



OF THE ROAD FOR MY CAREER

Vijay Janapa Reddi, Ph.D.
Electrical and Computer Engineering
The University of Texas at Austin





“The NSF Early Faculty Development (CAREER) Program Award is the most sought-after recognition a new faculty member can receive.”

dlockhar@nsf.gov

December 26, 2013 at 5:00 PM

To: Vijay Janapa Reddi Cc: helen.moore-logue@austin.utexas.edu
NSF Proposal Notification - Proposal No.-1350761



Proposal Number: 1350761
Title: CAREER: Architectural Innovation for the Next-Generation Mobile Web

Dear Dr. Janapa Reddi:

I regret to inform you that the National Science Foundation is unable to support your proposal referenced above.

Your proposal was reviewed in accordance with the general merit review criteria established by the National Science Board that address the intellectual merit of the proposed activity and its broader impacts. These criteria permit an evaluation of the proposal's technical merit, creativity, educational impact and its potential benefits to society. If your proposal was submitted in response to a specific solicitation, additional review criteria may have been used to review your proposal as described in the solicitation.

The full text of the two merit review criteria and supporting explanations are available in Chapter III.A of the NSF *Grant Proposal Guide* <http://www.nsf.gov/publications/pub_summ.jsp?ods_key=papp>.

You may access the reviews of your proposal, a description of the context in which your proposal was reviewed, and any further analysis or statements at the FastLane URL referenced below. This information may be helpful to you in understanding the Foundation's action and also in preparing any future submissions. If you would like further information concerning the review of your proposal, please contact the cognizant program officer whose name, email address, and telephone number are provided below. Information about NSF's reconsideration process is described in Chapter IV.D of the NSF *Grant Proposal Guide* <http://www.nsf.gov/publications/pub_summ.jsp?ods_key=papp>¹.

Although we are unable to support this proposal, we would be pleased to consider any future proposal you may wish to submit.

Sincerely,

Deborah Lockhart
Division Director
Division of Computer and Communication Foundations

Cognizant Program Officer: Hong Jiang, hjiang@nsf.gov, (703)292-8910

Reviews, and if applicable, the Panel Summary, Context Statement and Site Visit Report may be found at <https://www.fastlane.nsf.gov/jsp/homepage/proposals.jsp>.

dlockhar@nsf.gov

December 26, 2013 at 5:00 PM

To: Vijay Janapa Reddi Cc: helen.moore-logue@austin.utexas.edu
NSF Proposal Notification - Proposal No.-1350761

Proposal Number: 1350761
Title: CAREER: Architectural Innovation for the Next-Generation Mobile Web

Dear Dr. Janapa Reddi:

I regret to inform you that the National Science Foundation is unable to support your proposal referenced above.

Your proposal was reviewed in accordance with the general merit review criteria established by the National Science Board that address the intellectual merit of the proposed activity and its broader impacts. These criteria permit an evaluation of the proposal's technical merit, creativity, educational impact and its potential benefits to society. If your proposal was submitted in response to a specific solicitation, additional review criteria may have been used to review your proposal as described in the solicitation.

The full text of the two merit review criteria and supporting explanations are available in Chapter III.A of the NSF *Grant Proposal Guide* <http://www.nsf.gov/publications/pub_summ.jsp?ods_key=papp>.

You may access the reviews of your proposal, a description of the context in which your proposal was reviewed, and any further analysis or statements at the FastLane URL referenced below. This information may be helpful to you in understanding the Foundation's action and also in preparing any future submissions. If you would like further information concerning the review of your proposal, please contact the cognizant program officer whose name, email address, and telephone number are provided below. Information about NSF's reconsideration process is described in Chapter IV.D of the NSF *Grant Proposal Guide* <http://www.nsf.gov/publications/pub_summ.jsp?ods_key=papp>¹.

Although we are unable to support this proposal, we would be pleased to consider any future proposal you may wish to submit.

Sincerely,

Deborah Lockhart
Division Director
Division of Computer and Communication Foundations

Cognizant Program Officer: Hong Jiang, hjiang@nsf.gov, (703)292-8910

Reviews, and if applicable, the Panel Summary, Context Statement and Site Visit Report may be found at <https://www.fastlane.nsf.gov/jsp/homepage/proposals.jsp>.

dlockhar@nsf.gov

To: Vijay Janapa Reddi Cc: helen.moore-logue@austin.utexas.edu
NSF Proposal Notification - Proposal No.-1350761

December 26, 2013 at 5:00 PM

Proposal Number: 1350761

Title: CAREER: Architectural Innovation for the Next-Generation Mobile Web

Dear Dr. Janapa Reddi:

I regret to inform you that the National Science Foundation is unable to support your proposal referenced above.

Your proposal was reviewed in accordance with the general merit review criteria established by the National Science Board that address the intellectual merit of the proposed activity and its broader impacts. These criteria permit an evaluation of the proposal's technical merit, creativity, educational impact and its potential benefits to society. If your proposal was submitted in response to a specific solicitation, additional review criteria may have been used to review your proposal as described in the solicitation.

The full text of the two merit review criteria and supporting explanations are available in Chapter III.A of the NSF *Grant Proposal Guide*
<http://www.nsf.gov/publications/pub_summ.jsp?ods_key=papp>.

You may access the reviews of your proposal, a description of the context in which your proposal was reviewed, and any further analysis or statements at the FastLane URL referenced below. This information may be helpful to you in understanding the Foundation's action and also in preparing any future submissions. If you would like further information concerning the review of your proposal, please contact the cognizant program officer whose name, email address, and telephone number are provided below. Information about NSF's reconsideration process is described in Chapter IV.D of the NSF *Grant Proposal Guide*
<http://www.nsf.gov/publications/pub_summ.jsp?ods_key=papp>¹.

Although we are unable to support this proposal, we would be pleased to consider any future proposal you may wish to submit.

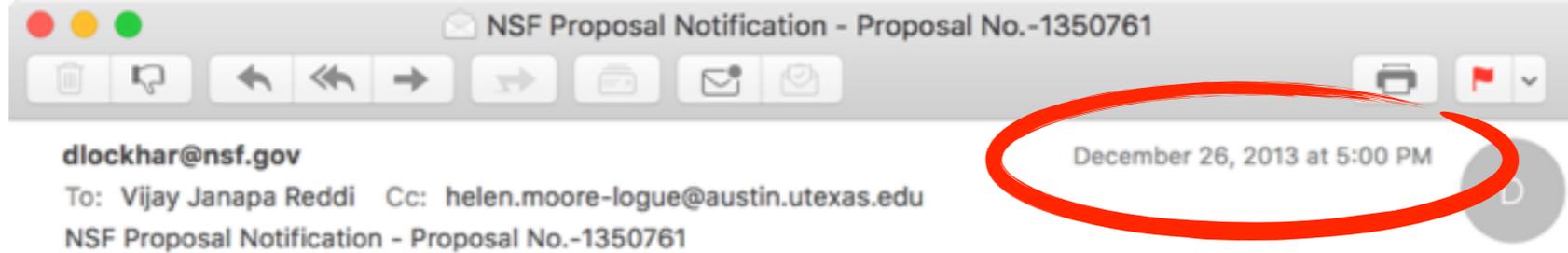
Sincerely,

Deborah Lockhart
Division Director
Division of Computer and Communication Foundations

Cognizant Program Officer: Hong Jiang, hjiang@nsf.gov, (703)292-8910

Reviews, and if applicable, the Panel Summary, Context Statement and Site Visit Report may be found at
<https://www.fastlane.nsf.gov/jsp/homepage/proposals.jsp>.





Proposal Number: 1350761
Title: CAREER: Architectural Innovation for the Next-Generation Mobile Web

Dear Dr. Janapa Reddi:

I regret to inform you that the National Science Foundation is unable to support your proposal referenced above.

Your proposal was reviewed in accordance with the general merit review criteria established by the National Science Board that address the intellectual merit of the proposed activity and its broader impacts. These criteria permit an evaluation of the proposal's technical merit, creativity, educational impact and its potential benefits to society. If your proposal was submitted in response to a specific solicitation, additional review criteria may have been used to review your proposal as described in the solicitation.

The full text of the two merit review criteria and supporting explanations are available in Chapter III.A of the NSF *Grant Proposal Guide*
<http://www.nsf.gov/publications/pub_summ.jsp?ods_key=papp>.

I received another two emails like this in 2014 and 2015, marking the end of my CAREER.

Although we are unable to support this proposal, we would be pleased to consider any future proposal you may wish to submit.

Sincerely,

Deborah Lockhart
Division Director
Division of Computer and Communication Foundations

Cognizant Program Officer: Hong Jiang, hjiang@nsf.gov, (703)292-8910

Reviews, and if applicable, the Panel Summary, Context Statement and Site Visit Report may be found at <https://www.fastlane.nsf.gov/jsp/homepage/proposals.jsp>.



Disclaimer: The views expressed in this presentation are solely my own and do not reflect those of my employer, students, NSF, colleagues, or anyone else.

My CAREER development ...







Number of mobile
computing papers in
ISCA, MICRO, HPCA,
ASPLOS in 2010

== ?



Number of mobile
computing papers in
ISCA, MICRO, HPCA,
ASPLOS in 2010

== 1/157



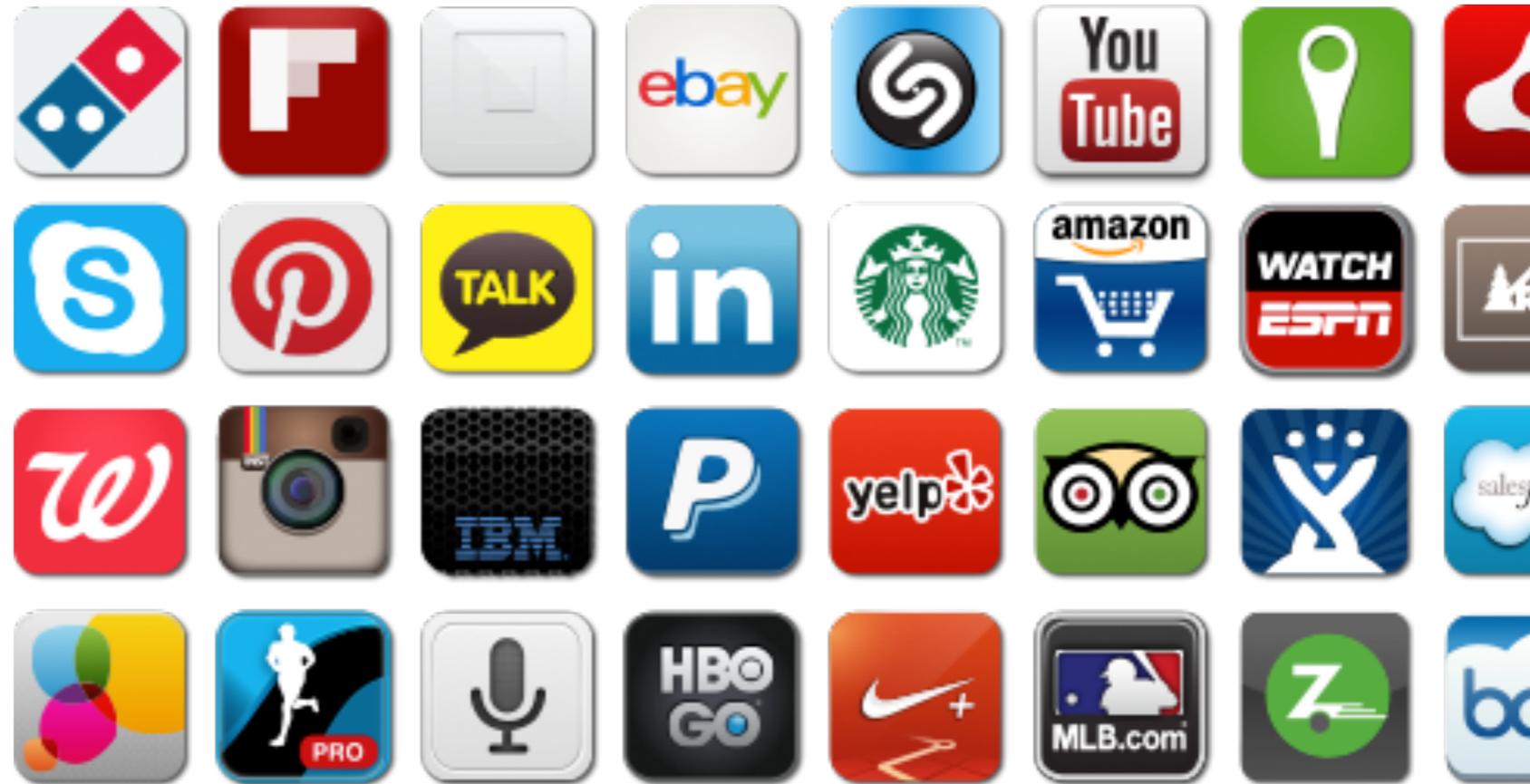
**< 1% of all papers
are on mobile***

*Papers from ISCA, MICRO, HPCA, ASPLOS based on titles and session names. Does not consider papers that are generic (micro)architectural techniques that could be put to use in mobile application processors.

