – Hollings Manufacturing Extension Centers

Objective: to enhance productivity and technological performance in United States manufacturing through:

- the **transfer of manufacturing technology** and techniques;
- cooperative **technology transfer** activities with industry, universities, state governments, and other federal agencies;
- efforts to **make new manufacturing technology and processes usable** by US- based small- and medium-sized companies;
- the **active dissemination** of scientific, engineering, technical, and management **information** about manufacturing **to industrial firms**
- the **utilization of the expertise and capability** that exists in Federal laboratories other than the Institute.

Manufacturing Extension Partnership: Manufacturing Skills Certification Program

- Announced in June 2011 by President Obama as part of the Skills for America's Future
- Will give status to manufacturing credentials for acceptance by employers
- Designed by NAM affiliate Manufacturing Institute, the Gates Foundation, the Lumina Foundation, the Society of Manufacturing Engineers, the American Welding Society, the National Institute of Metalworking Skills, and the Manufacturing Skills Standards Council
- MEP will be the federal government's agent to educate local manufacturers about the value of this NAM-endorsed skills certification system
- MEP will provide input to the Manufacturing Institute about aggregate skill needs of manufacturers by industry and region



MEP Technology Acceleration Strategy: Buy American Supplier Scouting

- MEP uses national network of 60 Centers with 1400 Staff to bring business opportunities to small US manufacturers
- Finds SMEs who have the capabilities and capacities to solve supply chain and procurement issues facing federal agencies and OEMs
- Programs with Department of Energy, Defense Logistics Agency, Naval Air Systems Command, Veterans Administration
- Significant new program with Department of Transportation to find suppliers – and eliminate the need for "Buy America" waivers- for high speed rail construction
- Four Next Gen Supply Chain Connectivity Forums in 2012 attracted hundreds of potential suppliers

Partnership for a US Manufacturing Renaissance

"Today, I'm calling for all of us to come together- private sector industry, universities, and the government- to spark a renaissance in American manufacturing and help our manufacturers develop the cutting-edge tools they need to compete with anyone in the world…

With these key investments, we can ensure that the United States remains a nation that 'invents it here and manufactures it here' and creates high-quality, good paying jobs for American workers."

President Obama,
on establishing Advanced Manufacturing Partnership
June 24, 2011.

Advanced Manufacturing Partnership (AMP)

President Obama Launches AMP
June 24, 2011
Carnegie Mellon University

AMP Mission
Identify opportunities for investments in R&D, pre-competitive collaboration, and shared facilities and infrastructure that have the potential to transform advanced manufacturing in the United States, and recommend collaborative approaches that will realize these opportunities

AMP Goals
- Sustain US advanced manufacturing capability
- Increase private sector investment in manufacturing
- Create new or enhance existing public private partnerships
- Leverage advanced infrastructure (e.g., facilities access)

AMP Steering Committee Members

University Presidents

Susan Hockfield, President, Massachusetts Institute of Technology
Jared L. Cohon, President, Carnegie Mellon University
George P. "Bud" Peterson, President, Georgia Institute of Technology
John Hennessy, President, Stanford University
Robert J. Birgenau, Chancellor, University of California, Berkeley
Mary Sue Coleman, President, University of Michigan

Chief Executive Officers

Andrew Liveris, CEO, Dow Chemical
Richard Harshman, CEO, Allegheny Technologies
Douglas Oberhelman, CEO, Caterpillar
Wendell Weeks, CEO, Corning
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Wes Bush, CEO, Northrop Grumman
Bob McDonald, CEO, Procter & Gamble
Stephen MacMillian, CEO, Stryker
Louis Chenevert, CEO, United Technologies

AMP Steering Committee

AMP Steering Committee Leadership

Andrew Liveris
CEO, Dow Chemical

Susan Hockfield
President, MIT

AMP Steering Committee: Leading experts from industry and academia, operating under PCAST providing recommendations on advanced manufacturing

1. Manufacturing Policy
2. Technology Development
3. Shared Infrastructure and Facilities,
4. Education and Workforce Development

AMP Outreach workshops held October 14 (Georgia Tech), November 28 (MIT), December 5 (Berkeley), and December 12 (Michigan).

Over 1200 stakeholders participated; a number of surveys; and numerous consultations with subject matter experts .

AMP Steering Committee Report (to PCAST)

- April 16, 2012, PCAST meeting reviewed the AMP Steering Committee report and unanimously approved transmittal to the President
  - The Steering Committee reached consensus despite the complexity of issue on sixteen (16) total recommendations in three major themes: Enabling Innovation; Securing Talent Pipeline; Improving Business climate
  - Enabling Innovation: 6 recommendations
    - Recommend a permanent public-private mechanism to identify key technologies; prioritize them; define future needs; and drive implementation of future federal technology roadmaps
    - Identifies a list of 11 critical technologies important for any nation to develop
    - Recommends formation of Manufacturing Innovation Institutes that are co-led by industry and academia to accelerate development of these technologies and develop the talent
  - Securing Talent Pipeline: 6 recommendations in 3 general areas
    - Image of Manufacturing
    - Education
    - Veterans
  - Improving Business Climate: 4 recommendations
    - Tax Reform
    - Smarter Regulation
    - Improve Trade policy
    - Updated Energy policy
  - PCAST recommends key role for NIST NPO in coordinating the "whole of government" response

http://www.whitehouse.gov/photos-and-video/video/2012/04/26/pcast-april-conference-call

Questions?

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