Mobile Applications



Mobile Applications



Web Mobile Applications

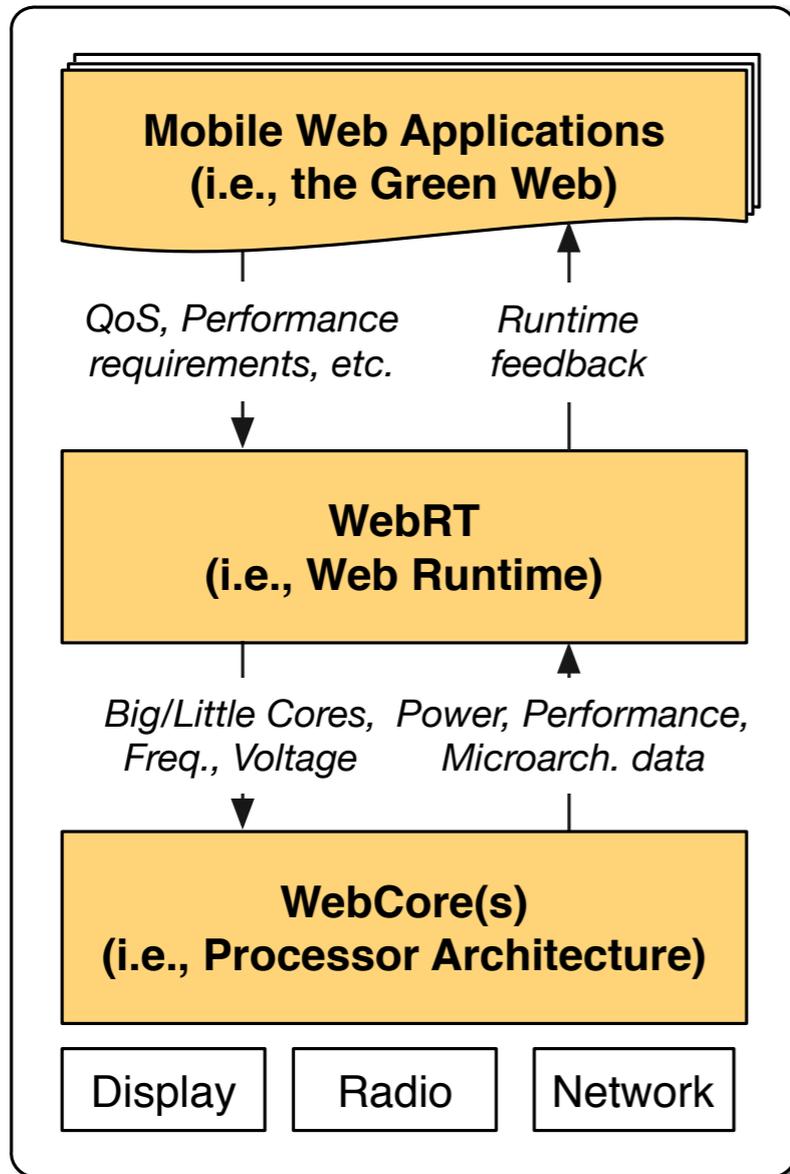




+



Mobile Device (Client-side Computing)



eQoS-Aware Web Application Design

- Understand QoS vs. Performance vs. Energy
- Language Extensions: e.g., <QoS>

Intelligent Web Runtime

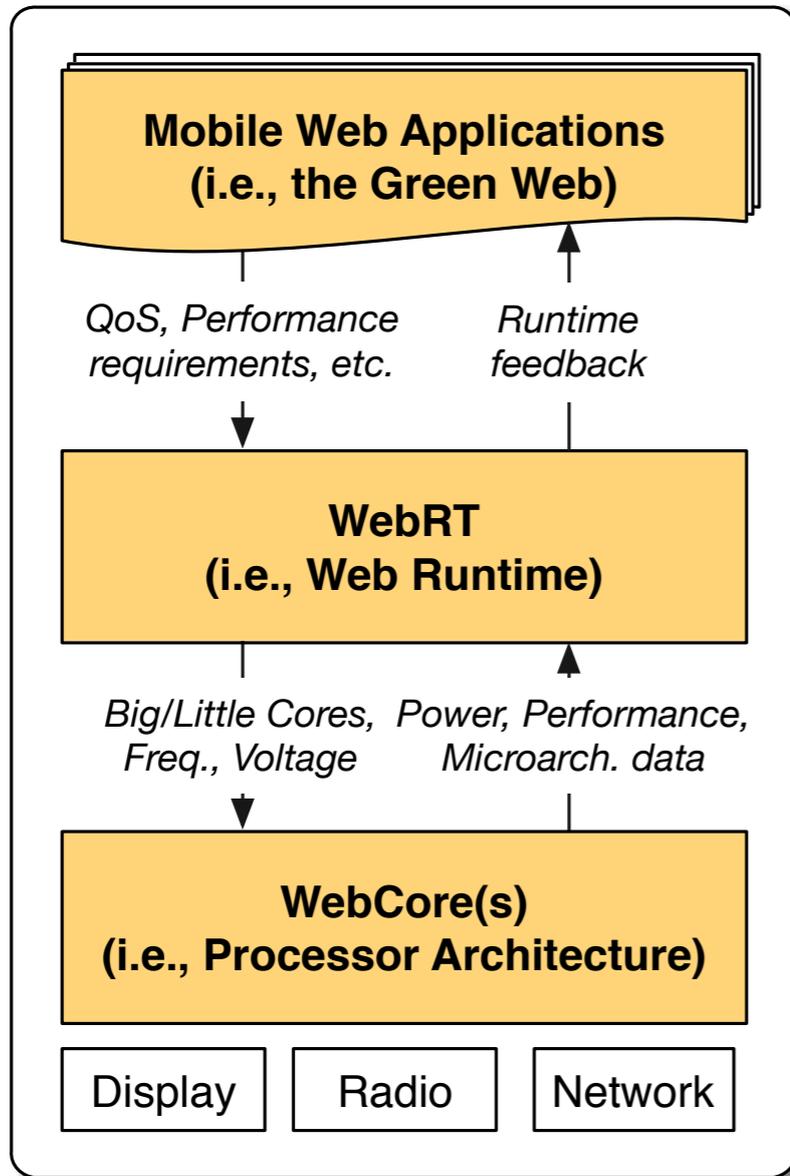
- Webpage Perf / Energy Prediction
- Web Workloads Scheduling

Web-specific Processor Architecture

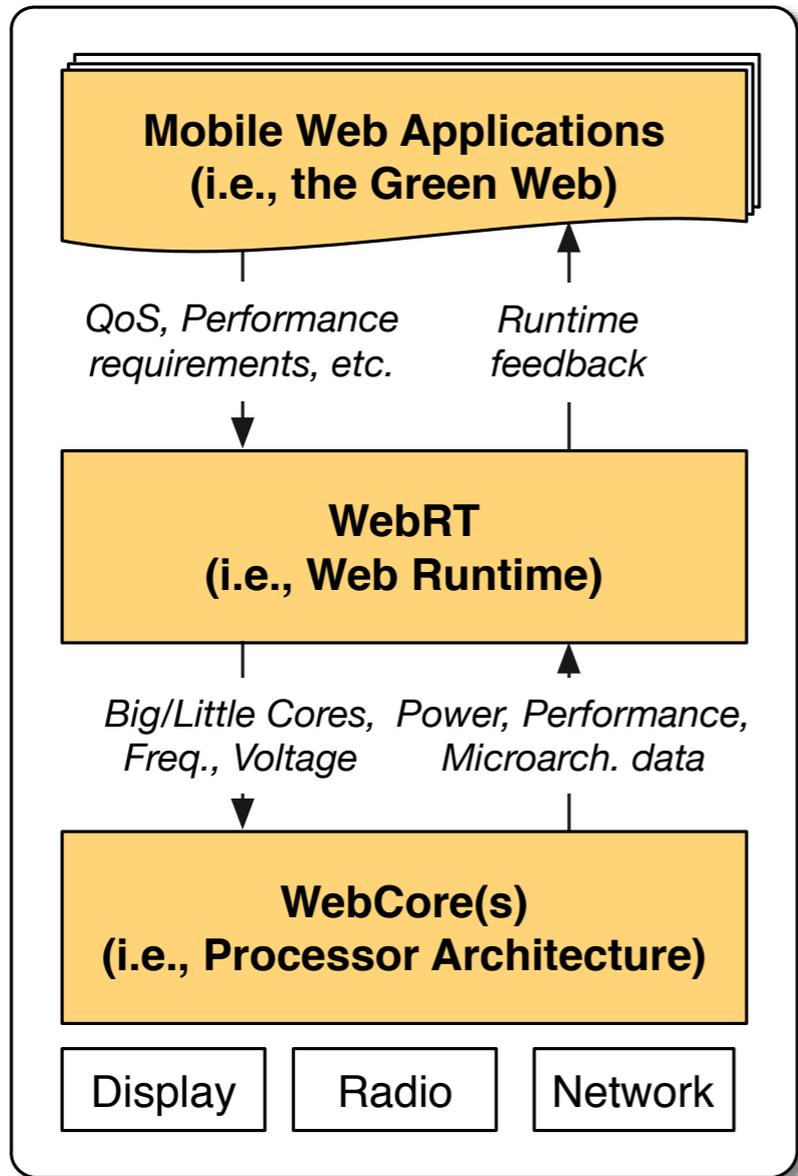
- Web-optimized General-purpose Cores
- An Event-Driven Architecture

[HPCA'16, MICRO'15, HPCA'15, ISCA'14, ISPASS'15, IEEE Micro'15, HPCA'13, TOCS'11, ISCA'10, ...]

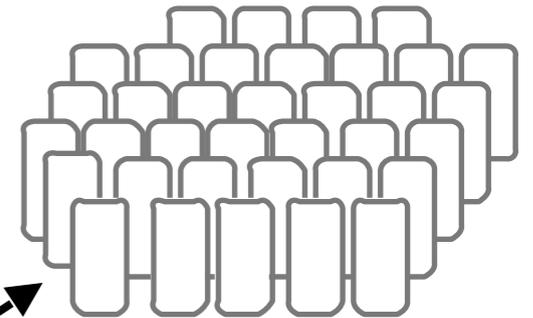
Mobile Device (Client-side Computing)



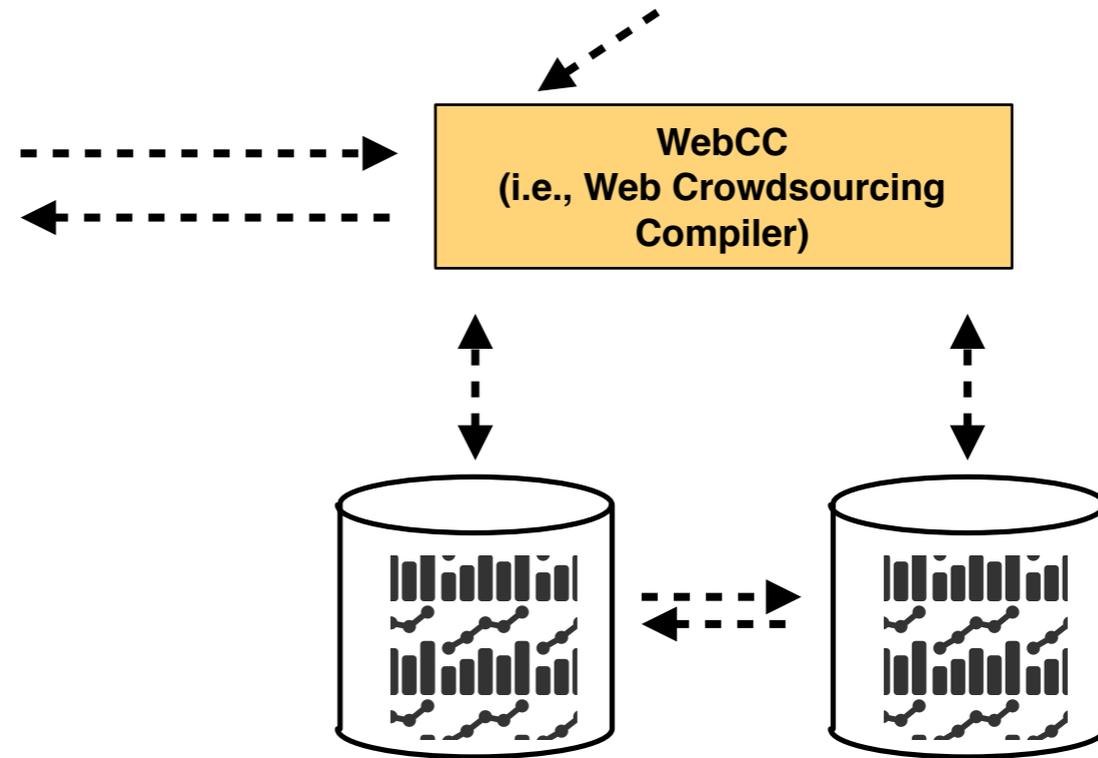
Mobile Device (Client-side Computing)



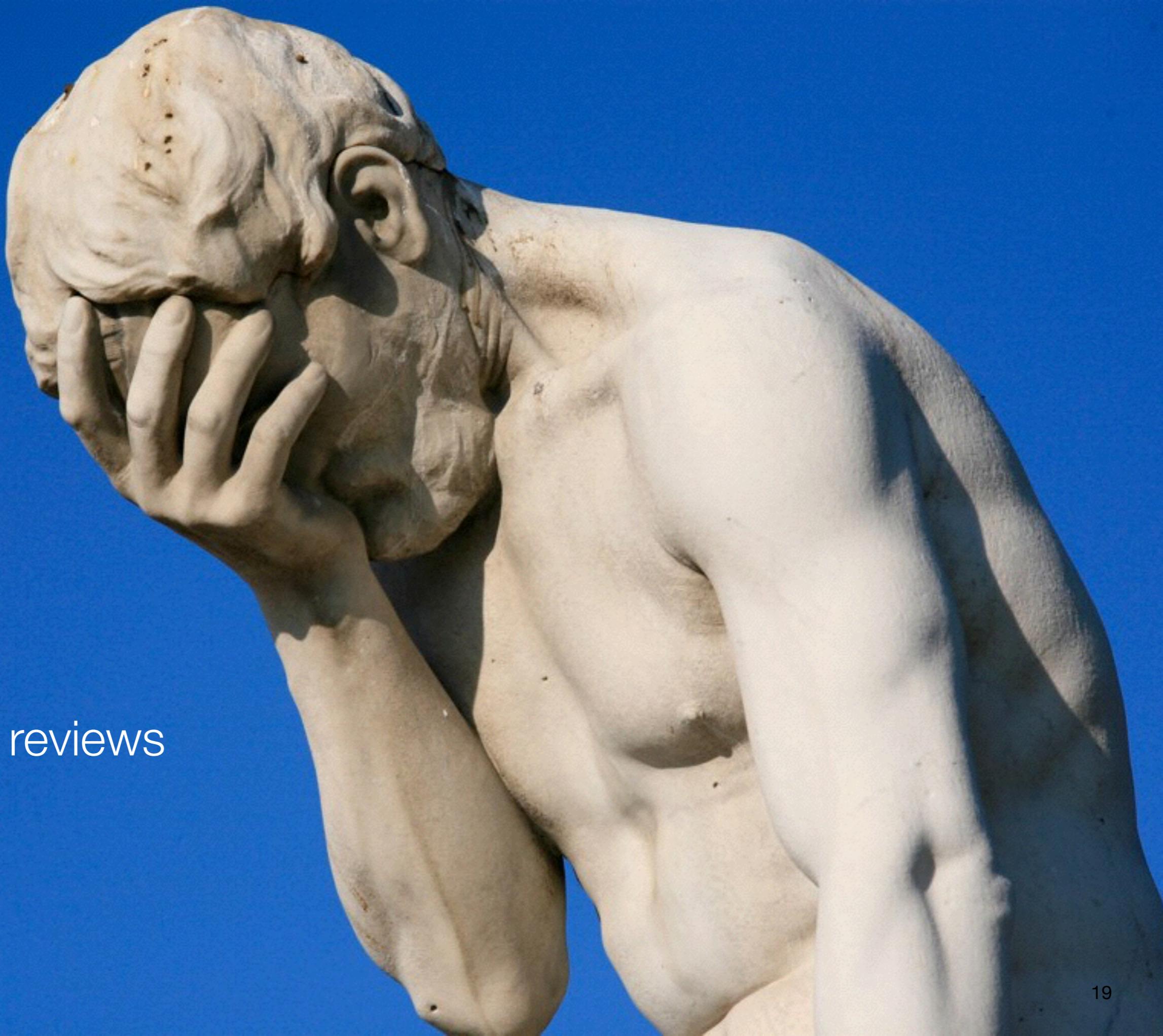
Other devices



Profile, hints, optimizations



Crowdsourced Data Analytics



NSF reviews

- “++ This is a very well-written proposal with a **brilliant research direction**”

- “++ This is a very well-written proposal with a **brilliant research direction**”
- “+ The pervasiveness of mobile computing provides a **great opportunity for impact by this work.**”

- “++ This is a very well-written proposal with a **brilliant research direction**”
- “+ The pervasiveness of mobile computing provides a **great opportunity for impact by this work.**”
- “This is **one of the best written proposal** with substantial amount of substantive novel ideas built on impressive work and infrastructure.”

- “++ This is a very well-written proposal with a **brilliant research direction**”
- “+ The pervasiveness of mobile computing provides a **great opportunity for impact by this work.**”
- “This is **one of the best written proposal** with substantial amount of substantive novel ideas built on impressive work and infrastructure.”
- “It has potential to make broad impact to **advance state of art in mobile computing research and make impact to industry.**”

- “++ This is a very well-written proposal with a **brilliant research direction**”
- “+ The pervasiveness of mobile computing provides a **great opportunity for impact by this work.**”
- “This is **one of the best written proposal** with substantial amount of substantive novel ideas built on impressive work and infrastructure.”
- “It has potential to make broad impact to **advance state of art in mobile computing research and make impact to industry.**”
- “+**Hands-on learning at K-12 level** by conducting IoT workshops has a mass-appeal to this project. Industry support is another positive aspect of the project.”

“While improving the energy-efficiency and response time of mobile devices is an important issue, **industry is taking care of this and I do not see a need for an NSF Career proposal on this.**”

Unaware of the Problem

“I think the problem tackled (speed of web browsing) is **mainly related to networking and not to the processing speed of the client processor.**”

Living in the Past

[ISCA'14, IEEE Micro'15]

“- The proposed techniques depend on many existing technologies such as **HTML, CSS, etc., which if they change significantly could delay results or wipe out existing efforts.** Industry is still defining itself in the mobile web and things can change drastically.”

Ignorance of Web Technologies

“... would work proposed in this effort be invalid if the **user instead stops browsing the mobile web for high powered sites, but instead starts using the apps** which are very well optimized for mobile browsing?”

Problem with “Shallow Research” or Blackbox Testing

“ - The **major source of power consumption in mobile devices (e.g. smartphones, tablets) is the display and not the computing engine.** There is no mention of this at all throughout the proposal.”

[HPCA'16]

“- The proposal is **very ambitious in its scope** and unfocussed in its approach, and as such, **its impact is very questionable.**”

X

“+ The pervasiveness of mobile computing provides a **great opportunity for impact by this work.**”

Let's Agree to Disagree

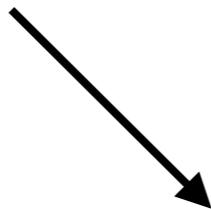
“There is a **noticeable pattern with your proposal** though, across divisions: **Your work was valued higher by the industry reviewers each time.** I went back and studied the reviews and summaries of everyone’s prior submissions trying to understand better what’s going on. The pattern with your CAREER is very evident and worth more conversation and thought on our side and on yours. Are you making the case better for industry or does industry see the problem space as more important? Those are just 2 of a number of questions around this observation.”

— NSF Program Director

So what do I do now...



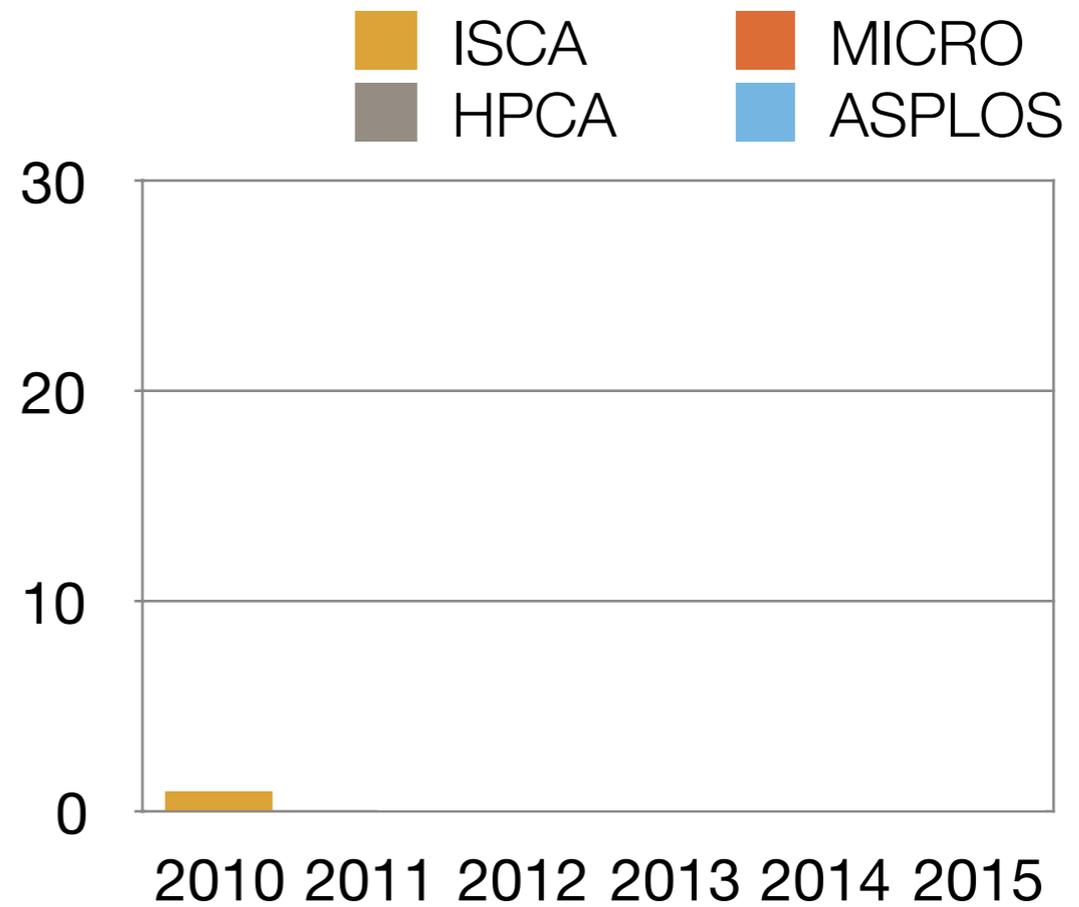




Total Number of Accepted Papers*

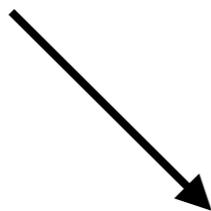


Total Number of Accepted Papers*

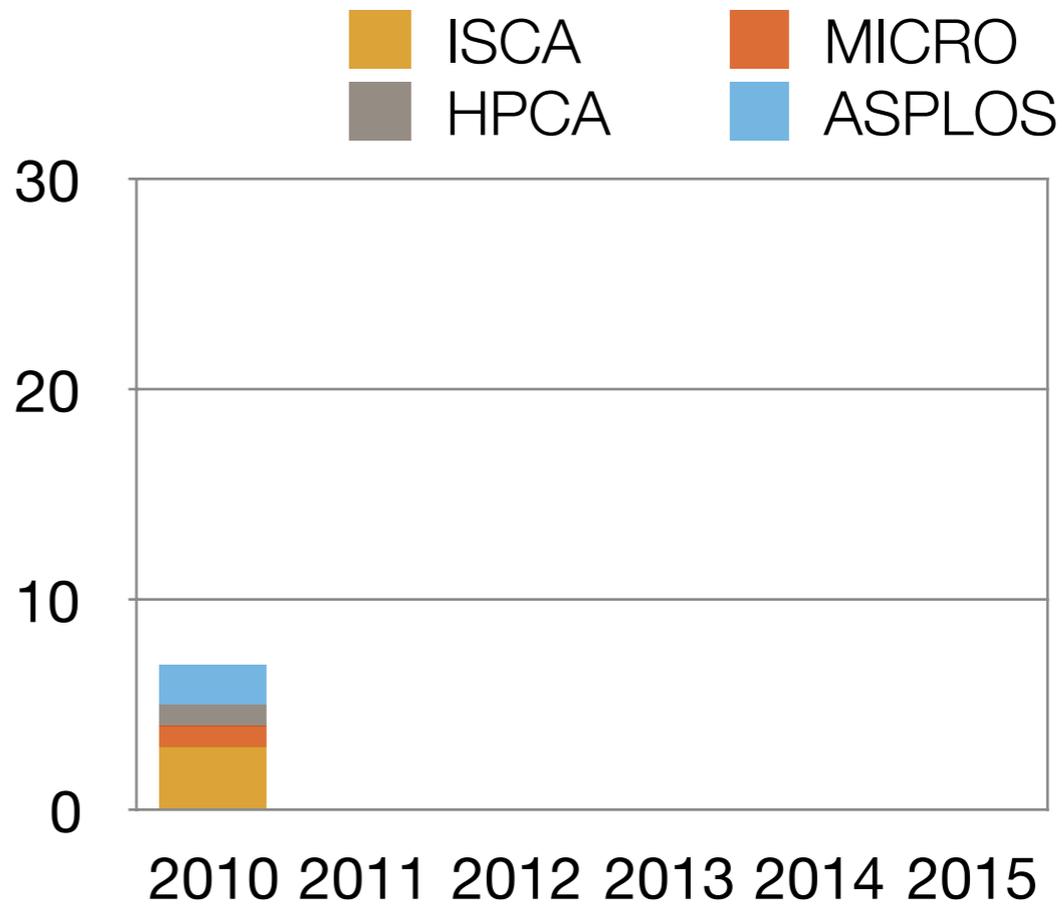


Datacenters

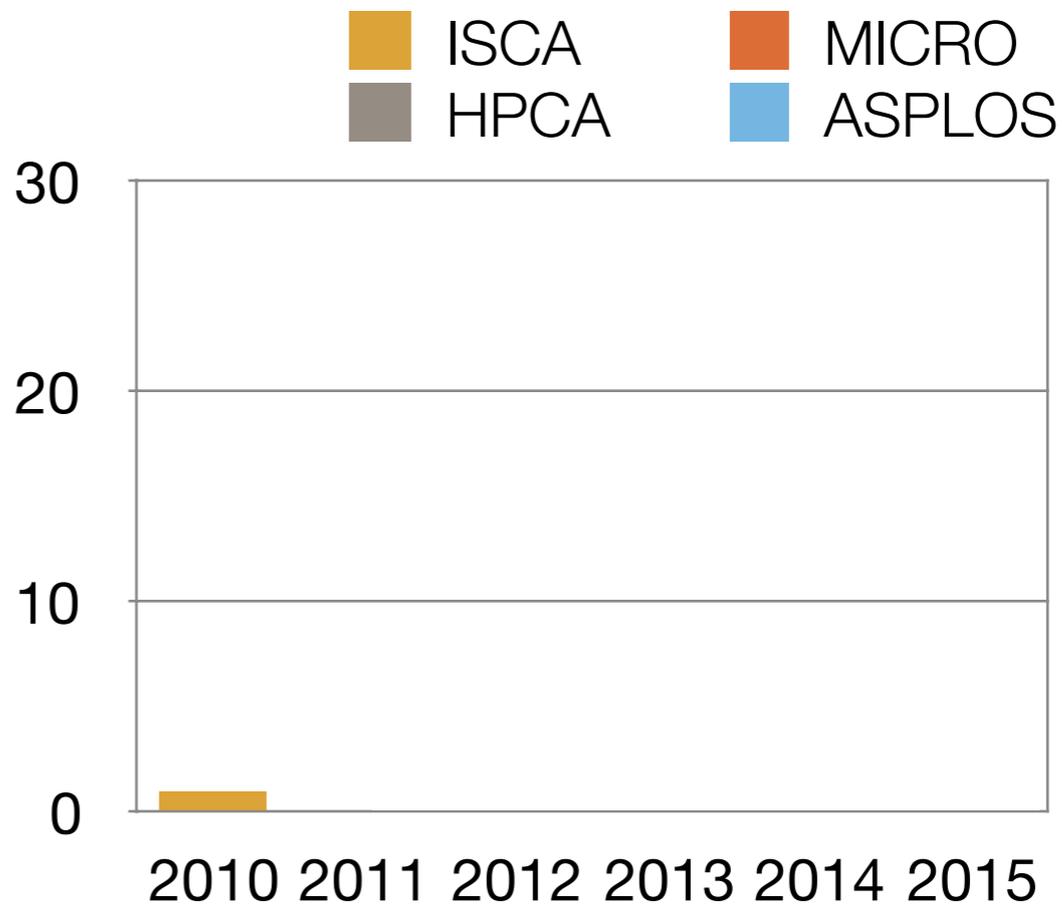
*Papers from ISCA, MICRO, HPCA, ASPLOS based on titles and session names. Does not consider papers that are generic (micro)architectural techniques that could be put to use in mobile application processors.



Total Number of Accepted Papers*

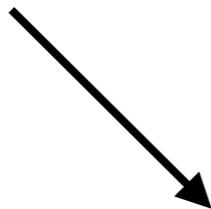


Total Number of Accepted Papers*

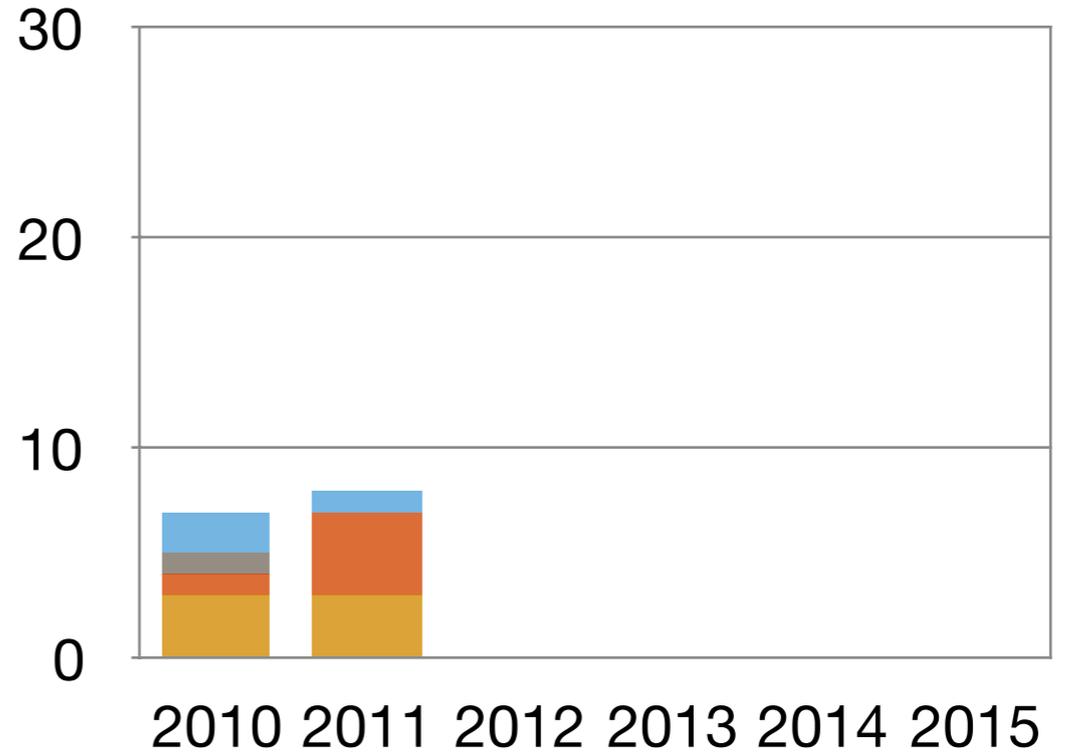


Datacenters

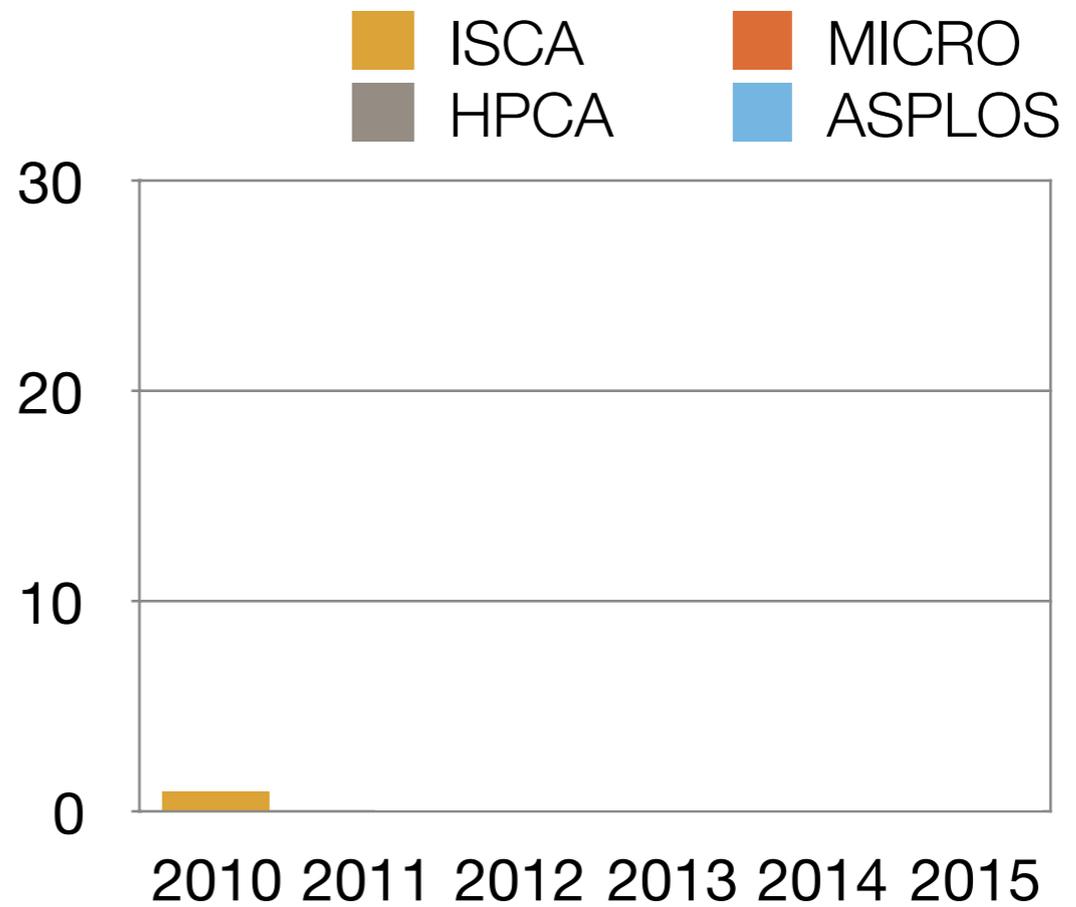
*Papers from ISCA, MICRO, HPCA, ASPLOS based on titles and session names. Does not consider papers that are generic (micro)architectural techniques that could be put to use in mobile application processors.



Total Number of Accepted Papers*

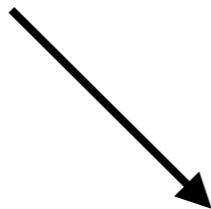


Total Number of Accepted Papers*

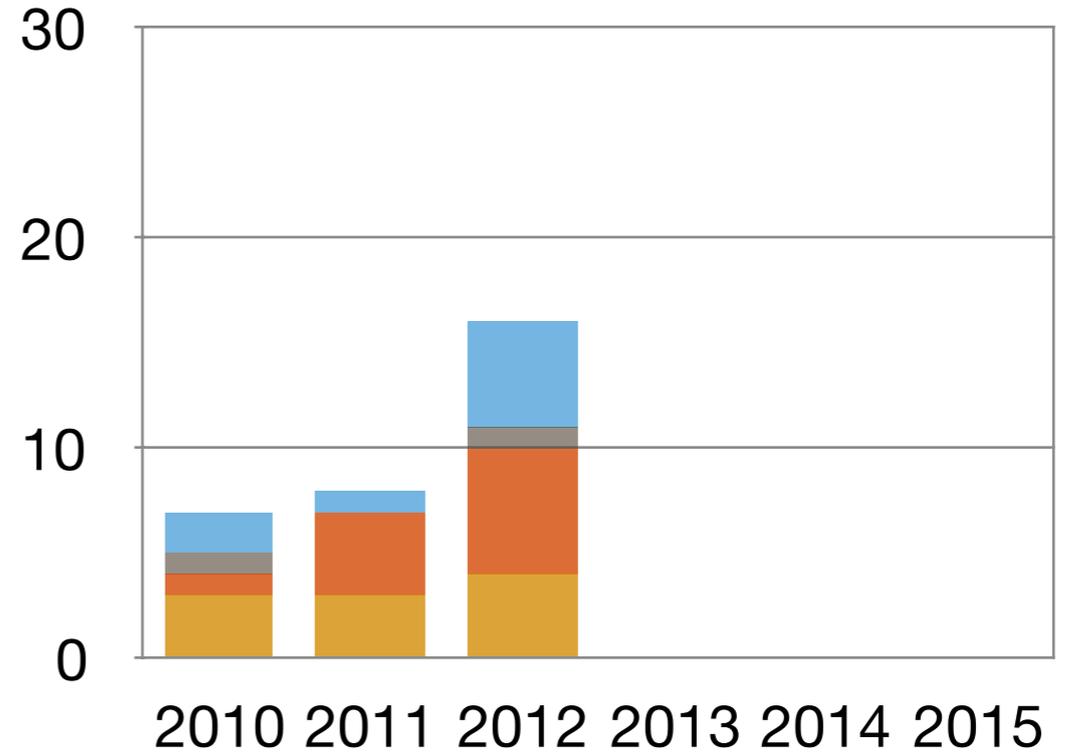


Datacenters

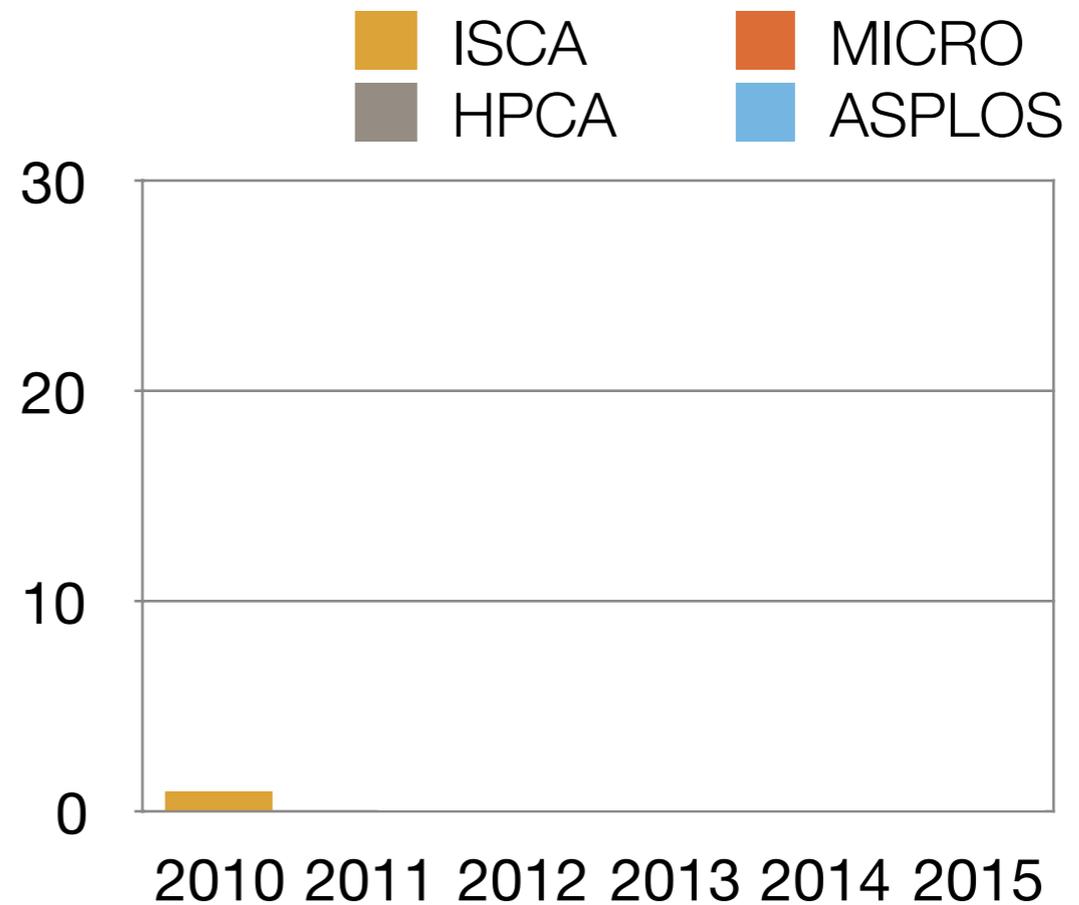
*Papers from ISCA, MICRO, HPCA, ASPLOS based on titles and session names. Does not consider papers that are generic (micro)architectural techniques that could be put to use in mobile application processors.



Total Number of Accepted Papers*

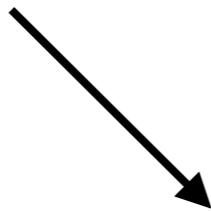


Total Number of Accepted Papers*

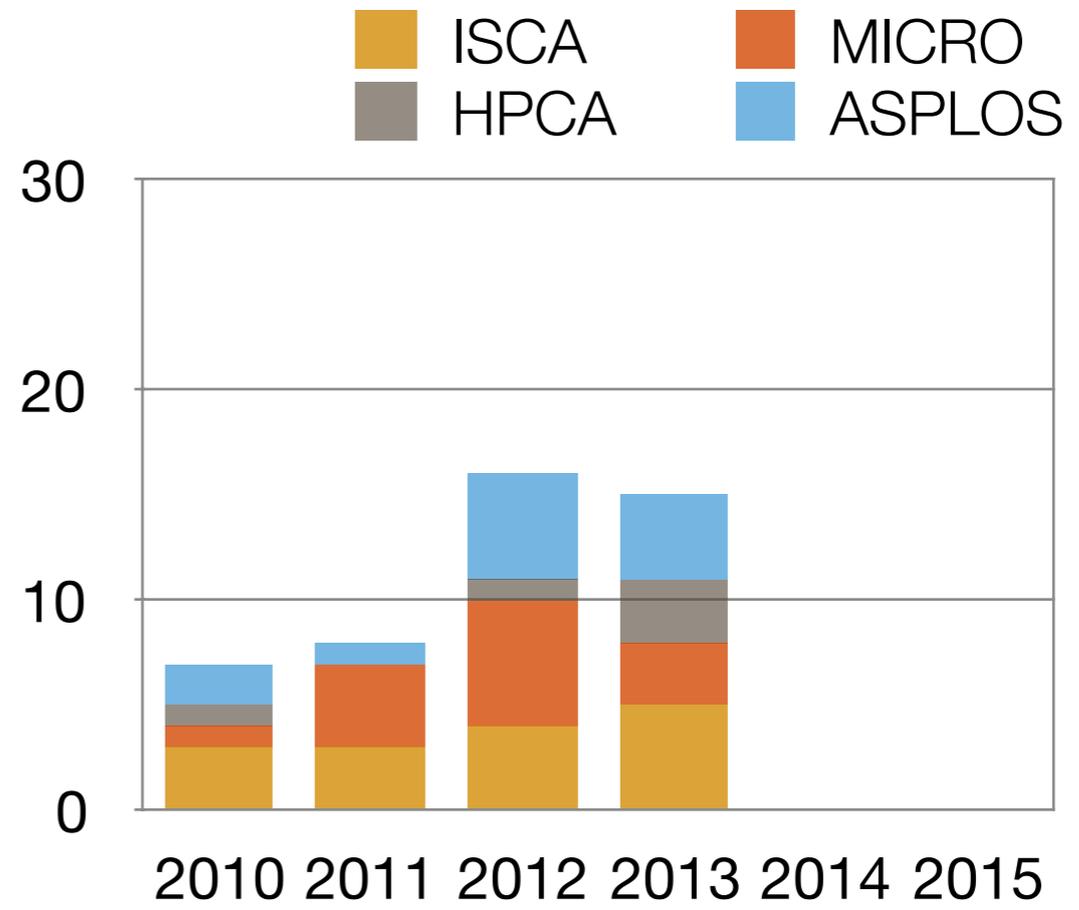


Datacenters

*Papers from ISCA, MICRO, HPCA, ASPLOS based on titles and session names. Does not consider papers that are generic (micro)architectural techniques that could be put to use in mobile application processors.

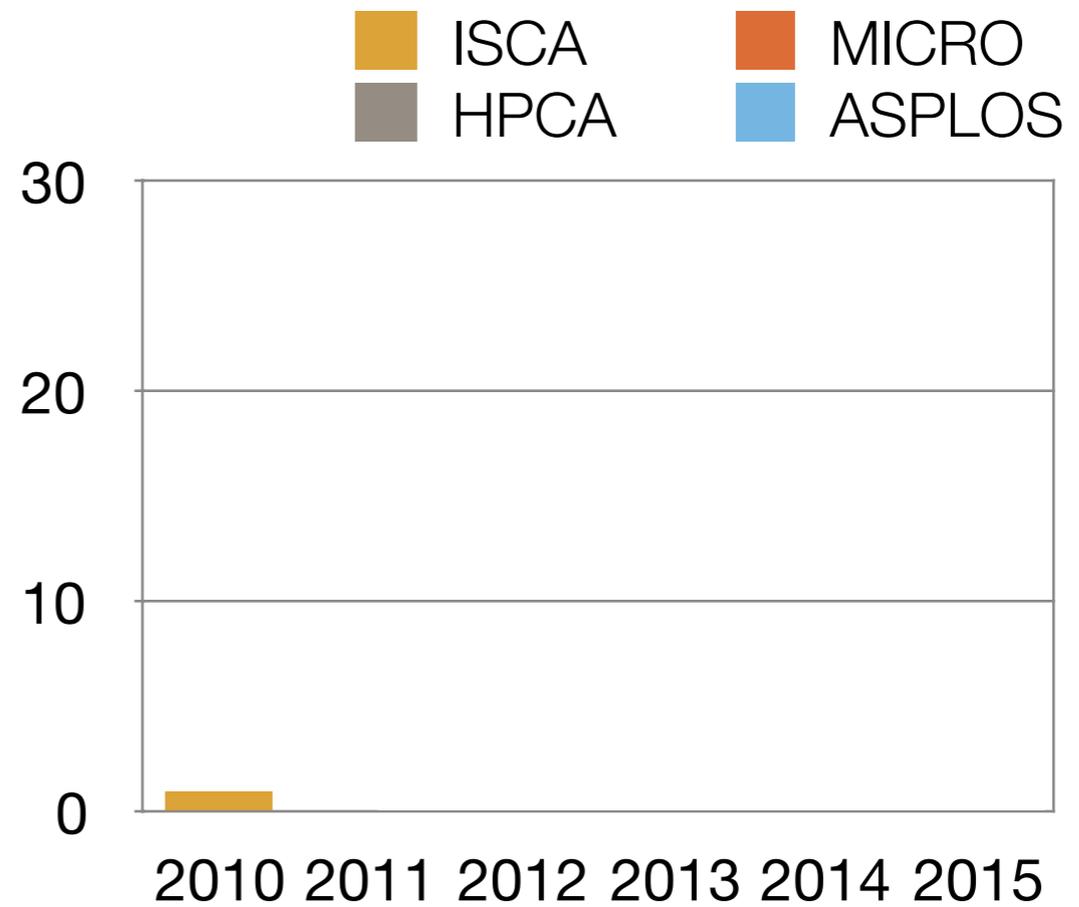


Total Number of Accepted Papers*

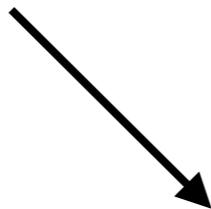


Datacenters

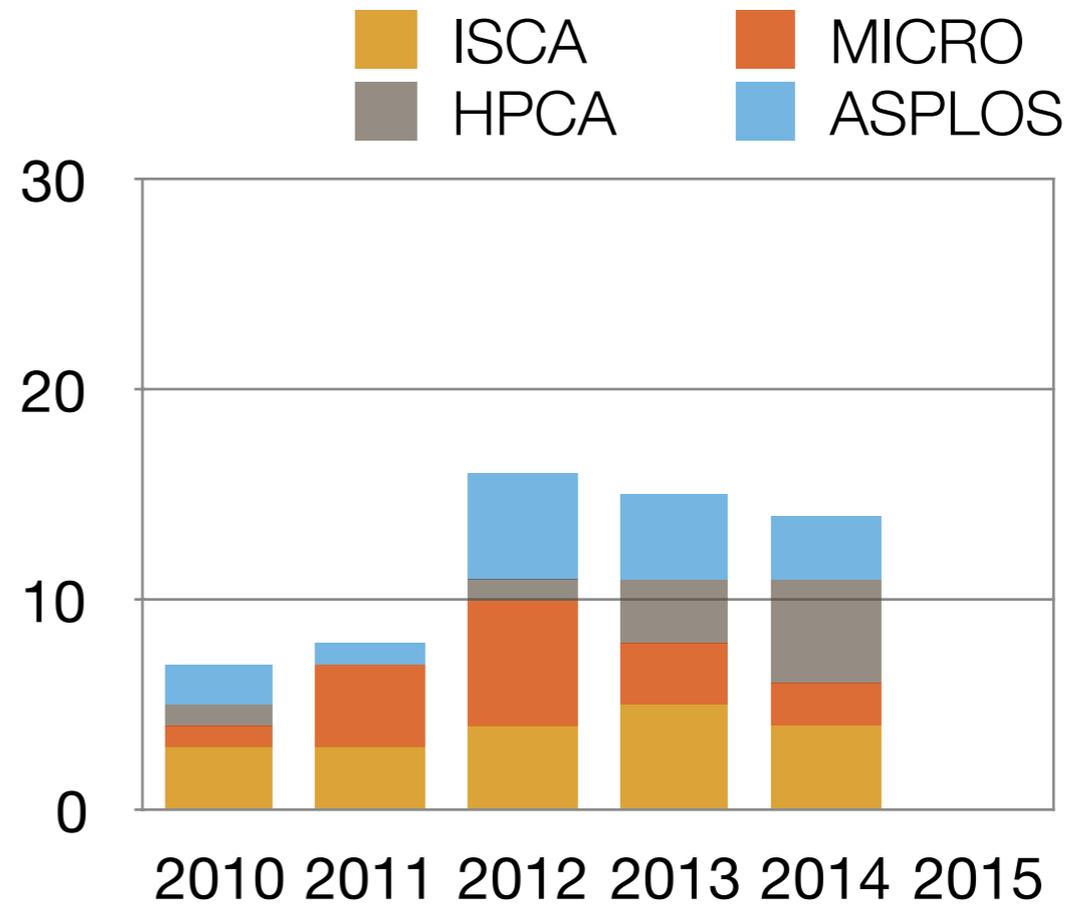
Total Number of Accepted Papers*



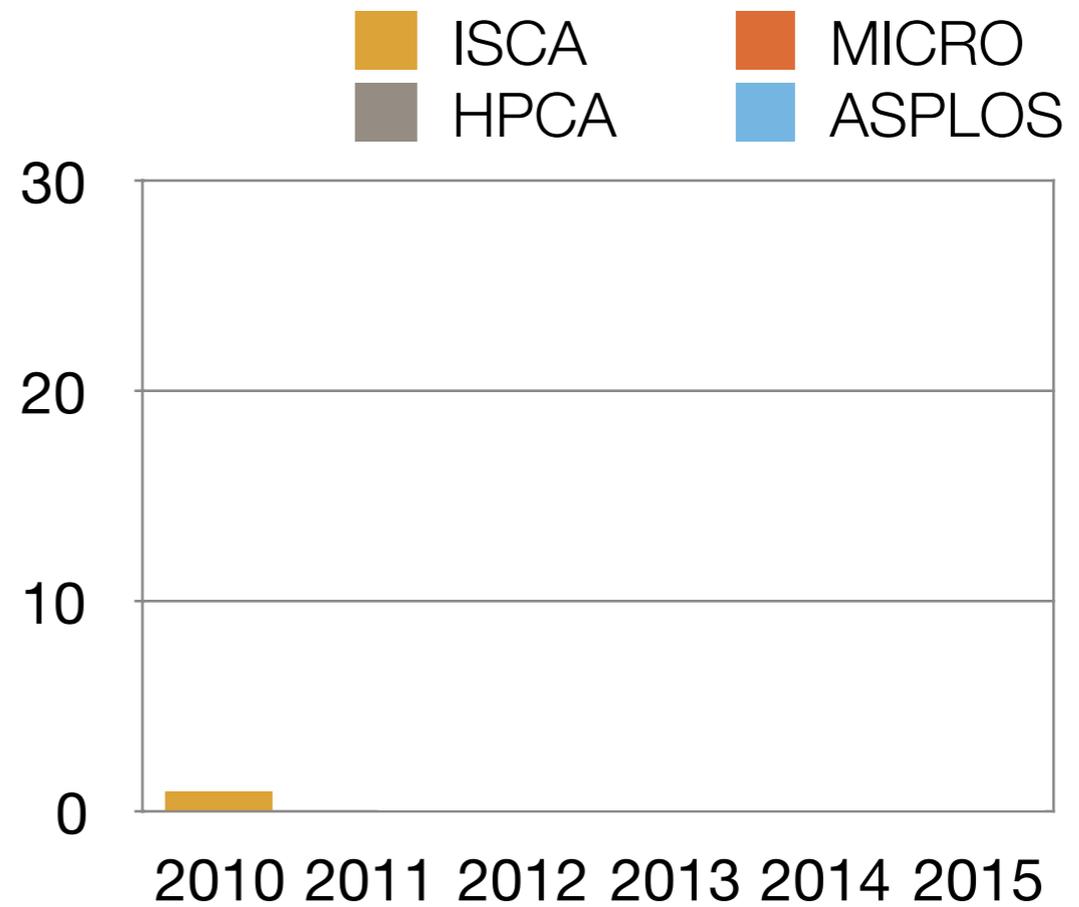
*Papers from ISCA, MICRO, HPCA, ASPLOS based on titles and session names. Does not consider papers that are generic (micro)architectural techniques that could be put to use in mobile application processors.



Total Number of Accepted Papers*

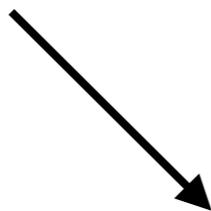


Total Number of Accepted Papers*

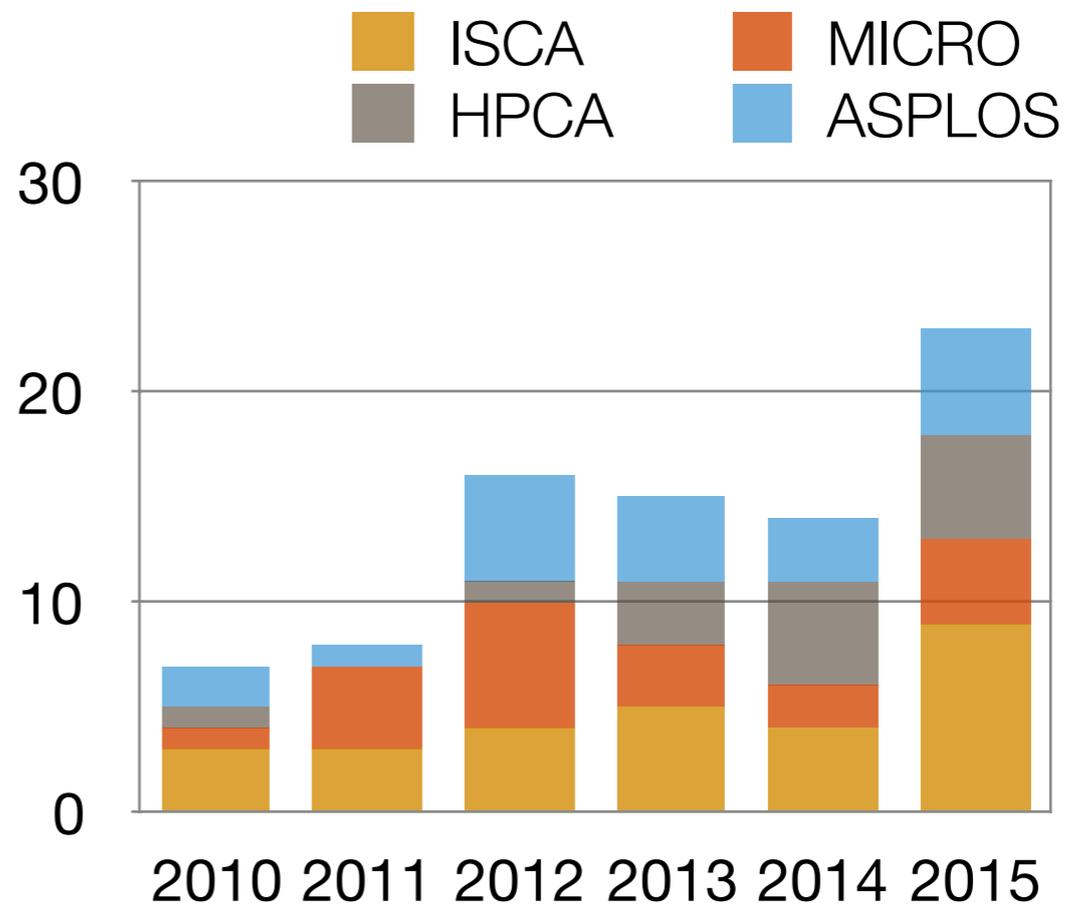


Datacenters

*Papers from ISCA, MICRO, HPCA, ASPLOS based on titles and session names. Does not consider papers that are generic (micro)architectural techniques that could be put to use in mobile application processors.

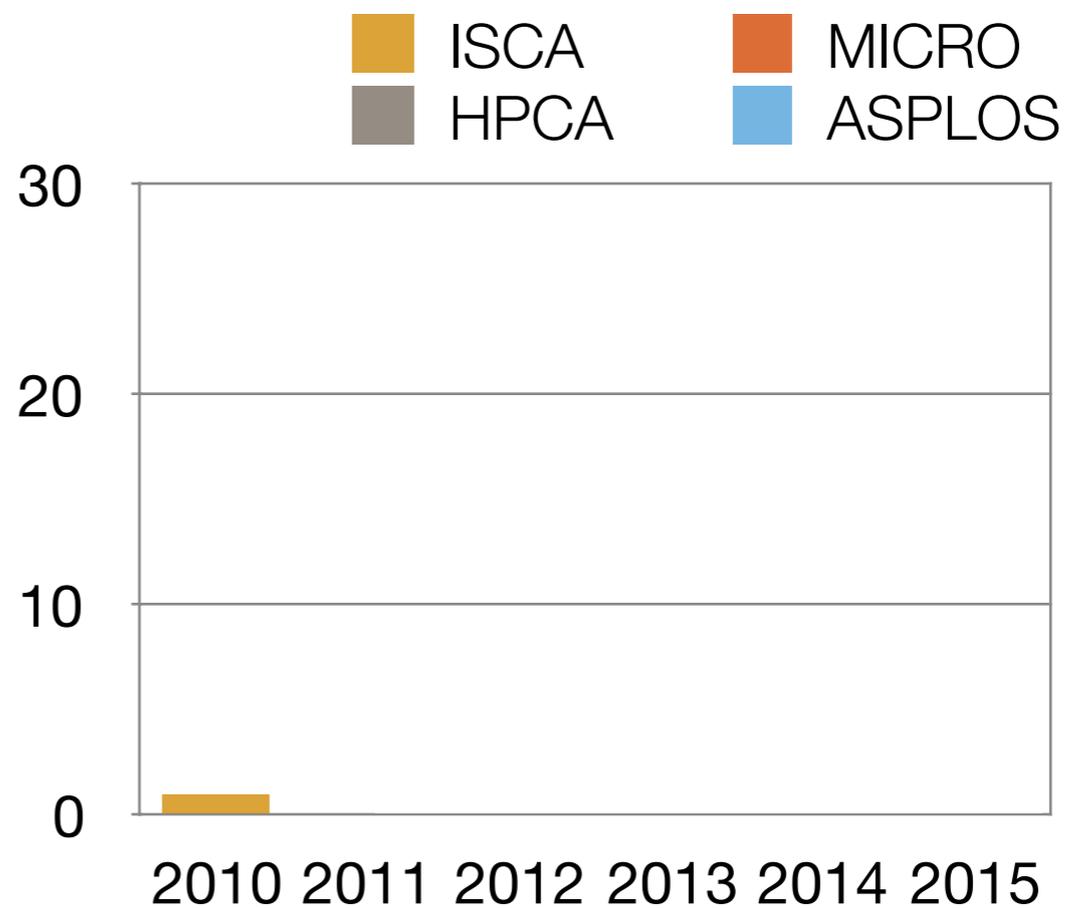


Total Number of Accepted Papers*

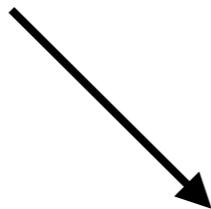


Datacenters

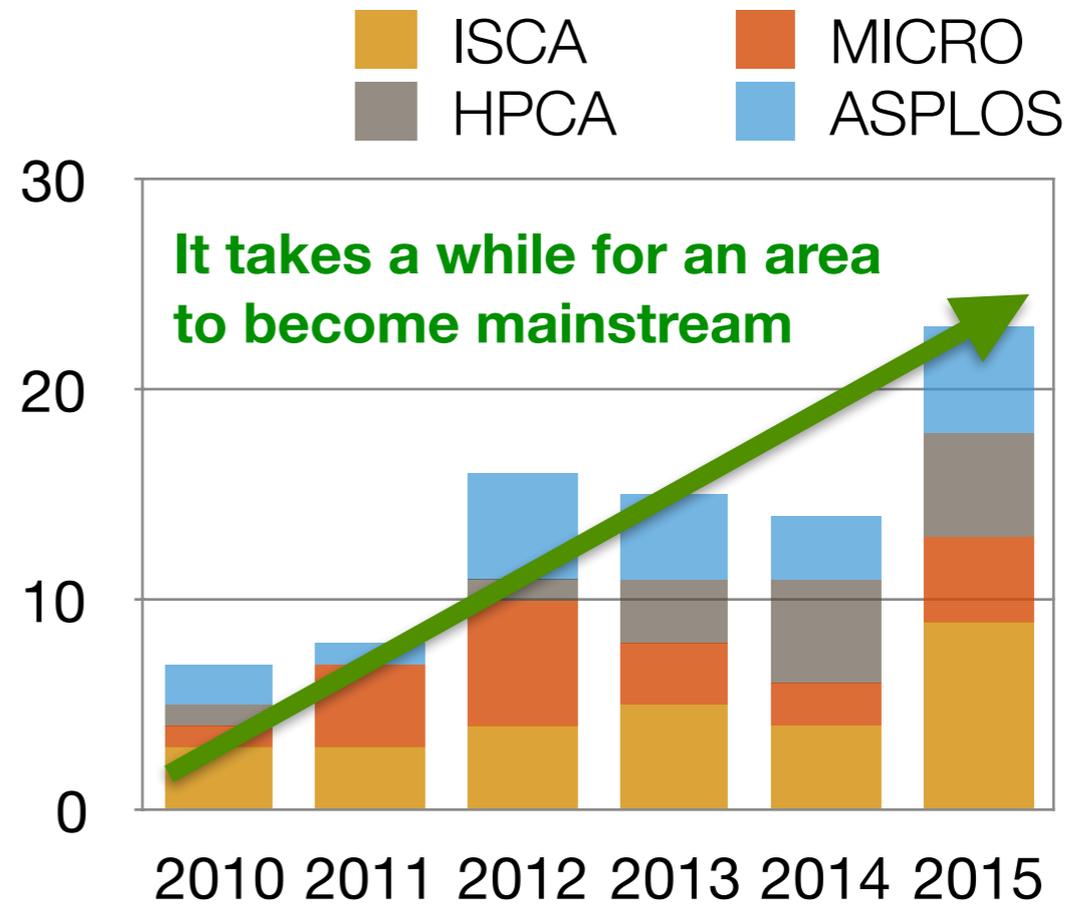
Total Number of Accepted Papers*



*Papers from ISCA, MICRO, HPCA, ASPLOS based on titles and session names. Does not consider papers that are generic (micro)architectural techniques that could be put to use in mobile application processors.

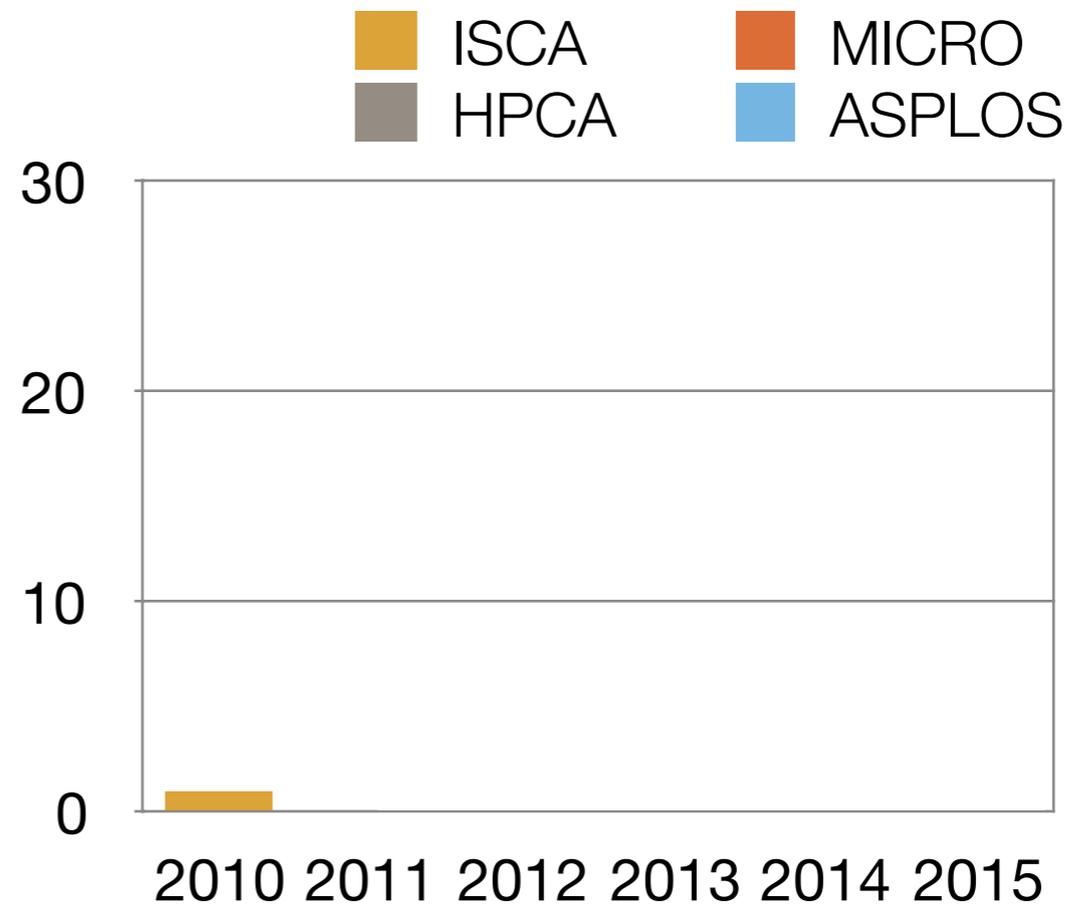


Total Number of Accepted Papers*

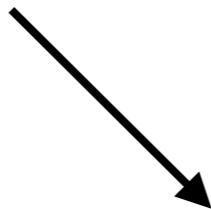


Datacenters

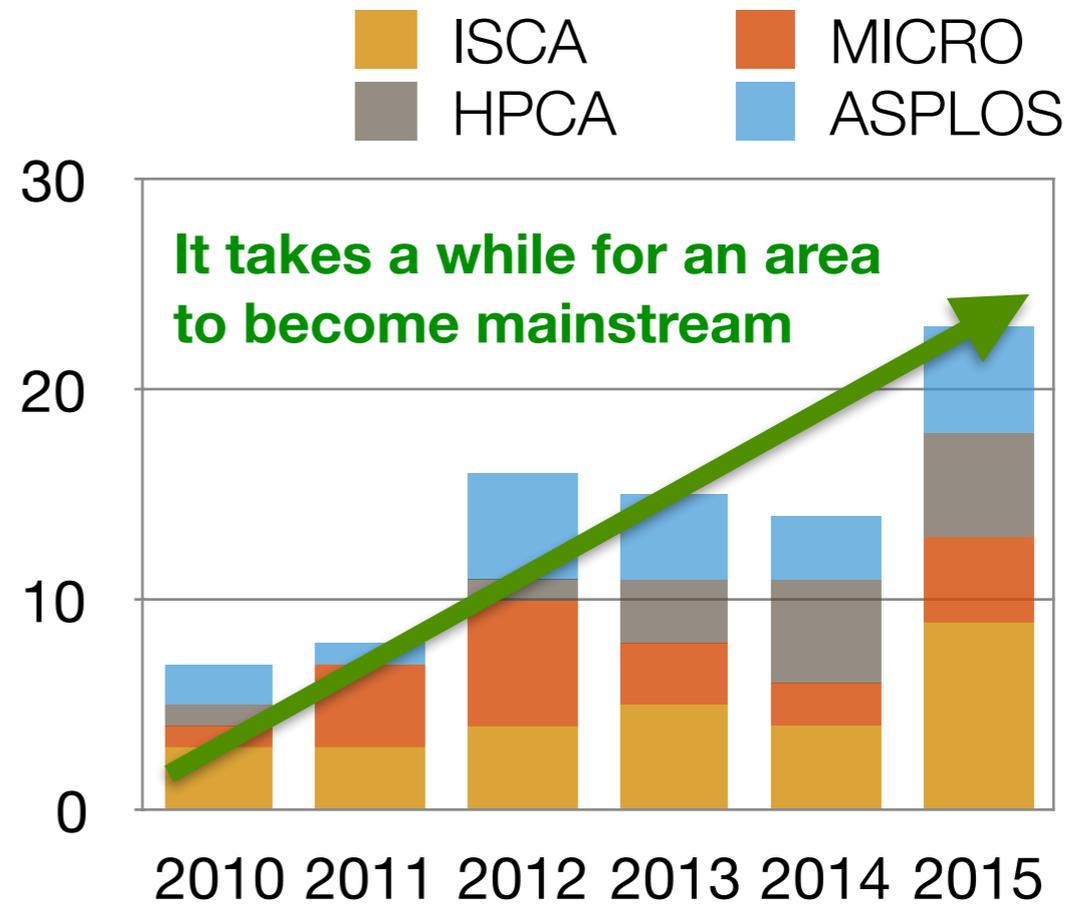
Total Number of Accepted Papers*



*Papers from ISCA, MICRO, HPCA, ASPLOS based on titles and session names. Does not consider papers that are generic (micro)architectural techniques that could be put to use in mobile application processors.

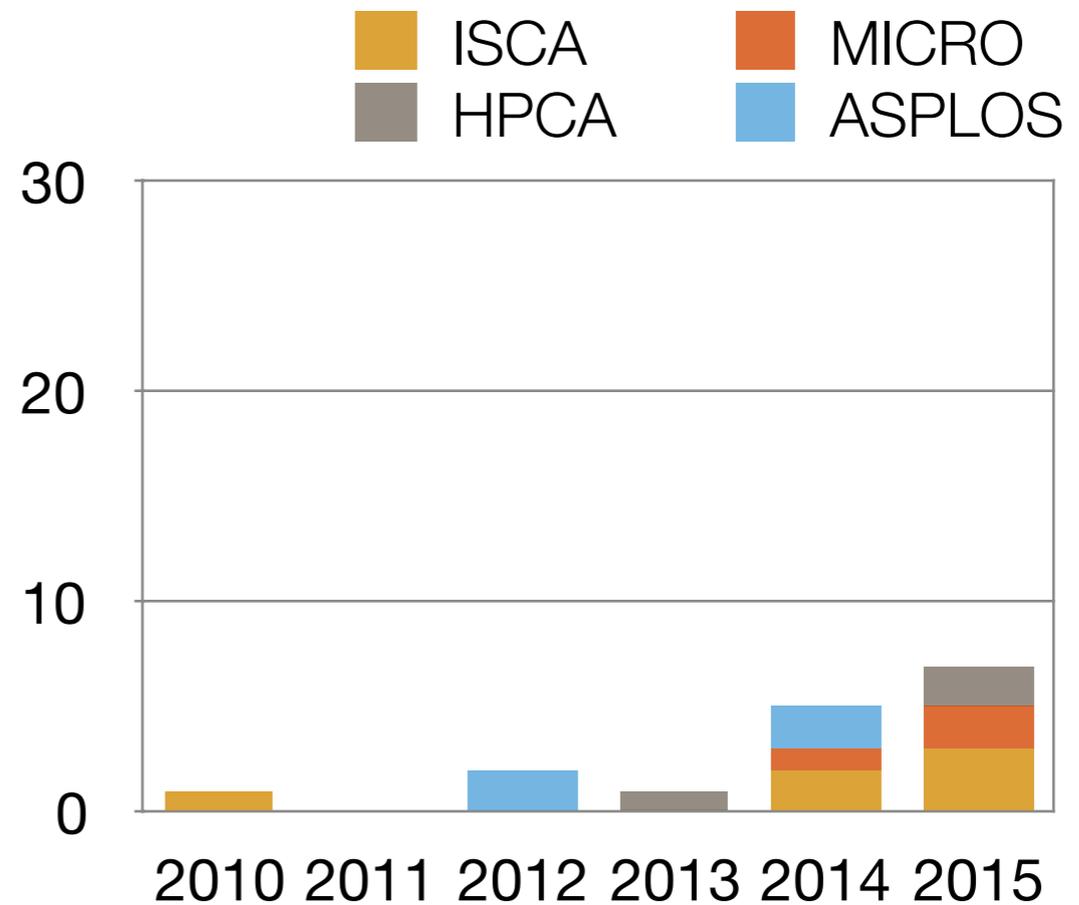


Total Number of Accepted Papers*

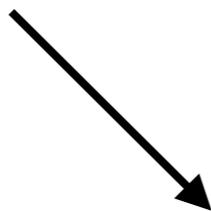


Datacenters

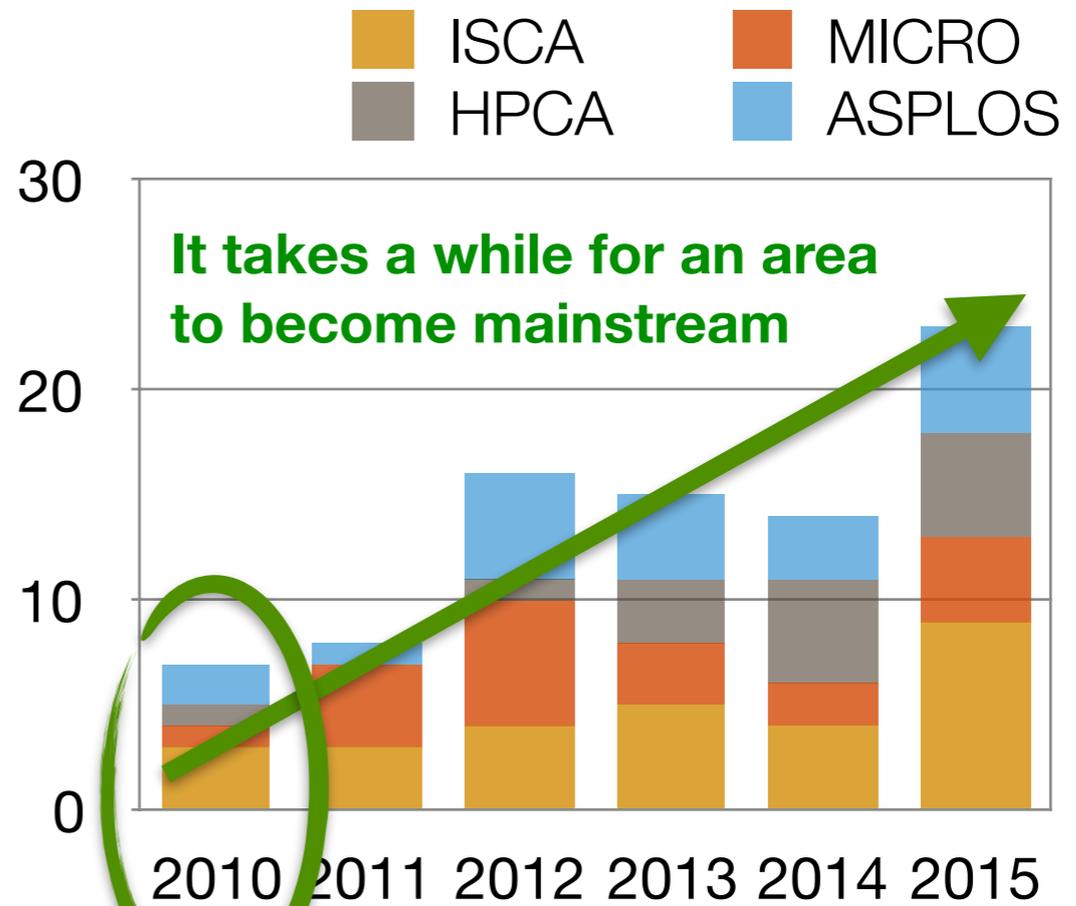
Total Number of Accepted Papers*



*Papers from ISCA, MICRO, HPCA, ASPLOS based on titles and session names. Does not consider papers that are generic (micro)architectural techniques that could be put to use in mobile application processors.

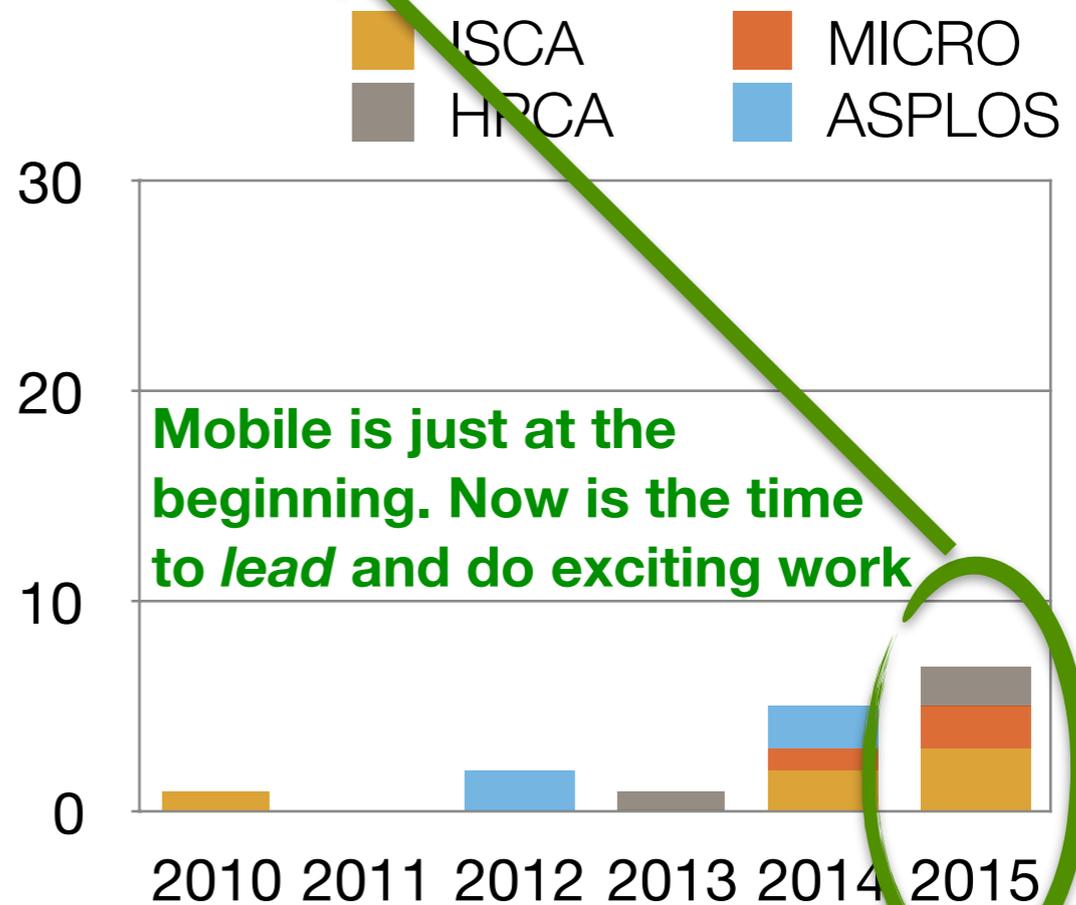


Total Number of Accepted Papers*



Datacenters

Total Number of Accepted Papers*



*Papers from ISCA, MICRO, HPCA, ASPLOS based on titles and session names. Does not consider papers that are generic (micro)architectural techniques that could be put to use in mobile application processors.

“Science advances one funeral at a time.”

– Max Planck, a founder of
quantum theory

“Science advances one funeral at a time.”

– **Max Planck, a founder of
quantum theory**

“A new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die, and a new generation grows up that is familiar with it.”



National Science Foundation
WHERE DISCOVERIES BEGIN

Thank You.